FENOC™
FirstEnergy Nuclear Operating Company

Beaver Valley Power Station
P.O. Box 4
Shippingport, PA 15077

Richard D. Bologna
Site Vice President

724-682-5234
Fax: 724-643-8069

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L-17-298

10 CFR 50.55a

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT:
Beaver Valley Power Station, Unit Nos. 1 and 2
Docket No. 50-334, License No. DPR-66
Docket No. 50-412, License No. NPF-73
Submittal of the 10-Year Interval Inservice Testing Programs for Beaver Valley Power Station, Units Nos. 1 and 2

In accordance with 10 CFR 50.55a(f)(5)(i), FirstEnergy Nuclear Operating Company (FENOC) has revised the Beaver Valley Power Station (BVPS) Inservice Testing (IST) Programs for BVPS, Units Nos. 1 and 2. The fifth ten-year interval IST Program at BVPS Unit No. 1 and the fourth ten-year interval IST Program at BVPS Unit No. 2 both began on September 20, 2017.

The American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants, Subsection ISTA, Paragraph ISTA-3200(a) (2004 Edition through the 2006 Addenda) requires the IST Plans to be filed with the regulatory authorities having jurisdiction at the plant site. FENOC hereby submits a copy of the IST Programs for BVPS, Units Nos. 1 and 2, which are provided in Enclosures A and B, respectively.

There are no regulatory commitments contained in this submittal. If there are any questions or if additional information is required, please contact Mr. Thomas A. Lentz, Manager - Fleet Licensing, at 330-315-6810.

Sincerely,

Richard D. Bologna

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NRR

Enclosures:

A Fifth Ten-Year Interval Inservice Testing Program for BVPS Unit No. 1

B Fourth Ten-Year Interval Inservice Testing Program for BVPS Unit No. 2

cc: Nuclear Regulatory Commission (NRC) Region I Administrator
NRC Resident Inspector
NRC Project Manager
Director BRP/DEP
Site BRP/DEP Representative

Enclosure A
L-17-298

Fifth Ten-Year Interval Inservice Testing Program for BVPS Unit No. 1
(336 pages follow)

FirstEnergy Nuclear Operating Company (FENOC)

Beaver Valley Power Station

Unit 1

Inservice Testing (IST) Program For Pumps And Valves

5th Ten-Year Inservice Test Interval

September 20, 2017 – September 19, 2027

Commercial Operation: October 1, 1976

Issue 5, Revision 0

Effective Date of Procedure: 09/20/17

Addresses: FirstEnergy Nuclear Operating Company (FENOC)
76 South Main Street
Akron, OH 44308

Beaver Valley Power Station
P. O. Box 4, Route 168
Shippingport, PA 15077

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SECTION I: PUMP TESTING REQUIREMENTS

Title 10, Part 50.55a of the Code of Federal Regulations, Paragraph (f)(4)(ii) requires that 10-year IST Programs comply with the latest NRC approved edition and addenda of the Code incorporated by reference in Paragraph (a)(1)(iv), 12 months prior to the start of the 120-month inspection interval. The fifth 10-year inservice testing interval for Beaver Valley Power Station (BVPS) Unit 1 commences on September 20, 2017. The Inservice Testing (IST) Program for pumps at BVPS, Unit 1, is based on the following:

- American Society of Mechanical Engineers (ASME) OM Code-2004 Edition, Code for Operation and Maintenance of Nuclear Plants, with Addenda through OMb-2006.
- Generic Letter No. 89-04, "Guidance on Developing Acceptable Inservice Testing Programs"
- NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants"
- US NRC Regulatory Guide 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code"

The pumps included in this program are all centrifugal and positive displacement pumps that are provided with an emergency power source, which are required in shutting down a reactor to the safe shutdown condition, maintaining the safe shutdown condition, or mitigating the consequences of an accident, at BVPS, Unit 1. Unit 1 was designed with Hot Shutdown as its Safe Shutdown condition (Per NUREG-1482, Section 2.2, "If the plant was licensed for a safe shutdown condition of hot standby or hot shutdown rather than cold shutdown, the IST Program document will stipulate that the plant was not designed and licensed for a safe shutdown of cold shutdown"). Although Unit 1 was not designed and licensed for a safe shutdown of cold shutdown, it will generally be treated as such for consistency with BVPS-2.

Exclusions

The following pumps are excluded from the requirements of Subsection ISTB:

- Drivers, except where the pump and driver form an integral unit and the pump bearings are in the driver.
- Pumps that are supplied with emergency power solely for operating convenience.
- Skid-mounted pumps that are tested as part of the major component and are justified by BVPS-1 to be adequately tested. Skid-Mounted Pumps are pumps which are integral to or support operation of a parent pump or major component. NUREG-1482, Section 3.4, "Skid-mounted Components and Component Subassemblies" provides further discussion pertaining to skid-mounted components.

NOTE:	Transitioning to the applicable edition of the ASME OM Code for the IST Fifth 10-Year Interval requires the Grouping of pumps according to function including Comprehensive Pump Testing. The pump Groupings, instrument accuracy requirements, test parameters and acceptance criteria for tests parameters are detailed in the following.

When a Group A test is required a Comprehensive test may be substituted. When a Group B test is required a Group A test or Comprehensive test may be substituted. A preservice test may be substituted for any inservice test.

Group A Pumps

The ASME OM Code defines Group A pumps as those pumps that are operated continuously or routinely during normal operation, cold shutdown, or refueling operations. BVPS considers the following Unit 1 pumps as being categorized as Group A as well as justification for grouping. Justification does not necessarily consider all safety related functions.

- **Charging / High Head Safety Injection Pumps, [1CH-P-1A, 1B, 1C]** – The Charging Pumps support the Reactor Coolant System (RCS) during all normal modes of plant operation. The functions performed include, but are not limited to, the following; maintenance of seal water injection flow to the Reactor Coolant Pumps (RCPs); control of RCS inventory; supplying pressurizer auxiliary spray and reducing the radioactivity level in the reactor coolant. The pumps also serve as the High Head Safety Injection (HHSI) Pumps for emergency cool cooling during post accident conditions.

- **Boric Acid Transfer Pumps, [1CH-P-2A, 2B]** – The Boric Acid Transfer Pumps provide a solution of soluble boric acid for reactor coolant makeup. These pumps also provide boric acid for emergency boration.

- **Residual Heat Removal Pumps, [1RH-P-1A, 1B]** - The Residual Heat Removal Pumps are required to operate when maintaining the plant in a cold shutdown condition. Although not needed for safe shutdown of Unit 1, the removal of decay and sensible heat by the Residual Heat Removal System is considered a safety related function.

- **Component Cooling Water Pumps, [1CC-P-1A, 1B, 1C]** - The Component Cooling Water Pumps operate continuously during normal plant operation to supply cooling water to non-essential heat loads as well as cooling water to the RCP motor bearings and thermal barrier. Their safety related function is to provide cooling water for Residual Heat Removal System support.

- **River Water Pumps [1WR-P-1A, 1B, 1C]** - The River Water Pumps operate continuously during normal plant operation to supply cooling water to non-essential heat loads. During post accident conditions they provide the heat sink to the following components: recirculation spray heat exchangers, charging pump lube oil coolers, control room river water cooling coil and Emergency Diesel Generator cooling system heat exchanger.

Group B Pumps

The ASME OM Code defines Group B pumps as those pumps in standby systems that are not operated routinely except for testing. BVPS-1 considers the following pumps as being categorized as Group B as well as justification for grouping.

- **Low Head Safety Injection Pumps, [1SI-P-1A, 1B]** - The Low Head Safety Injection Pumps are not utilized during any plant operating evolution. The pumps remain in standby during all operating Modes. The pumps are required to operate primarily during a large break loss-of-coolant accident (LOCA), in addition to other design basis accidents (DBA), in order to provide low head safety injection and recirculation flow to the RCS, and for long term shutdown cooling during post-LOCA conditions.

- **Quench Spray Pumps, [1QS-P-1A, 1B]** - The Quench Spray Pumps are not utilized during any plant operating evolution. The pumps remain in standby during all operating modes. The pumps are required to operate only during a loss-of-coolant accident (LOCA) for containment heat removal and pressure suppression. The Quench Spray System also serves in removing fission products released into the containment atmosphere during a LOCA by the admission of sodium hydroxide to the spray stream.

- **Inside Recirculation Spray Pumps, [1RS-P-1A, 1B] -** The Inside Recirculation Spray Pumps are not utilized during any plant operating evolution. The pumps remain in standby during all operating modes. The pumps are required to operate only during a loss-of-coolant accident (LOCA) for long term containment heat removal and pressure suppression after sufficient inventory has collected in the containment sump to support pump operation. Group B pumps lacking the required fluid inventory (e.g., pump in dry sumps) shall only require a comprehensive pump test once every 2 years with the required fluid inventory provided during this test. A Group B test is not required.

- **Outside Recirculation Spray Pumps, [1RS-P-2A, 2B] -** The Outside Recirculation Spray Pumps are not utilized during any plant operating evolution. The pumps remain in standby during all operating modes. The pumps are required to operate only during a loss-of-coolant accident (LOCA) for long term containment heat removal and pressure suppression after sufficient inventory has collected in the containment sump to support pump operation. The pumps also have the capability of providing sump inventory to the suction supply of the High Head Safety Injection Pumps. Group B pumps lacking the required fluid inventory (e.g., pump in dry sumps) shall only require a comprehensive pump test once every 2 years with the required fluid inventory provided during this test. A Group B test is not required.

- **Turbine Driven Auxiliary Feedwater Pump, [1FW-P-2].** - The Turbine Driven Auxiliary Feedwater Pump is not utilized during any plant operating evolution. The pump remains in standby during all operating modes and is required to operate only in the event of a main turbine trip with a total loss of all electrical power (Station Blackout) in order to provide emergency makeup to the Steam Generators during a loss of normal feedwater.

- **Motor Driven Auxiliary Feedwater Pumps, [1FW-P-3A, 3B]** - The Motor Driven Auxiliary Feedwater Pumps may be utilized during startup from refueling outages to fill the steam generators and to maintain steam generator level prior to initiation of normal feedwater. However, restart is not dependent upon operation of the Motor Driven Auxiliary Feedwater Pumps since the Steam Generator startup Feedwater Pump [1FW-P-4] may be used to perform this non-safety related function. With the possible exception of the above, the Motor Driven Auxiliary Feedwater Pumps remain in standby during all operating modes. The pumps also serve as an emergency source of feedwater supply to the steam generators during a loss of normal feedwater, loss of offsite power, secondary side pipe ruptures, or cool down following a steam generator tube rupture.

- **Fuel Oil Transfer Pumps, [1EE-P-1A, 1B, 1C, 1D] -** The Fuel Oil Transfer Pumps are not utilized during any plant operating evolution. The pumps remain in standby during all operating Modes. The pumps are required to operate only during emergency diesel generator operation to replenish day tank inventory.

Instrument Accuracy Requirements

Instrument accuracy shall be within the limits specified in Table ISTB-3510-1, as reflected below. If a parameter is determined by analytical methods instead of measurement, then the determination shall meet the parameter accuracy requirement of Table ISTB-3510-1. For individual analog instruments, the required accuracy is percent of full scale. For digital instruments, the required accuracy is over the calibrated range. For a combination of instruments, the required accuracy is loop accuracy. Table ISTB-3510-1 below reflects the required instrument accuracies for both the Group A test and Group B test as well Comprehensive testing applicable to Group A and Group B pumps and Preservice tests.

Per ISTB-3510(b), The full-scale of each analog instrument shall be not greater than three times the reference value. Digital instruments shall be selected such that the reference value does not exceed 90% of the calibrated range of the instrument.

Table ISTB-3510-1
Required Instrument Accuracy (%)

Quantity	Group A and Group B Tests, %	Comprehensive and Preservice Tests, %
Pressure	± 2	± ½
Flow Rate	± 2	± 2
Speed	± 2	± 2
Vibration	± 5	± 5
Differential Pressure	± 2	± ½

Instrument accuracy is defined as the allowable inaccuracy of an instrument loop based on the square root of the sum of the square of the inaccuracies of each instrument in the loop when considered separately. Alternatively, the allowable inaccuracy of the instrument loop may be based on the output for a known input into the instrument loop.

Instrument loop is defined as two or more instruments working together to provide a single output (e.g., a vibration probe and its associated signal conditioning and readout devices, transmitter and indicator, etc.). Per ASME OM Code Interpretation 04-07, pump suction and discharge pressure instruments are not considered an instrument loop when used in conjunction to determine differential pressure.

Test Parameters

NOTE: In accordance with ASME OM Code Case OM-20 as approved by Pump Relief Request No. 1 (PRR1), all pump test frequencies less than 2 years may be extended by a 25% grace period, if necessary, with up to a 6 month extension for test intervals ≥2 years. A 25% grace period also applies for pumps on double frequency. Test frequencies based on plant conditions (e.g., CSD or R) cannot be extended.

The requirements of the Code and the guidance provided by NUREG-1482, will be followed at all times unless specific relief has been granted by the NRC. A Group A or Group B inservice test, run quarterly, as applicable, and a Comprehensive inservice test, run biennially, to measure or observe the test quantities listed in Table ISTB-3000-1, below, is required for all pumps in the IST Program. In addition, a Periodic Verification Test (PVT), run biennially, may also be required for those pumps listed in Pump Relief Request No. 3 (PRR3).

Pursuant to ISTB-3540, "Vibration", vibration measurements on centrifugal pumps (except vertical line shaft pumps) shall be taken in a plane approximately perpendicular to the rotating shaft in two orthogonal directions on each accessible pump –bearing housing. Measurement shall also be taken in the axial direction on each accessible pump thrust bearing housing. 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. If a portable instrument is used to measure vibrations, the measurement points shall be clearly identified on the pump (or on a figure) to permit subsequent duplication in both location and plane.

Pursuant to ISTB-3550, "Flow Rate"; When measuring flow rate, a rate or quantity meter shall be installed in the pump test circuit. If a meter does not indicate the flow rate directly, the record shall include the method used to reduce the data. Internal recirculated flow is not required to be measured. External recirculated flow is not required to be measured if it is not practical to isolate, has a fixed resistance, and has been evaluated by BVPS-1 to not have a substantial effect on the results of the test.

TABLE ISTB-3000-1

INSERVICE TEST PARAMETERS

Quantity	Preservice Test	Group A Test	Group B Test	Comprehensive Test	Remarks
Speed: N	X	X	X	X (Note 2)	If variable speed ONLY
Differential Pressure: ΔP	X	X	X (Note1)	X (Note 2)	Centrifugal pumps, including vertical line shaft pumps
Discharge Pressure: P	X	X	X	X	Positive displacement pumps
Flow Rate: Q	X	X	X (Note 1)	X (Note 2)	- - - -
Vibration: Velocity, V_v	X	X		X	Peak

NOTE:

(1) For positive displacement pumps, flow rate shall be measured or determined. For all other pumps, differential pressure or flow rate shall be measured or determined.

(2) In addition to a Comprehensive Test, this quantity is also required for those pumps identified in Pump Relief Request No. 3 (PRR3) requiring a Periodic Verification Test.

Test Duration

(a) 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 required quantities shall be made and recorded.

(b) For the Group B test, after pump conditions are stable, at least one measurement or determination of the required quantity shall be made and recorded.

(c) For the Periodic Verification Test (if required by Pump Relief Request No. 3), after pump flow has been increased to its highest design basis accident flow rate, the required differential pressure (and speed if required) is measured and recorded.

Reference Values

(a) Initial reference values shall be determined from the results of testing meeting the requirements of ISTB-3100, Preservice Testing, or from the results of the first inservice test. In a system where resistance can be varied, flow rate and differential pressure shall be measured at a minimum of five (5) points. If practicable, these points shall be from pump minimum flow to at least the comprehensive pump test flow rate (or periodic verification test flow rate if required by Pump Relief Request No. 3). A pump curve shall be established based on the measured points with at least one point designated as the reference point(s). A pump curve is not required in systems where resistance cannot be varied nor for positive displacement pumps.

(b) New or additional reference values shall be established as required by ISTB-3310, ISTB-3320, or ISTB-6200(c).

(c) Reference values shall be established only when the pump is known to be operating acceptably.

(d) Reference values shall be established at a point(s) of operation (reference point) readily duplicated during subsequent tests.

(e) Reference values shall be established in a region(s) of relatively stable pump flow.

  (1) Reference values shall be established within ±20% of pump design flow rate (i.e., the flow rate at the design point or the accident analysis flow, with operation at the best efficiency point (BEP) desired provided all are greater than or equal to the maximum accident analysis flow) for the Comprehensive pump test.

  (2) Reference values shall be established within ±20% of pump design flow for the Group A and Group B tests, if practicable. If not practicable, the reference point flow shall be established at the highest practical flow rate.

(f) All subsequent test results shall be compared to these initial reference values or to new reference values established per ISTB-3310, ISTB-3320, or ISTB-6200(c).

(g) Related conditions that can significantly influence the measurement or determination of the reference value shall be analyzed in accordance with ISTB-6400.

(h) Group A, B and comprehensive pump tests shall be conducted with the pump operating as close as practical to a specified reference point.

  (1) Pump speed for variable speed pumps shall be adjusted to the reference point ±1%.

  (2) The resistance of the system shall be varied until the flow rate is as close as practical to the reference point with differential pressure determined and compared to its reference value. For those pumps listed in Pump Relief Request No. 14 (PRR14), an allowable tolerance of +2/-1 percent of the reference flow rate value (without the need to include instrument uncertainties) is acceptable in accordance with ASME OM Code Case OMN-21. For those pumps NOT included in Pump Relief Request No. 14 (PRR14), and per NUREG-1482, Section 5.3 (Allowable Variance from Reference Points), the NRC staff has determined that, if the design does not allow for establishing and maintaining flow at an exact value, the allowed tolerance for setting the fixed parameter must be established for each case

individually, including the accuracy of the instrument and the precision of its display. A total tolerance of ±2% of the reference flow value (including instrument accuracy) is allowed without prior NRC approval.

(3) Vibrations (velocity) measurements shall be broad band (unfiltered) and at peak while compared to a reference value.

(i) All deviations from reference values shall be compared with the ranges of Tables ISTB-5121-1, 5221-1, 5321-1 and 5321-2 and corrective actions taken as specified in ISTB-6200.

Reference Pump Curves

Utilization of a pump curve in the BVPS-1 IST Program for performing testing and establishing acceptance criteria is considered acceptable since the guidelines provided by NUREG-1482, Section 5.2 relating to the use of a pump curve shall be followed. The licensee will also meet the requirements of ASME OM Code Case OMN-16, "Use of Pump Curve for Testing," in the development and use of pump curves, which is unconditionally approved for use by Regulatory Guide 1.92 (Rev. 1), "Operation and Maintenance Code Case Acceptability, ASME OM Code".

(a) A pump curve shall only be developed, or manufacturer's pump curve validated, when the pump is known to be operating acceptably.

(b) The reference points used to develop or validate a pump curve shall be measured using instruments at least as accurate (accuracy and range) as required by ISTB-3510. The instrument accuracy requirements specified in Table ISTB-3510-1 for Comprehensive and Preservice tests shall apply when developing a pump curve.

(c) A pump curve shall be based on an adequate number of reference points, with a minimum of five (5). If practicable, these points shall be from pump minimum flow to at least the comprehensive pump test flow rate (or periodic verification test flow rate if required by Pump Relief Request No. 3), and shall have at least one data point for each 20% of the maximum pump curve range.

(d) Sufficient reference points shall be beyond the "flat" portion (low flow rates) of the pump curve in a range which includes or is as close as practical to the design basis flow rate.

(e) Acceptance criteria based on a pump curve shall not conflict with technical specifications or UFSAR operability criteria (minimum operating point/curve) for flow rate and differential pressure, for the affected pump.

(f) If vibration levels vary significantly over the range of pump conditions, a method of assigning appropriate vibration acceptance criteria should be developed for different regions of the pump curve. If vibration levels are relatively unaffected by changing differential pressure or flow over the range of the pump curve, then a single set of data may be used for acceptance criteria provided it is the most conservative measured data.

(g) When the reference pump curve may have been affected by repair, replacement, or routine servicing, a new reference pump curve shall be determined or the previous pump curve revalidated by an inservice test.

Centrifugal Pump Test Acceptance Criteria

The allowable ranges for centrifugal pump test parameters are specified in Table ISTB-5121-1 and are reflected below. It should be noted that the hydraulic acceptance criteria defining Acceptable Range and Required Action Range for the quarterly Group A and Group B tests are less stringent than the acceptance range imposed on the hydraulic test parameters associated with the biennial Comprehensive test. In addition, an Alert Range is imposed on the hydraulic parameters for centrifugal pumps during the Comprehensive test.

Table ISTB-5121-1

Centrifugal Pump Test Acceptance Criteria

Test Type	Pump Speed	Test Parameter	Acceptable Range	Alert Range	Required Action Range Low	Required Action Range High
Group A[1,2]	N/A	Q	0.90 to 1.10 Q_r	None	< 0.90 Q_r	> 1.10 Q_r
	N/A	ΔP	0.90 to 1.10 ΔP_r	None	< 0.90 ΔP_r	> 1.10 ΔP_r
	≥600	V_v or V_d	≤ 2.5V_r	> 2.5V_r to 6 V_r or >0.325 to 0.7 in/sec	None	>6V_r or >0.7 in/sec
Group B	N/A	Q	0.90 to 1.10 Q_r	None	< 0.90 Q_r	> 1.10 Q_r
	N/A	ΔP	0.90 to 1.10 ΔP_r	None	< 0.90 ΔP_r	> 1.10 ΔP_r
Comprehensive[1,2,3]	N/A	Q	0.94 to 1.03 Q_r	0.90 to <0.94 Q_r	< 0.90 Q_r	> 1.03 Q_r
	N/A	ΔP	0.93 to 1.03 ΔP_r	0.90 to <0.93 ΔP_r	< 0.90 ΔP_r	> 1.03 ΔP_r
	≥600	V_v or V_d	≤ 2.5V_r	> 2.5V_r to 6 V_r or >0.325 to 0.7 in/sec	None	>6V_r or >0.7 in/sec

NOTES: The subscript r denotes reference value, the subscript v denotes vibration velocity reference value, and the subscript d denotes displacement.

(1) Vibration parameter per Table ISTB-3000-1. V_r is vibration reference value in the selected units.

(2) Refer to Fig. ISTB-5223-1 to establish velocity limits for pumps with speeds <600 rpm.

(3) An upper Acceptable Range limit of 1.06 Q_r and 1.06 ΔP_r instead of 1.03 Q_r and 1.03 ΔP_r may be used for the Comprehensive pump test of those pumps listed in Pump Relief Request No. 3 (PRR3).

All deviations from the reference values shall be compared with the ranges of Table ISTB-5121-1 and corrective action taken as specified in ISTB-6200, as reflected in the Corrective Action section following pump test acceptance criteria. The vibration measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges of Table ISTB-5121-1. For example, if vibration exceeds either 6Vr, or 0.7 in./sec, the pump is in the required action range.

Vertical Line Shaft Centrifugal Pump Test Acceptance Criteria

The allowable ranges for vertical line shaft centrifugal pump test parameters are specified in Table ISTB-5221-1 and are reflected below. It should be noted that the hydraulic acceptance criteria defining Acceptable Range and Required Action Range for the quarterly Group A and Group B tests are less stringent than the acceptance range imposed on the hydraulic test parameters associated with the biennial Comprehensive test.

A vertical line shaft pump is defined as a vertically suspended pump, where the pump driver and the pumping element are connected by a line shaft within an enclosing column which contains the pump bearings, making pump bearing vibration measurements impracticable.

Table ISTB-5221-1

Vertical Line Shaft and Centrifugal Pumps Test Acceptance Criteria

Test Type	Pump Speed	Test Parameter	Acceptable Range	Alert Range	Required Action Range	
					Low	High
Group A[1,2]	N/A	Q	0.95 to 1.10 Q_r	0.93 to <0.95 Q_r	< 0.93 Q_r	> 1.10 Q_r
	N/A	ΔP	0.95 to 1.10 ΔP_r	0.93 to <0.95 ΔP_r	< 0.93 ΔP_r	> 1.10 ΔP_r
	≥600	V_v or V_d	≤ 2.5V_r	> 2.5V_r to 6 V_r or >0.325 to 0.7 in/sec	None	>6V_r or >0.7 in/sec
Group B	N/A	Q, or	0.90 to 1.10 Q_r	None	< 0.90 Q_r	> 1.10 Q_r
	N/A	ΔP	0.90 to 1.10 ΔP_r	None	< 0.90 ΔP_r	> 1.10 ΔP_r
Comprehensive[1,2,3]	N/A	Q	0.95 to 1.03 Q_r	0.93 to <0.95 Q_r	< 0.93 Q_r	> 1.03 Q_r
	N/A	ΔP	0.95 to 1.03 ΔP_r	0.93 to <0.95 ΔP_r	< 0.93 ΔP_r	> 1.03 ΔP_r
	≥600	V_v or V_d	≤ 2.5V_r	> 2.5V_r to 6 V_r or >0.325 to 0.7 in/sec	None	>6V_r or >0.7 in/sec

NOTES: The subscript r denotes reference value, the subscript v denotes vibration velocity reference value, and the subscript d denotes displacement.

(1) Vibration parameter per Table ISTB-3000-1. Vr is vibration reference value in the selected units.

(2) Refer to Fig. ISTB-5223-1 to establish velocity limits for pumps with speeds <600 rpm.

(3) An upper Acceptable Range limit of 1.06 Q_r and 1.06 ΔP_r instead of 1.03 Q_r and 1.03 ΔP_r may be used for the Comprehensive pump test of those pumps listed in Pump Relief Request No. 3 (PRR3).

All deviations from the reference values shall be compared with the ranges of Table ISTB-5221-1 and corrective action taken as specified in ISTB-6200, as reflected in the Corrective Action section following pump test acceptance criteria. The vibration measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges of Table ISTB-5221-1. For example, if vibration exceeds either 6Vr, or 0.7 in./sec, the pump is in the required action range.

Positive Displacement Pump Test Acceptance Criteria

The allowable ranges for positive displacement parameters are specified in Table ISTB-5321-1 and Table ISTB-5321-2, and are reflected below. It should be noted that the hydraulic acceptance criteria defining Acceptable Range and Required Action Range for the quarterly Group A and Group B tests are less stringent than the acceptance range imposed on the hydraulic test parameters associated with the biennial Comprehensive test.

Table ISTB-5321-1

Positive Displacement Pump (Except Reciprocating) Test Acceptance Criteria

Test Type	Pump Speed	Test Parameter	Acceptable Range	Alert Range	Required Action Range	
					Low	High
Group A[1,2]	N/A	Q	0.95 to 1.10 Q_r	0.93 to <0.95 Q_r	< 0.93 Q_r	> 1.10 Q_r
	N/A	P	0.93 to 1.10 P_r	0.90 to <0.93 P_r	< 0.90 P_r	> 1.10 P_r
	≥600	V_v or V_d	≤ 2.5V_r	> 2.5V_r to 6 V_r or >0.325 to 0.7 in/sec	None	>6V_r or >0.7 in/sec
Group B	N/A	Q	0.90 to 1.10 Q_r	None	< 0.90 Q_r	> 1.10 Q_r
Comprehensive[1,2,3]	N/A	Q	0.95 to 1.03 Q_r	0.93 to <0.95 Q_r	< 0.93 Q_r	> 1.03 Q_r
	N/A	P	0.93 to 1.03 P_r	0.90 to <0.93 P_r	< 0.90 P_r	> 1.03 P_r
	N/A	V_v or V_d	≤ 2.5V_r	> 2.5V_r to 6 V_r or >0.325 to 0.7 in/sec	None	>6V_r or >0.7 in/sec

NOTES: The subscript r denotes reference value, the subscript v denotes vibration velocity reference value, and the subscript d denotes displacement.

(1) Vibration parameter per Table ISTB-3000-1. V_r is vibration reference value in the selected units.

(2) Refer to Fig. ISTB-5223-1 to establish velocity limits for pumps with speeds <600 rpm.

(3) An upper Acceptable Range limit of 1.06 Q_r and 1.06 P_r instead of 1.03 Q_r and 1.03 P_r may be used for the Comprehensive pump test of those pumps listed in Pump Relief Request No. 3 (PRR3).

Table ISTB-5321-2

Reciprocating Positive Displacement Pump Test Acceptance Criteria

Test Type	Pump Speed	Test Parameter	Acceptable Range	Alert Range	Required Action Range	
					Low	High
Group A	N/A	Q	0.95 to 1.10 Q_r	0.93 to <0.95 Q_r	< 0.93 Q_r	> 1.10 Q_r
	N/A	P	0.93 to 1.10 P_r	0.90 to <0.93 P_r	< 0.90 P_r	> 1.10 P_r
	N/A	V_v or V_d	≤ 2.5V_r	> 2.5V_r to 6 V_r	None	>6V_r
Group B	N/A	Q	0.90 to 1.10 Q_r	None	< 0.90 Q_r	> 1.10 Q_r
Comprehensive[1]	N/A	Q	0.95 to 1.03 Q_r	0.93 to <0.95 Q_r	< 0.93 Q_r	> 1.03 Q_r
	N/A	P	0.93 to 1.03 P_r	0.90 to <0.93 P_r	< 0.90 P_r	> 1.03 P_r
	N/A	V_v or V_d	≤ 2.5V_r	> 2.5V_r to 6 V_r	None	>6V_r

NOTES: The subscript r denotes reference value, the subscript v denotes vibration velocity reference value, and the subscript d denotes displacement.

(1) An upper Acceptable Range limit of 1.06 Q_r and 1.06 P_r instead of 1.03 Q_r and 1.03 P_r may be used for the Comprehensive pump test of those pumps listed in Pump Relief Request No. 3 (PRR3).

All deviations from the reference values shall be compared with the ranges of Table ISTB-5321-1 or Table ISTB-5321-2, as applicable, and corrective action taken as specified in ISTB-6200, as reflected in the Corrective Action section following pump test acceptance criteria. The vibration measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges of Table ISTB-5321-1. For example, if vibration exceeds either 6Vr, or 0.7 in./sec, the pump is in the required action range.

__Corrective Actions__

(a) **Alert Range [ISTB-6200(a)]**. If the measured test parameter values fall within the alert range of Table ISTB-5121-1, Table ISTB-5221-1, Table ISTB-5321-1 or Table ISTB-5321-2, as applicable, the frequency of testing specified in paragraph ISTB-3400 shall be doubled until the cause of the deviation is determined and the condition corrected.

(b) **Action Range [ISTB-6200(b)]**. If the measured test parameter values fall within the required action range of Table ISTB-5121-1, Table ISTB-5221-1, Table ISTB-5321-1 or Table ISTB-5321-2, as applicable, the pump shall be declared inoperable until either the cause of the deviation has been determined and the condition corrected, or an analysis of the pump is performed and new reference values are established in accordance with paragraph ISTB-6200(c). The analysis of the pump's condition with respect to system operability and Technical Specifications shall also be made as follows:

(1) If the inoperable pump is specifically identified in the technical specifications, then the applicable technical specification required action statements shall be followed.

(2) If the inoperable pump is in a system covered by a technical specification, an assessment of its condition shall be made to determine if it makes the system inoperable. If the condition of the pump renders the system inoperable, then the applicable system technical specification required action statements shall be followed.

(3) Nothing in the ASME OM Code shall be construed to supersede the requirements of any technical specification.

(c) **New Reference Values [ISTB-6200(c)]**. In cases where the pump's test parameters are within either the alert or required action ranges of Table ISTB-5121-1, Table ISTB-5221-1, Table ISTB-5321-1 or Table ISTB-5321-2, as applicable, and the pump's continued use at the changed values is supported by an analysis, a new set of reference values may be established. The analysis shall include verification of the pump's operational readiness. The analysis shall include both a pump level and a system level evaluation of operational readiness, the cause of the change in pump performance, and an evaluation of all trends indicated by available data. The results of this analysis shall be documented in the record of tests.

When a test shows measured parameter values that fall outside of the acceptable range of Table ISTB-5121-1, Table ISTB-5221-1, Table ISTB-5321-1 or Table ISTB-5321-2, as applicable, that have resulted from an identified systematic error, such as improper system lineup or inaccurate instrumentation, the test shall be rerun after correcting the error.

If the reference value of a particular parameter being measured or determined can be significantly influenced by other related conditions, then these conditions shall be analyzed and documented in the record of tests.

Records and Reports

Records of the results of inservice tests and corrective actions as required by ISTB-9000 are maintained in computerized or in tabular form. Pump performance characteristics will be examined for trends.

Pump Definitions

Operational Readiness - The ability of a component to perform its intended function when required.

Plant Operation - The conditions of startup, operation at power, hot standby, and reactor cool down, as defined by the plant Technical Specifications.

Reference Point - A point of operation at which reference values are established and inservice test parameters are measured for comparison with applicable acceptance criteria.

Reference Values - One or more values of test parameters measured or determined when the equipment is known to be operating acceptably.

Safe Shutdown - The operating Mode a plant must achieve subsequent to a design basis accident as reflected in the plant safety analysis. BVPS-1 is licensed as hot shutdown being safe shutdown.

Trending - A comparison of current data to previous data obtained under similar conditions for the same equipment.

NOTE:	The following three sections of this document are the "Pump Outline Tables", "Pump Relief Requests", and "Pump Minimum Operating Point (MOP) Curves" sections.

Pump Outline Tables

The "Pump Outline Tables" are a listing of all the pumps in the IST Program, their testing requirements, and their specific pump relief request reference numbers. The pumps are arranged according to system and pump number. The following abbreviations and designations are used on the Pump Outline Tables and throughout the IST Program for pumps:

N - Speed

P - Discharge Pressure

ΔP - Differential Pressure

Q	- Flow rate
V	- Vibration
1BVT	- Unit 1 Beaver Valley Test
1OST	- Unit 1 Operating Surveillance Test
CMP	- Corrective Maintenance Procedure
CPT	- Comprehensive Pump Test
PVT	- Periodic Verification Test
Q	- Quarterly Test Frequency
CSD	- Cold Shutdown Frequency
R	- Refueling Test Frequency
2YR	- Required every 2 years (biennial), but normally done at refueling outages
PRR	- Pump Relief Request
X	- Meets or exceeds ASME OM Code ISTB requirements
NA	- Not Applicable

Pump Relief Requests

The "Pump Relief Requests" section contains the detailed technical description of particular conditions and equipment installations prohibiting the testing of some of the characteristics of safety-related pumps. An alternate test method and the frequency of revised testing are also included to meet the intent of 10CFR50.55a. The relief request(s) for a specific pump is referenced by the number(s) listed on the pump's testing outline sheet.

Pump Minimum Operating Point (MOP) Curves

The "Pump Minimum Operating Point (MOP) Curves" section contains a graphical representation of the minimum allowable pump flow versus head, which is required to meet the applicable safety analysis, for each centrifugal pump in the Unit 1 IST Program.

SECTION II: PUMP OUTLINE TABLES

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
1A Charging Pump	1CH-P-1A	2	7-Chemical and Volume Control

Function:		**Type:**	**Dwg. OM No.:**
	To support the RCS during all normal modes of plant operation. The functions performed include, but are not limited to, the following; maintenance of seal water injection flow to the RCPs; control of RCS inventory; supplying pressurizer auxiliary spray and reducing the radioactivity level in the reactor coolant. The pumps also serve as the High Head Safety Injection Pumps for emergency core cooling during post accident conditions.	Centrifugal	7-1
		Group:	**Dwg. Coord.:**
		A	C-4

Remarks: Pump is tested quarterly (Group A test) on recirculation flow with the VCT via the normal charging header while at power or via the miniflow recirc path with the RWST when shutdown. Comprehensive and Periodic Verification tests ~~is~~ are performed during refueling outages at full flow from the RWST to the RCS during HHSI full flow testing. The design point is 150 gpm, the BEP is approximately 350 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-1430 (Rev.1, Add.0) is 509 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR3 and PRR14.

Parameter (Group A)	1OST (Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	7.4 (Q)	X	Calculated using the Pump Discharge Pressure Indicator [PI-1CH-151](local) and a temporary suction pressure test gauge (local).
Q	7.4 (Q)	X	Summation of flow rates from Flow Indicators [FI-1CH-122A, 124, 127, 130, 160] (Control Room) and [FI-1CH-180] (local).
V	7.4 (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	11.14B (R)	X	Calculated using a temporary suction and discharge pressure test gauge (local).
Q	11.14B (R)	X	Calculated from the voltage measured in the process racks from a temporary d/p transmitter installed at [FT-1SI-943] (local)
V	11.14B (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	11.14B (R)	X	Calculated using a temporary suction and discharge pressure test gauge (local).
Q	11.14B (R)	X	Calculated from the voltage measured in the process racks from a temporary d/p transmitter installed at [FT-1SI-943] (local)

BVPS-1 IST PUMP OUTLINE TABLE					
Pump Name: 1B Charging Pump		**Pump Number:** 1CH-P-1B	**Code Class:** 2	**System:** 7-Chemical and Volume Control	
Function:	To support the RCS during all normal modes of plant operation. The functions performed include, but are not limited to, the following; maintenance of seal water injection flow to the RCPs; control of RCS inventory; supplying pressurizer auxiliary spray and reducing the radioactivity level in the reactor coolant. The pumps also serve as the High Head Safety Injection Pumps for emergency core cooling during post accident conditions.			**Type:** Centrifugal **Group:** A	**Dwg. OM No.:** 7-1 **Dwg. Coord.:** D-4
Remarks:	Pump is tested quarterly (Group A test) on recirculation flow with the VCT via the normal charging header while at power or via the miniflow recirc path with the RWST when shutdown. Comprehensive and Periodic Verification tests ~~is~~ are performed during refueling outages at full flow from the RWST to the RCS during HHSI full flow testing. The design point is 150 gpm, the BEP is approximately 350 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-1430 (Rev.1, Add.0) is 509 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR3 and PRR14.				

Parameter (Group A)	1OST (Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	7.5 (Q)	X	Calculated using the Pump Discharge Pressure Indicator [PI-1CH-152] (local) and a temporary suction pressure test gauge (local)..
Q	7.5 (Q)	X	Summation of flow rates from Flow Indicators [FI-1CH-122A, 124, 127, 130, 160] (Control Room) and [FI-1CH-180] (local).
V	7.5 (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	11.14B (R)	X	Calculated using a temporary suction and discharge pressure test gauge (local).
Q	11.14B (R)	X	Calculated from the voltage measured in the process racks from a temporary d/p transmitter installed at [FT-1SI-943] (local)
V	11.14B (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	11.14B (R)	X	Calculated using a temporary suction and discharge pressure test gauge (local).
Q	11.14B (R)	X	Calculated from the voltage measured in the process racks from a temporary d/p transmitter installed at [FT-1SI-943] (local)

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	Pump Number:	Code Class:	System:	
1C Charging Pump	1CH-P-1C	2	7-Chemical and Volume Control	
Function:	To support the RCS during all normal modes of plant operation. The functions performed include, but are not limited to, the following; maintenance of seal water injection flow to the RCPs; control of RCS inventory; supplying pressurizer auxiliary spray and reducing the radioactivity level in the reactor coolant. The pumps also serve as the High Head Safety Injection Pumps for emergency core cooling during post accident conditions.		**Type:** Centrifugal **Group:** A	**Dwg. OM No.:** 7-1 **Dwg. Coord.:** E-4
Remarks:	Pump is tested quarterly (Group A test) on recirculation flow with the VCT via the normal charging header while at power or via the miniflow recirc path with the RWST when shutdown. Comprehensive and Periodic Verification tests ~~is~~ are performed during refueling outages at full flow from the RWST to the RCS during HHSI full flow testing. The design point is 150 gpm, the BEP is approximately 350 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-1430 (Rev.1, Add.0) is 509 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR3 and PRR14.			

Parameter (Group A)	1OST (Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	7.6 (Q)	X	Calculated using the Pump Discharge Pressure Indicator [PI-1CH-153] (local) and a temporary suction pressure test gauge (local).
Q	7.6 (Q)	X	Summation of flow rates from Flow Indicators [FI-1CH-122A, 124, 127, 130, 160] (Control Room) and [FI-1CH-180] (local).
V	7.6 (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	11.14B (R)	X	Calculated using a temporary suction and discharge pressure test gauge (local).
Q	11.14B (R)	X	Calculated from the voltage measured in the process racks from a temporary d/p transmitter installed at [FT-1SI-943] (local)
V	11.14B (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	11.14B (R)	X	Calculated using a temporary suction and discharge pressure test gauge (local).
Q	11.14B (R)	X	Calculated from the voltage measured in the process racks from a temporary d/p transmitter installed at [FT-1SI-943] (local)

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	Pump Number:	Code Class:	System:	
2A Boric Acid Transfer Pump	1CH-P-2A	3	7-Chemical and Volume Control	
Function:	To provide a solution of soluble boric acid for reactor coolant makeup. These pumps also provide boric acid for emergency boration.		**Type:** Centrifugal	**Dwg. OM No.:** 7-3
			Group: A	**Dwg. Coord.:** C-3
Remarks:	Pump is tested by recirculating the Boric Acid Tank quarterly (Group A test) using a fixed-resistance minimum flow line and at full flow through a larger recirculation line once every 2 years (Comprehensive and Periodic Verification tests). The design point is 75 gpm, the BEP is approximately 75 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-2384 (Rev.1) is 71 gpm (required discharge check valve flow). The full-flow (Comprehensive test) may be performed in lieu of the quarterly (Group A) recirculation flow test. Also see PRR1, PRR3, PRR6, PRR8 and PRR14.			

Parameter	1OST (Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3510 rpm / 1765 rpm.
ΔP	7.1 (Q)	X	Calculated using the Pump Discharge Pressure Indicator [PI-1CH-110] (local) and the calculated suction pressure from the level in the Boric Acid Storage Tank [LI-CH-106 (161)], in accordance with Section 5.5.3 of NUREG-1482 (Control Room).
Q	7.1 (Q)	X (PRR6)	No installed instrumentation to measure flow rate quarterly. Pump tested on a fixed-resistance recirculation line with the flow assumed to be constant.
V	7.1 (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3510 rpm / 1765 rpm.
ΔP	7.13 (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure measured by taking the voltage from the Boric Acid Storage Tank Level Transmitter [LT-CH-106 (161)], (local), in accordance with Section 5.5.3 of NUREG-1482.
Q	7.13 (2YR)	X	Flow rate measurement using portable ultrasonic flow meter (local) at least once every 2 years.
V	7.13 (2YR)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3510 rpm / 1765 rpm.
ΔP	7.13 (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure measured by taking the voltage from the Boric Acid Storage Tank Level Transmitter [LT-CH-106 (161)], (local), in accordance with Section 5.5.3 of NUREG-1482.
Q	7.13 (2YR)	X	Flow rate measurement using portable ultrasonic flow meter (local) at least once every 2 years.

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	Pump Number:	Code Class:	System:	
2B Boric Acid Transfer Pump	1CH-P-2B	3	7-Chemical and Volume Control	
Function: To provide a solution of soluble boric acid for reactor coolant makeup. The pump also provide boric acid for emergency boration.			**Type:** Centrifugal	**Dwg. OM No.:** 7-3
			Group: A	**Dwg. Coord.:** G-3
Remarks: Pump is tested by recirculating the Boric Acid Tank quarterly (Group A test) using a fixed-resistance minimum flow line and at full flow through a larger recirculation line once every 2 years (Comprehensive and Periodic Verification tests). The design point is 75 gpm, the BEP is approximately 75 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-2384 (Rev.1) is 71 gpm (required discharge check valve flow). The full-flow (Comprehensive test) may be performed in lieu of the quarterly (Group A) recirculation flow test. Also see PRR1, PRR3, PRR6, PRR8 and PRR14.				

Parameter (Group A)	1OST (Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3510 rpm / 1765 rpm.
ΔP	7.2 (Q)	X	Calculated using the Pump Discharge Pressure Indicator [PI-1CH-105A] (local) and the calculated suction pressure from the level in the Boric Acid Storage Tank [LI-1CH-108 (163)], in accordance with Section 5.5.3 of NUREG-1482 (Control Room).
Q	7.2 (Q)	X (PRR6)	No installed instrumentation to measure flow rate quarterly. Pump is tested on a fixed-resistance minimum flow recirculation line with the flow assumed to be a constant.
V	7.2 (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3510 rpm / 1765 rpm.
ΔP	7.14 (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure measured by taking the voltage from the Boric Acid Storage Tank Level Transmitter [LT-1CH-108 (163)], in accordance with Section 5.5.3 of NUREG-1482.
Q	7.14 (2YR)	X	Flow rate measurement using portable ultrasonic flow meter (local) at least once every 2 years.
V	7.14 (2YR)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3510 rpm / 1765 rpm.
ΔP	7.14 (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure measured by taking the voltage from the Boric Acid Storage Tank Level Transmitter [LT-1CH-108 (163)], in accordance with Section 5.5.3 of NUREG-1482.
Q	7.14 (2YR)	X	Flow rate measurement using portable ultrasonic flow meter (local) at least once every 2 years.

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	Pump Number:	Code Class:	System:	
1A Residual Heat Removal Pump	1RH-P-1A	2	10-Residual Heat Removal	
Function:	To operate when maintaining the plant in a cold shutdown condition. Although not needed for safe shutdown of Unit 1, the removal of decay and sensible heat by the Residual Heat Removal System is considered a safety related function.		**Type:** Vertically-mounted Centrifugal	**Dwg. OM No.:** 10-1
			Group: A	**Dwg. Coord.:** E-3
Remarks:	Per PRR7, the pump is tested during cold shutdowns (Group A Test) and during refueling outages (Comprehensive and Periodic Verification Tests) at full flow by recirculating the RCS. The design point is 4000 gpm, the BEP is approximately 4000 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-2924 (Rev.0) is 4148.9 gpm (MOP). During cold shutdowns and extended outages, the Group A test will occur at least every 92 days. The Comprehensive test will be performed in lieu of the Group A test at least once during refueling outages. Also see PRR1, PRR3, PRR8 and PRR14.			

Parameter (Group A)	1OST (Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1780 rpm.
ΔP	10.1 (CSD)	X	Calculated using temporary test pressure gauges installed on the pump discharge on [1RH-209] (local) and pump suction on [1RH-200] (local) or from temporary ΔP gauge installed between [1RH-200] and [1RH-213] (local).
Q	10.1 (CSD)	X	Measured using flow indicators [FI-1CH-150] and computer point [F0626A] in place of [FI-1RH-605] (Control Room).
V	10.1 (CSD)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1780 rpm.
ΔP	10.1 (R)	X	Calculated using temporary test pressure gauges installed on the pump discharge on [1RH-209] (local) and pump suction on [1RH-200] (local) or from temporary ΔP gauge installed between [1RH-200] and [1RH-213] (local).
Q	10.1 (R)	X	Measured using flow indicators [FI-1CH-150] and computer point [F0626A] in place of [FI-1RH-605] (Control Room).
V	10.1 (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1780 rpm.
ΔP	10.1 (R)	X	Calculated using temporary test pressure gauges installed on the pump discharge on [1RH-209] (local) and pump suction on [1RH-200] (local) or from temporary ΔP gauge installed between [1RH-200] and [1RH-213] (local).
Q	10.1 (R)	X	Measured using flow indicators [FI-1CH-150] and computer point [F0626A] in place of [FI-1RH-605] (Control Room).

BVPS-1 IST PUMP OUTLINE TABLE				
Pump Name: 1B Residual Heat Removal Pump	**Pump Number:** 1RH-P-1B	**Code Class:** 2	**System:** 10-Residual Heat Removal	
Function: To operate when maintaining the plant in a cold shutdown condition. Although not needed for safe shutdown of Unit 1, the removal of decay and sensible heat by the Residual Heat Removal System is considered a safety related function.			**Type:** Vertically-mounted Centrifugal	**Dwg. OM No.:** 10-1
			Group: A	**Dwg. Coord.:** F-3
Remarks: Per PRR7, the pump is tested during cold shutdowns (Group A Test) and during refueling outages (Comprehensive and Periodic Verification Tests) at full flow by recirculating the RCS. The design point is 4000 gpm, the BEP is approximately 4000 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-2924 (Rev.0) is 4189.3 gpm (MOP)). During cold shutdowns and extended outages, the Group A test will occur at least every 92 days. The Comprehensive test will be performed in lieu of the Group A test at least once during refueling outages. Also see PRR1, PRR3 PRR8 and PRR14.				

Parameter (Group A)	1OST (Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1780 rpm.
ΔP	10.1 (CSD)	X	Calculated using temporary test pressure gauges installed on the pump discharge on [1RH-210] (local) and pump suction on [1RH-200] (local) or from temporary ΔP gauge installed between [1RH-200] and [1RH-213] (local).
Q	10.1 (CSD)	X	Measured using flow indicators [FI-1CH-150] and computer point [F0626A] in place of [FI-1RH-605] (Control Room).
V	10.1 (CSD)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1780 rpm.
ΔP	10.1 (R)	X	Calculated using temporary test pressure gauges installed on the pump discharge on [1RH-210] (local) and pump suction on [1RH-200] (local) or from temporary ΔP gauge installed between [1RH-200] and [1RH-213] (local).
Q	10.1 (R)	X	Measured using flow indicators [FI-1CH-150] and computer point [F0626A] in place of [FI-1RH-605] (Control Room).
V	10.1 (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1780 rpm.
ΔP	10.1 (R)	X	Calculated using temporary test pressure gauges installed on the pump discharge on [1RH-210] (local) and pump suction on [1RH-200] (local) or from temporary ΔP gauge installed between [1RH-200] and [1RH-213] (local).
Q	10.1 (R)	X	Measured using flow indicators [FI-1CH-150] and computer point [F0626A] in place of [FI-1RH-605] (Control Room).

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
1A Low Head Safety Injection Pump	1SI-P-1A	2	11-Safety Injection

Function:	To operate primarily during a large break LOCA, in addition to other DBA, in order to provide low head safety injection and recirculation flow to the RCS, and for long term shutdown cooling during post-LOCA conditions. The pump is not utilized during any plant operating evolution and remains in standby during all operating Modes.	**Type:** Vertical line shaft **Group:** B	**Dwg. OM No.:** 11-1 **Dwg. Coord.:** F-2
Remarks:	Pump is tested quarterly (Group B test) on recirculation flow with the RWST. Comprehensive and Periodic Verification tests are performed during refueling outages at full flow to the RCS. The design point is 3000 gpm, the BEP is approximately 3500 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-1430 (Rev.1) is 3335 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR3, PRR8 and PRR14.		

Parameter (Group B)	1OST (Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1780 rpm.
ΔP	11.1 (Q)	X	Calculated using the Pump Discharge Pressure Indicator [PI-1SI-943] (local) and the calculated suction pressure using RWST level indicators [LI-QS-100A-D], in accordance with Section 5.5.3 of NUREG-1482 (Control Room).
Q	11.1 (Q)	X	Flow indicator [FI-1SI-941] (local).
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1780 rpm.
ΔP	11.14A (R)	X	Calculated using a temporary suction and discharge pressure test gauge (local).
Q	11.14A (R)	X	Flow Indicator [FI-1SI-945] (Control Room).
V	11.14A (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1780 rpm.
ΔP	11.14A (R)	X	Calculated using a temporary suction and discharge pressure test gauge (local).
Q	11.14A (R)	X	Flow Indicator [FI-1SI-945] (Control Room).

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	Pump Number:	Code Class:	System:
1B Low Head Safety Injection Pump	1SI-P-1B	2	11-Safety Injection

Function: To operate primarily during a large break LOCA, in addition to other DBA, in order to provide low head safety injection and recirculation flow to the RCS, and for long term shutdown cooling during post-LOCA conditions. The pump is not utilized during any plant operating evolution and remains in standby during all operating Modes.

Type:	Dwg. OM No.:
Vertical line shaft	11-1
Group:	**Dwg. Coord.:**
B	F-4

Remarks: Pump is tested quarterly (Group B test) on recirculation flow with the RWST. Comprehensive and Periodic Verification tests are performed during refueling outages at full flow to the RCS. The design point is 3000 gpm, the BEP is approximately 3500 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-1430 (Rev.1) is 3335 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR3, PRR8 and PRR14.

Parameter (Group B)	1OST (Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1780 rpm.
ΔP	11.2 (Q)	X	Calculated using the Pump Discharge Pressure Indicator [PI-1SI-944] (local) and the calculated suction pressure using RWST level indicators [LI-1QS-100A-D], in accordance with Section 5.5.3 of NUREG-1482 (Control Room).
Q	11.2 (Q)	X	Flow indicator [FI-1SI-941] (local). (Mini flow and test line flow indicator).
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1780 rpm.
ΔP	11.14A (R)	X	Calculated using a temporary suction and discharge pressure test gauge (local).
Q	11.14A (R)	X	Flow Indicator [FI-1SI-946] (Control Room).
V	11.14A (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1780 rpm.
ΔP	11.14A (R)	X	Calculated using a temporary suction and discharge pressure test gauge (local).
Q	11.14A (R)	X	Flow Indicator [FI-1SI-946] (Control Room).

BVPS-1 IST PUMP OUTLINE TABLE				
Pump Name: 1A Quench Spray Pump	**Pump Number:** 1QS-P-1A	**Code Class:** 2	**System:** 13-Containment Depressurization	
Function: To operate only during a loss-of-coolant accident (LOCA) for containment heat removal and pressure suppression. The Quench Spray System also serves in removing fission products released into the containment atmosphere during a LOCA by the admission of sodium hydroxide to the spray stream. The pump is not utilized during any plant operating evolution and remains in standby during all operating modes.			**Type:** Centrifugal **Group:** B	**Dwg. OM No.:** 13-1 **Dwg. Coord.:** C-5
Remarks: Per PRR12, pump is tested quarterly (Group B test) and once every 2 years (Comprehensive test) by recirculating the RWST on recirculation flow within approximately 30% of design flow (design point is 2500 gpm). As discussed in PRR12, the recirculation line is unable to accommodate testing at 2500 gpm or within 20% of design flow as required for Comprehensive Pump testing. In addition, use of expanded delta-p ranges for the Comprehensive Pump Test by performing a Pump Verification Test per PRR3 has not been requested since the recirculation line is unable to accommodate these flow rates per PRR12. The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1.				

Parameter (Group B)	1OST (Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3550 rpm.
ΔP	13.1 (Q)	X	Calculated using the Pump Discharge Pressure Indicator [PI-1QS-101A] (local) and a temporary suction pressure test gauge (local).
Q	13.1 (Q)	X (PRR12)	Total flow rates from recirculation line Flow Indicators [FI-1QS-103] and [FI-1QS-104] (local).
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3550 rpm.
ΔP	13.1 (2YR)	X	Calculated using a temporary suction and discharge pressure test gauge (local).
Q	13.1 (2YR)	X (PRR12)	Total flow rates from recirculation line Flow Indicators [FI-1QS-103] and [FI-1QS-104] (local).
V	13.1 (2YR)	X	Portable monitoring equipment using velocity units during the Comprehensive test.

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	Pump Number:	Code Class:	System:
1B Quench Spray Pump	1QS-P-1B	2	13-Containment Depressurization

Function:	To operate only during a loss-of-coolant accident (LOCA) for containment heat removal and pressure suppression. The Quench Spray System also serves in removing fission products released into the containment atmosphere during a LOCA by the admission of sodium hydroxide to the spray stream. The pump is not utilized during any plant operating evolution and remains in standby during all operating modes	**Type:** Centrifugal **Group:** B	**Dwg. OM No.:** 13-1 **Dwg. Coord.:** D-5
Remarks:	Per PRR12, pump is tested quarterly (Group B test) and once every 2 years (Comprehensive test) by recirculating the RWST on recirculation flow within approximately 30% of design flow (design point is 2500 gpm). As discussed in PRR12, the recirculation line is unable to accommodate testing at 2500 gpm or within 20% of design flow as required for Comprehensive Pump testing. In addition, use of expanded delta-p ranges for the Comprehensive Pump Test by performing a Pump Verification Test per PRR3 has not been requested since the recirculation line is unable to accommodate these flow rates per PRR12. The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1.		

Parameter (Group B)	1OST (Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3550 rpm.
ΔP	13.2 (Q)	X	Calculated using the Pump Discharge Pressure Indicator [PI-1QS-101B] (local) and a temporary suction pressure test gauge (local).
Q	13.2 (Q)	X (PRR12)	Total flow rates from recirculation line Flow Indicator [FI-1QS-103] and [FI-1QS-104] (local).
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	1OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3550 rpm.
ΔP	13.2 (2YR)	X	Calculated using a temporary suction and discharge pressure test gauge (local).
Q	13.2 (2YR)	X (PRR12)	Total flow rates from recirculation line Flow Indicator [FI-1QS-103] and [FI-1QS-104] (local).
V	13.2 (2YR)	X	Portable monitoring equipment using velocity units during the Comprehensive test.

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
1A Inside Recirc. Spray Pump	1RS-P-1A	2	13-Containment Depressurization

Function: To operate only during a loss-of-coolant accident (LOCA) for long term containment heat removal and pressure suppression after sufficient inventory has collected in the containment sump to support pump operation. The pump is not utilized during any plant operating evolution and remains in standby during all operating modes.		**Type:** Vertical line shaft	**Dwg. OM No.:** 13-2
		Group: B	**Dwg. Coord.:** E-2

Remarks: Per ISTB-3430, "Pumps Lacking Required Fluid Inventory", pumps in dry sumps need not be tested every 3 months, however, they shall be tested at least once every 2 years with the required fluid inventory provided during this test. Per PRR11, this pump is tested by filling a temporary dike built around the containment sump area and recirculating water through a 4" test loop on recirculation flow during refueling outages to within approximately 41% of the design point/BEP flow and within 38% of the accident analysis flow (design point/BEP flow is 3500 gpm, accident analysis flow per Calc. 8700-US(B)-263 (Rev.2) is 3320 gpm). As discussed in PRR11, the 4" recirculation test loop is only able to accommodate testing at approximately 2050 gpm or within 20% of design flow as required for Comprehensive Pump testing. In addition, use of expanded delta-p ranges for the Comprehensive Pump Test by performing a Pump Verification Test per PRR3 has not been requested since the 4" test loop is unable to accommodate these flow rates per PRR11. In all cases, the Comprehensive test will be performed in lieu of the Group B test at refueling. Also see PRR1 and PRR14.

Parameter (Group B)	**1OST-(Frequency)**	**Req'd**	**Group B Test Comments**
N	NA	NA	Constant speed induction motor. Pump speed is 1787 rpm.
ΔP	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
Q	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	**1OST-(Frequency)**	**Req'd**	**Comprehensive Test Comments**
N	NA	NA	Constant speed induction motor. Pump speed is 1787 rpm.
ΔP	1BVT 1.13.5 (R)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure using the level in the dike as measured by a ruler (local), in accordance with Section 5.5.3 of NUREG-1482.~~, Rev.1.~~
Q	1BVT 1.13.5 (R)	X (PRR11)	Recirculation test line flow is calculated by measuring differential pressure across local flow orifice using test gauges.
V	1BVT 1.13.5 (R)	X	Portable monitoring equipment using velocity units.

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
1B Inside Recirc. Spray Pump	1RS-P-1B	2	13-Containment Depressurization

Function: To operate only during a loss-of-coolant accident (LOCA) for long term containment heat removal and pressure suppression after sufficient inventory has collected in the containment sump to support pump operation. The pump is not utilized during any plant operating evolution and remains in standby during all operating modes.	**Type:** Vertical line shaft	**Dwg. OM No.:** 13-2	
	Group: B	**Dwg. Coord.:** E-4	

Remarks: Per ISTB-3430, "Pumps Lacking Required Fluid Inventory", pumps in dry sumps need not be tested every 3 months, however, they shall be tested at least once every 2 years with the required fluid inventory provided during this test. Per PRR11, this pump is tested by filling a temporary dike built around the containment sump area and recirculating water through a 4" test loop on recirculation flow during refueling outages to within approximately 41% of the design point/BEP flow and within 38% of the accident analysis flow (design point/BEP flow is 3500 gpm, accident analysis flow per Calc. 8700-US(B)-263 (Rev.2) is 3370 gpm). As discussed in PRR11, the 4" recirculation test loop is only able to accommodate testing at approximately 2050 gpm or within 20% of design flow as required for Comprehensive Pump testing. In addition, use of expanded delta-p ranges for the Comprehensive Pump Test by performing a Pump Verification Test per PRR3 has not been requested since the 4" test loop is unable to accommodate these flow rates per PRR11. In all cases, the Comprehensive test will be performed in lieu of the Group B test at refueling. Also see PRR1 and PRR14.

Parameter (Group B)	1OST-(Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1784 rpm.
ΔP	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
Q	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	1OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1784 rpm.
ΔP	1BVT 1.13.5 (R)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure using the level in the dike as measured by a ruler (local), in accordance with Section 5.5.3 of NUREG-1482~~, Rev.1.~~
Q	1BVT 1.13.5 (R)	X (PRR11)	Recirculation test line flow is calculated by measuring differential pressure across local flow orifice using test gauges.
V	1BVT 1.13.5 (R)	X	Portable monitoring equipment using velocity units.

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name: 2A Outside Recirc. Spray Pump	**Pump Number:** 1RS-P-2A	**Code Class:** 2	**System:** 13-Containment Depressurization	
Function:	To operate only during a loss-of-coolant accident (LOCA) for long term containment heat removal and pressure suppression after sufficient inventory has collected in the containment sump to support pump operation. The pumps also have the capability of providing sump inventory to the suction supply of the High Head Safety Injection Pumps. The pump is not utilized during any plant operating evolution and remains in standby during all operating modes.		**Type:** Vertical line shaft **Group:** B	**Dwg. OM No.:** 13-2 **Dwg. Coord.:** E-7
Remarks:	Per ISTB-3430, “Pumps Lacking Required Fluid Inventory”, pumps in dry sumps need not be tested every 3 months, however, they shall be tested at least once every 2 years with the required fluid inventory provided during this test. Per PRR11 this pump is tested by filling the pump casing and recirculating water through a test loop on recirculation flow to within approximately 41% of the design point/BEP flow and within 40% of the accident analysis flow (design point/BEP flow is 3500 gpm, accident analysis flow per Calc. 8700-US(B)-263 (Rev.2) is 3385 gpm). As discussed in PRR11, the 4” recirculation test loop is only able to accommodate testing at approximately 2050 gpm or within 20% of design flow as required for Comprehensive Pump testing. In addition, use of expanded delta-p ranges for the Comprehensive Pump Test by performing a Pump Verification Test per PRR3 has not been requested since the 4” recirculation test loop is unable to accommodate these flow rates per PRR11. In all cases, the Comprehensive test will be performed in lieu of the Group B test at refueling. Also see PRR1 and PRR14.			

Parameter (Group B)	1OST-(Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1786 rpm.
ΔP	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
Q	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	1OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1786 rpm.
ΔP	13.7A (2YR)	X	Calculated using a temporary suction and discharge pressure test gauge (local).
Q	13.7A (2YR)	X (PRR11)	Flow Indicator [FI-1RS-157A] (local).
V	13.7A (2YR)	X	Portable monitoring equipment using velocity units.

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	Pump Number:	Code Class:	System:
2B Outside Recirc. Spray Pump	1RS-P-2B	2	13-Containment Depressurization

Function: To operate only during a loss-of-coolant accident (LOCA) for long term containment heat removal and pressure suppression after sufficient inventory has collected in the containment sump to support pump operation. The pumps also have the capability of providing sump inventory to the suction supply of the High Head Safety Injection Pumps. The pump is not utilized during any plant operating evolution and remains in standby during all operating modes.	**Type:** Vertical line shaft **Group:** B	**Dwg. OM No.:** 13-2 **Dwg. Coord.:** E-9	

Remarks: Per ISTB-3430, "Pumps Lacking Required Fluid Inventory", pumps in dry sumps need not be tested every 3 months, however, they shall be tested at least once every 2 years with the required fluid inventory provided during this test. Per PRR11 this pump is tested by filling the pump casing and recirculating water through a test loop on recirculation flow to within approximately 41% of the design point/BEP flow and within 40% of the accident analysis flow (design point/BEP flow is 3500 gpm, accident analysis flow per Calc. 8700-US(B)-263 (Rev.2) is 3340 gpm). As discussed in PRR11, the 4" recirculation test loop is only able to accommodate testing at approximately 2050 gpm or within 20% of design flow as required for Comprehensive Pump testing. In addition, use of expanded delta-p ranges for the Comprehensive Pump Test by performing a Pump Verification Test per PRR3 has not been requested since the 4" recirculation test loop is unable to accommodate these flow rates per PRR11. In all cases, the Comprehensive test will be performed in lieu of the Group B test at refueling. Also see PRR1 and PRR14.

Parameter (Group B)	1OST-(Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1785 rpm.
ΔP	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
Q	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	1OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1785 rpm.
ΔP	13.7B (2YR)	X	Calculated using a temporary suction and discharge pressure test gauge (local).
Q	13.7B (2YR)	X (PRR11)	Flow Indicator [FI-1RS-157B] (local).
V	13.7B (2YR)	X	Portable monitoring equipment using velocity units.

BVPS-1 IST PUMP OUTLINE TABLE				
Pump Name: 1A Component Cooling Water Pump	**Pump Number:** 1CC-P-1A	**Code Class:** 3	**System:** 15-Reactor Plant Component Cooling Water	
Function: To operate continuously during normal plant operation to supply cooling water to non-essential heat loads as well as cooling water to the RCP motor bearings and thermal barrier. Its safety related function consists of providing cooling water for Residual Heat Removal System support.			**Type:** Centrifugal	**Dwg. OM No.:** 15-1
			Group: A	**Dwg. Coord.:** E-6
Remarks: Pump is tested quarterly (Group A test) through various CCR heat exchangers using a pump curve developed per the guidelines of ASME OM Code Case OMN-16. This same flow path is utilized during the performance of the Comprehensive and Periodic Verification tests once every 2 years. The design point is 4700 gpm, the BEP is approximately 5400 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-3052 (Rev.0) is 5006 gpm (MOP). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR2 and PRR3.				

Parameter (Group A)	1OST (Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1785 rpm.
ΔP	15.1 (Q)	X (PRR2)	Calculated using Discharge Pressure Indicator [PI-1CC-100A] and Pump Suction Pressure Indicator [PI-1CC-181] (local). See PRR2 for range and accuracy of Pump Discharge Pressure Indicator [PI-1CC-100A]. ΔP will be converted to a developed head and compared to a pump curve using a head ratio (Hr) based on the ΔP limits of Table ISTB-5121-1.
Q	15.1 (Q)	X (PRR2)	Summation from Flow Indicators [PDI-1CC-117] and [PDI-1CC-119], (local gages), and computer point [F0520A], or as a back-up, any combination of the following: [FI-1CC-117], [F0510A], [FI-1CC-118], [PDI-1CC-118], [FI-1CC-119] or [F0530A]. See PRR2 for range and accuracy of pump Flow Indicators [FI-1CC-117], [PDI-1CC-118] and [PDI-1CC-119]. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.
V	15.1 (Q)	X	Portable monitoring equipment using velocity units.

BVPS-1 IST PUMP OUTLINE TABLE			
Pump Name: 1A Component Cooling Water Pump	**Pump Number:** 1CC-P-1A	**Code Class:** 3	**System:** 15-Reactor Plant Component Cooling Water

Parameter (CPT)	1OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1785 rpm.
ΔP	15.1 (2YR)	X	Calculated using a temporary suction and discharge pressure test gauge (local). ΔP will be converted to a developed head and compared to a pump curve using a head ratio (Hr) based on the ΔP limits of Table ISTB-5121-1.
Q	15.1 (2YR)	X (PRR2)	Summation from Flow Indicators [PDI-1CC-117] and [PDI-1CC-119], (local gages), and computer point [F0520A], or as a back-up, any combination of the following: [FI-1CC-117], [F0510A], [FI-1CC-118], PDI-1CC-118], [FI-1CC-119] or [F0530A]. See PRR2 for range and accuracy of pump Flow Indicators [FI-1CC-117], [PDI-1CC-118] and [PDI-1CC-119]. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.
V	15.1 (2YR)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1785 rpm.
ΔP	15.1 (2YR)	X	Calculated using a temporary suction and discharge pressure test gauge (local). ΔP will be converted to a developed head and verified greater than a minimum operating point (MOP) curve.
Q	15.1 (2YR)	X (PRR2)	Summation from Flow Indicators [PDI-1CC-117] and [PDI-1CC-119], (local gages), and computer point [F0520A], or as a back-up, any combination of the following: [FI-1CC-117], [F0510A], [FI-1CC-118], PDI-1CC-118], [FI-1CC-119] or [F0530A]. See PRR2 for range and accuracy of pump Flow Indicators [FI-1CC-117], [PDI-1CC-118] and [PDI-1CC-119]. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name: 1B Component Cooling Water Pump	**Pump Number:** 1CC-P-1B	**Code Class:** 3	**System:** 15-Reactor Plant Component Cooling Water	
Function:	To operate continuously during normal plant operation to supply cooling water to non-essential heat loads as well as cooling water to the RCP motor bearings and thermal barrier. Its safety related function consists of providing cooling water for Residual Heat Removal System support.		**Type:** Centrifugal **Group:** A	**Dwg. OM No.:** 15-1 **Dwg. Coord.:** E-7
Remarks:	Pump is tested quarterly (Group A test) through various CCR heat exchangers using a pump curve developed per the guidelines of ASME OM Code Case OMN-16. This same flow path is utilized during the performance of the Comprehensive and Periodic Verification tests once every 2 years. The design point is 4700 gpm, the BEP is approximately 5400 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-3052 (Rev.0) is 5006 gpm (MOP). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR2 and PRR3.			

Parameter (Group A)	1OST (Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1785 rpm.
ΔP	15.2 (Q)	X (PRR2)	Calculated using Discharge Pressure Indicator [PI-1CC-100B] and Pump Suction Pressure Indicator [PI-1CC-183] (local). See PRR2 for range and accuracy of Pump Discharge Pressure Indicator [PI-1CC-100B]. ΔP will be converted to a developed head and compared to a pump curve using a head ratio (Hr) based on the ΔP limits of Table ISTB-5121-1.
Q	15.2 (Q)	X (PRR2)	Summation from Flow Indicators [PDI-1CC-117] and [PDI-1CC-119], (local gages), and computer point [F0520A], or as a back-up, any combination of the following: [FI-1CC-117], [F0510A], [FI-1CC-118], PDI-1CC-118], [FI-1CC-119] or [F0530A]. See PRR2 for range and accuracy of pump Flow Indicators [FI-1CC-117], [PDI-1CC-118] and [PDI-1CC-119]. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.
V	15.2 (Q)	X	Portable monitoring equipment using velocity units.

BVPS-1 IST PUMP OUTLINE TABLE			
Pump Name: 1B Component Cooling Water Pump	**Pump Number:** 1CC-P-1B	**Code Class:** 3	**System:** 15-Reactor Plant Component Cooling Water

Parameter (CPT)	1OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1785 rpm.
ΔP	15.2 (2YR)	X	Calculated using a temporary suction and discharge pressure test gauge (local). ΔP will be converted to a developed head and compared to a pump curve using a head ratio (Hr) based on the ΔP limits of Table ISTB-5121-1.
Q	15.2 (2YR)	X (PRR2)	Summation from Flow Indicators [PDI-1CC-117] and [PDI-1CC-119], (local gages), and computer point [F0520A], or as a back-up, any combination of the following: [FI-1CC-117], [F0510A], [FI-1CC-118], PDI-1CC-118], [FI-1CC-119] or [F0530A]. See PRR2 for range and accuracy of pump Flow Indicators [FI-1CC-117], [PDI-1CC-118] and [PDI-1CC-119]. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.
V	15.2 (2YR)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1785 rpm.
ΔP	15.2 (2YR)	X	Calculated using a temporary suction and discharge pressure test gauge (local). ΔP will be converted to a developed head and verified greater than a minimum operating point (MOP) curve.
Q	15.2 (2YR)	X (PRR2)	Summation from Flow Indicators [PDI-1CC-117] and [PDI-1CC-119], (local gages), and computer point [F0520A], or as a back-up, any combination of the following: [FI-1CC-117], [F0510A], [FI-1CC-118], PDI-1CC-118], [FI-1CC-119] or [F0530A]. See PRR2 for range and accuracy of pump Flow Indicators [FI-1CC-117], [PDI-1CC-118] and [PDI-1CC-119]. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.

BVPS-1 IST PUMP OUTLINE TABLE				
Pump Name: 1C Component Cooling Water Pump	**Pump Number:** 1CC-P-1C	**Code Class:** 3	**System:** 15-Reactor Plant Component Cooling Water	
Function: To operate continuously during normal plant operation to supply cooling water to non-essential heat loads as well as cooling water to the RCP motor bearings and thermal barrier. Its safety related function consists of providing cooling water for Residual Heat Removal System support.			**Type:** Centrifugal	**Dwg. OM No.:** 15-1
			Group: A	**Dwg. Coord.:** E-8
Remarks: Pump is tested quarterly (Group A test) through various CCR heat exchangers using a pump curve developed per the guidelines of ASME OM Code Case OMN-16. This same flow path is utilized during the performance of the Comprehensive and Periodic Verification tests once every 2 years. The design point is 4700 gpm, the BEP is approximately 5400 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-3052 (Rev.0) is 5006 gpm (MOP). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR2 and PRR3.				

Parameter (Group A)	1OST (Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1785 rpm.
ΔP	15.3 (Q)	X (PRR2)	Calculated using Discharge Pressure Indicator [PI-1CC-100C] and Pump Suction Pressure Indicator [PI-1CC-185] (local). See PRR2 for range and accuracy of Pump Discharge Pressure Indicator [PI-1CC-100C]. ΔP will be converted to a developed head and compared to a pump curve using a head ratio (Hr) based on the ΔP limits of Table ISTB-5121-1.
Q	15.3 (Q)	X (PRR2)	Summation from Flow Indicators [PDI-1CC-117] and [PDI-1CC-119], (local gages), and computer point [F0520A], or as a back-up, any combination of the following: [FI-1CC-117], [F0510A], [FI-1CC-118], PDI-1CC-118], [FI-1CC-119] or [F0530A]. See PRR2 for range and accuracy of pump Flow Indicators [FI-1CC-117], [PDI-1CC-118] and [PDI-1CC-119]. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.
V	15.3 (Q)	X	Portable monitoring equipment using velocity units.

BVPS-1 IST PUMP OUTLINE TABLE			
Pump Name: 1C Component Cooling Water Pump	**Pump Number:** 1CC-P-1C	**Code Class:** 3	**System:** 15-Reactor Plant Component Cooling Water

Parameter (CPT)	1OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1785 rpm.
ΔP	15.3 (2YR)	X	Calculated using a temporary suction and discharge pressure test gauge (local). ΔP will be converted to a developed head and compared to a pump curve using a head ratio (Hr) based on the ΔP limits of Table ISTB-5121-1.
Q	15.3 (2YR)	X (PRR2)	Summation from Flow Indicators [PDI-1CC-117] and [PDI-1CC-119], (local gages), and computer point [F0520A], or as a back-up, any combination of the following: [FI-1CC-117], [F0510A], [FI-1CC-118], PDI-1CC-118], [FI-1CC-119] or [F0530A]. See PRR2 for range and accuracy of pump Flow Indicators [FI-1CC-117], [PDI-1CC-118] and [PDI-1CC-119]. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.
V	15.3 (2YR)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1785 rpm.
ΔP	15.3 (2YR)	X	Calculated using a temporary suction and discharge pressure test gauge (local). ΔP will be converted to a developed head and verified greater than a minimum operating point (MOP) curve.
Q	15.3 (2YR)	X (PRR2)	Summation from Flow Indicators [PDI-1CC-117] and [PDI-1CC-119], (local gages), and computer point [F0520A], or as a back-up, any combination of the following: [FI-1CC-117], [F0510A], [FI-1CC-118], PDI-1CC-118], [FI-1CC-119] or [F0530A]. See PRR2 for range and accuracy of pump Flow Indicators [FI-1CC-117], [PDI-1CC-118] and [PDI-1CC-119]. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
Turbine Driven Auxiliary Feedwater Pump	1FW-P-2	3	24-Auxiliary Feedwater

Function:			
To provide emergency makeup to the Steam Generators during a loss of normal feed water following a main turbine trip with a total loss of all electrical power (Station Blackout). The pump is not utilized during any plant operating evolution and remains in standby during all operating modes.	**Type:** Centrifugal	**Dwg. OM No.:** 24-2	
	Group: B	**Dwg. Coord.:** F-7	

Remarks: Per PRR10, pump is tested quarterly (Group B test) on recirculation flow by recirculating the PPDWST and at full flow (Comprehensive and Periodic Verification tests) from the PPDWST to the Steam Generators when in Mode 3 during shutdown for refueling or during startup from refueling outages. The design point is 700 gpm, the BEP is approximately 950 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-2402 (Rev.1) is 615 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR2, PRR3, PRR10 and PRR14.

Parameter (Group B)	1OST (Frequency)	Req'd	Group B Test Comments
N	24.4 (Q)	X	Variable speed turbine with no installed rpm indication. Use portable monitoring equipment-Stroboscope, with pump speed governed to within ±1% of the reference point per ISTB-5122(a).
ΔP	24.4 (Q)	X (PRR2)	Calculated using Discharge Pressure Indicator [PI-1FW-155] and Pump Suction Pressure Indicator [PI-1FW-156] (local). See PRR2 for range and accuracy of Pump Suction Pressure Indicator [PI-1FW-156].
Q	24.4 (Q)	X (PRR10)	Flow instrumentation which meets ASME OM Code requirements does not exist. Flow measurement will be performed during refueling outages per PRR10.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	24.9 (R)	X	Variable speed turbine with no installed rpm indication. Use portable monitoring equipment-Stroboscope, with pump speed governed to within ±1% of the reference point per ISTB-5122(a).
ΔP	24.9 (R)	X	Calculated using Discharge Pressure Indicator [PI-1FW-155] and a temporary suction pressure test gauge (local).
Q	24.9 (R)	X	Summation of flow to Steam Generators through Flow Indicators [FI-1FW-100A, B and C] (Control Room) at refueling.
V	24.9 (R)	X	Portable monitoring equipment using velocity units.

BVPS-1 IST PUMP OUTLINE TABLE			
Pump Name: Turbine Driven Auxiliary Feedwater Pump	**Pump Number:** 1FW-P-2	**Code Class:** 3	**System:** 24-Auxiliary Feedwater

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	24.9 (R)	X	Variable speed turbine with no installed rpm indication. Use portable monitoring equipment-Stroboscope, with pump speed governed to within ±1% of the reference point per ISTB-5122(a).
ΔP	24.9 (R)	X	Calculated using Discharge Pressure Indicator [PI-1FW-155] and a temporary suction pressure test gauge (local).
Q	24.9 (R)	X	Summation of flow to Steam Generators through Flow Indicators [FI-1FW-100A, B and C] (Control Room) at refueling.

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	Pump Number:	Code Class:	System:
3A Motor Driven Auxiliary Feedwater Pump	1FW-P-3A	3	24-Auxiliary Feedwater

Function:		Type:	Dwg. OM No.:
	To provide an emergency source of feedwater supply to the steam generators during a loss of normal feedwater, loss of offsite power, secondary side pipe ruptures, or cool down following a steam generator tube rupture. The pump is not normally utilized during any plant operating evolution and normally remains in standby during all operating Modes.	Centrifugal	24-2
		Group:	**Dwg. Coord.:**
		B	F-2

Remarks: Per PRR9, pump is tested quarterly (Group B test) on recirculation flow by recirculating the PPDWST and at full flow (Comprehensive and Periodic Verification tests) from the PPDWST to the Steam Generators during refueling outages. The design point is 350 gpm, the BEP is approximately 550 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-3615 (Rev.0) is 364 gpm (MOP) and 319 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR2, PRR3, PRR8, PRR9 and PRR14.

Parameter (Group B)	1OST (Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3580 rpm.
ΔP	24.2 (Q)	X (PRR2)	Calculated using Discharge Pressure Indicator [PI-1FW-155A] and Pump Suction Pressure Indicator [PI-1FW-156A] (local). See PRR2 for range and accuracy of Pump Suction Pressure Indicator [PI-1FW-156A].
Q	24.2 (Q)	X (PRR9)	Flow instrumentation which meets ASME OM Code requirements does not exist. Flow measurement will be performed during refueling outages per PRR9.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3580 rpm.
ΔP	24.8A (R)	X	Calculated using Discharge Pressure Indicator [PI-1FW-155A] and a temporary suction pressure test gauge (local).
Q	24.8A (R)	X (PRR2)	Summation of flow to Steam Generators through Flow Indicators [FI-1FW-100A, B and C] (Control Room) during refueling. See PRR2 for range and accuracy of pump Flow Indicators [FI-1FW-100A, B and C],
V	24.8A (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3580 rpm.
ΔP	24.8A (R)	X	Calculated using Discharge Pressure Indicator [PI-1FW-155A] and a temporary suction pressure test gauge (local).
Q	24.8A (R)	X	Summation of flow to Steam Generators through Flow Indicators [FI-1FW-100A, B and C] (Control Room) during refueling.

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
3B Motor Driven Auxiliary Feedwater Pump	1FW-P-3B	3	24-Auxiliary Feedwater

Function:		**Type:**	**Dwg. OM No.:**
	To provide an emergency source of feedwater supply to the steam generators during a loss of normal feedwater, loss of offsite power, secondary side pipe ruptures, or cool down following a steam generator tube rupture. The pump is not normally utilized during any plant operating evolution and normally remains in standby during all operating Modes.	Centrifugal	24-2
		Group:	**Dwg. Coord.:**
		B	F-5

Remarks: Per PRR9, pump is tested quarterly (Group B test) on recirculation flow by recirculating the PPDWST and at full flow (Comprehensive and Periodic Verification tests) from the PPDWST to the Steam Generators during refueling outages. The design point is 350 gpm, the BEP is approximately 550 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-3615 (Rev.0) is 365 gpm (MOP) and 319 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR2, PRR3, PRR8, PRR9 and PRR14.

Parameter (Group B)	1OST (Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3580 rpm.
ΔP	24.3 (Q)	X (PRR2)	Calculated using Discharge Pressure Indicator [PI-1FW-155B] and Pump Suction Pressure Indicator [PI-1FW-156B] (local). See PRR2 for range and accuracy of Pump Suction Pressure Indicator [PI-1FW-156B].
Q	24.3 (Q)	X (PRR9)	Flow instrumentation which meets ASME OM Code requirements does not exist. Flow measurement will be performed during refueling outages per PRR9.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3580 rpm.
ΔP	24.8B (R)	X	Calculated using Discharge Pressure Indicator [PI-1FW-155B] and a temporary suction pressure test gauge (local).
Q	24.8B (R)	X (PRR2)	Summation of flow to Steam Generators through Flow Indicators [FI-1FW-100A, B and C] (Control Room) during refueling. See PRR2 for range and accuracy of pump Flow Indicators [FI-1FW-100A, B and C].
V	24.8B (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3580 rpm.
ΔP	24.8B (R)	X	Calculated using Discharge Pressure Indicator [PI-1FW-155B] and a temporary suction pressure test gauge (local).
Q	24.8A (R)	X	Summation of flow to Steam Generators through Flow Indicators [FI-1FW-100A, B and C] (Control Room) during refueling.

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	Pump Number:	Code Class:	System:
1A River Water Pump	1WR-P-1A	3	30-River Water

Function:	To operate continuously during normal plant operation to supply cooling water to non-essential heat loads. During post accident conditions it provides the heat sink to the following components: recirculation spray heat exchangers, charging pump lube oil coolers, control room river water cooling coil and Emergency Diesel Generator cooling system heat exchanger.	**Type:** Vertical line shaft Group: A	**Dwg. OM No.:** 30-1 **Dwg. Coord.:** B-1

Remarks: Pump is tested quarterly (Group A test) at full flow through the River Water flush line. This same flow path is utilized during the performance of the Comprehensive and Periodic Verification tests once every 2 years. The design point is 9000 gpm, the BEP is approximately 10,000 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-3136 (Rev.3) is 9010 gpm (MOP). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR3, PRR8, PRR13 and PRR14.

Parameter (Group A)	1OST (Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1185 rpm.
ΔP	30.2 (Q)	X	Calculated using the Pump Discharge Pressure Indicator [PI-1RW-101A] and the calculated suction pressure using the Ohio River Level Recorder [LR-1CW-101] in accordance with Section 5.5.3 of NUREG-1482, Rev.1. (local).
Q	30.2 (Q)	X	Computer point [F2700A] in place of flow indicator [FI-1RW-102A] (Control Room).
V	30.2 (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1185 rpm.
ΔP	30.2 (2YR)	X (PRR13)	Calculated using a temporary discharge pressure test gauge per PRR13 and the calculated suction pressure using the Ohio River Level Recorder [LR-1CW-101] (local).
Q	30.2 (2YR)	X	Computer point [F2700A] in place of flow indicator [FI-1RW-102A] (Control Room).
V	30.2 (2YR)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1185 rpm.
ΔP	30.2 (2YR)	X	Calculated using the Pump Discharge Pressure Indicator [PI-1RW-101C] and the calculated suction pressure using the Ohio River Level Recorder [LR-1CW-101], in accordance with Section 5.5.3 of NUREG-1482. (local).
Q	30.2 (2YR)	X	Computer point [F2700A] in place of flow indicator [FI-1RW-102A] (Control Room).

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	Pump Number:	Code Class:	System:	
1B River Water Pump	1WR-P-1B	3	30-River Water	
Function:	To operate continuously during normal plant operation to supply cooling water to non-essential heat loads. During post accident conditions it provides the heat sink to the following components: recirculation spray heat exchangers, charging pump lube oil coolers, control room river water cooling coil and Emergency Diesel Generator cooling system heat exchanger.		**Type:** Vertical line shaft Group: A	**Dwg. OM No.:** 30-1 **Dwg. Coord.:** C-1
Remarks:	Pump is tested quarterly (Group A test) at full flow through the River Water flush line. This same flow path is utilized during the performance of the Comprehensive and Periodic Verification tests once every 2 years. The design point is 9000 gpm, the BEP is approximately 10,000 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-3136 (Rev.3) is 9010 gpm (MOP). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR3, PRR8, PRR13 and PRR14.			

Parameter (Group A)	1OST (Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1185 rpm.
ΔP	30.3 (Q)	X	Calculated using the Pump Discharge Pressure Indicator [PI-1RW-101B] and the calculated suction pressure using the Ohio River Level Recorder [LR-1CW-101], in accordance with Section 5.5.3 of NUREG-1482, Rev.1. (local).
Q	30.3 (Q)	X	Computer point [F2701A] in place of flow indicator [FI-1RW-102A] (Control Room).
V	30.3 (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1185 rpm.
ΔP	30.3 (2YR)	X (PRR13)	Calculated using a temporary discharge pressure test gauge per PRR13 and the calculated suction pressure using the Ohio River Level Recorder [LR-1CW-101] (local).
Q	30.3 (2YR)	X	Computer point [F2701A] in place of flow indicator [FI-1RW-102A] (Control Room).
V	30.3 (2YR)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1185 rpm.
ΔP	30.3 (2YR)	X	Calculated using the Pump Discharge Pressure Indicator [PI-1RW-101C] and the calculated suction pressure using the Ohio River Level Recorder [LR-1CW-101], in accordance with Section 5.5.3 of NUREG-1482. (local).
Q	30.3 (2YR)	X	Computer point [F2701A] in place of flow indicator [FI-1RW-102A] (Control Room).

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	Pump Number:	Code Class:	System:
1C River Water Pump	1WR-P-1C	3	30-River Water

Function:	To operate continuously during normal plant operation to supply cooling water to non-essential heat loads. During post accident conditions it provides the heat sink to the following components: recirculation spray heat exchangers, charging pump lube oil coolers, control room river water cooling coil and Emergency Diesel Generator cooling system heat exchanger.	**Type:** Vertical line shaft **Group:** A	**Dwg. OM No.:** 30-1 **Dwg. Coord.:** D-1
Remarks:	Pump is tested quarterly (Group A test) at full flow through the River Water flush line. This same flow path is utilized during the performance of the Comprehensive and Periodic Verification tests once every 2 years. The design point is 9000 gpm, the BEP is approximately 10,000 gpm, and the highest design basis accident flow rate per Calc. 8700-DMC-3136 (Rev.3) is 9010 gpm (MOP). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR3, PRR8, PRR13 and PRR14.		

Parameter (Group A)	1OST (Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1185 rpm.
ΔP	30.6A or 6B (Q)	X	Calculated using the Pump Discharge Pressure Indicator [PI-1RW-101C] and the calculated suction pressure using the Ohio River Level Recorder [LR-1CW-101], in accordance with Section 5.5.3 of NUREG-1482. (local).
Q	30.6A or 6B (Q)	X	Computer point [F2700A or F2701A] in place of flow indicator [FI-1RW-102A or B] (Control Room).
V	30.6A or 6B (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1185 rpm.
ΔP	30.6A or 6B (2YR)	X (PRR13)	Calculated using a temporary discharge pressure test gauge per PRR13 and the calculated suction pressure using the Ohio River Level Recorder [LR-1CW-101] (local).
Q	30.6A or 6B (2YR)	X	Computer point [F2700A or F2701A] in place of flow indicator [FI-1RW-102A or B] (Control Room).
V	30.6A or 6B (2YR)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1185 rpm.
ΔP	30.6A or 6B (2YR)	X	Calculated using the Pump Discharge Pressure Indicator [PI-1RW-101C] and the calculated suction pressure using the Ohio River Level Recorder [LR-1CW-101], in accordance with Section 5.5.3 of NUREG-1482. (local).
Q	30.6A or 6B (2YR)	X	Computer point [F2700A or F2701A] in place of flow indicator [FI-1RW-102A or B] (Control Room).

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
1A DG #1 Fuel Transfer Pump	1EE-P-1A	3	36-Station Service 4KV

Function:	**Type:**	**Dwg. OM No.:**
To operate only during emergency diesel generator operation to replenish day tank inventory. The pump is not used during any plant operating evolution and remains in standby during all operating Modes.	Positive Displacement	36-2
	Group: B	**Dwg. Coord.:** B-4

Remarks: Pump is normally tested bi-monthly (Group B test) at full flow from the fuel oil storage tank to the day tank. This same flow path is utilized during the performance of the Comprehensive test once every 2 years. The design point is 10 gpm and the accident analysis flow (minimum required flow per EM 115885) is 3.6 gpm. In addition, the use of expanded ranges for the Group B and Comprehensive Pump Tests have been requested per PRR5 without the need to perform a Pump Verification Test per PRR3. The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR4 and PRR8.

Parameter (Group B)	1OST (Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1150 rpm.
P	NA	NA	Not required during the Group B test.
Q	36.1 (Q)	X (PRR4) (PRR5)	No instrumentation is provided for flow. Pursuant to NUREG-1482, Rev.1, Section 5.5.2, a level change over time in the day tank will be measured using a ruler at [LG-1EE-201] and converted to flow rate, per PRR4. Expanded Ranges are used per PRR5.
V	NA	NA	Not required during the Group B test.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1150 rpm.
P	36.1 (2YR)	X (PRR5)	Positive displacement pump. Pump discharge pressure shall be determined by the use of a temporary test gauge (local). Expanded Ranges are used per PRR5.
Q	36.1 (2YR)	X (PRR4) (PRR5)	No instrumentation is provided for flow. Pursuant to NUREG-1482, Rev.1, Section 5.5.2, a level change over time in the day tank will be measured using a ruler at [LG-1EE-201] and converted to flow rate, per PRR4. Expanded Ranges are used per PRR5.
V	36.1 (2YR)	X	Portable monitoring equipment using velocity units.

BVPS-1 IST PUMP OUTLINE TABLE				
Pump Name: 1B DG #1 Fuel Transfer Pump	**Pump Number:** 1EE-P-1B	**Code Class:** 3	**System:** 36-Station Service 4KV	
Function: To operate only during emergency diesel generator operation to replenish day tank inventory. The pump is not used during any plant operating evolution and remains in standby during all operating Modes.			**Type:** Positive Displacement	**Dwg. OM No.:** 36-2
			Group: B	**Dwg. Coord.:** A-4
Remarks: Pump is normally tested bi-monthly (Group B test) at full flow from the fuel oil storage tank to the day tank. This same flow path is utilized during the performance of the Comprehensive test once every 2 years. The design point is 10 gpm and the accident analysis flow (minimum required flow per EM 115885) is 3.6 gpm. . In addition, the use of expanded ranges for the Group B and Comprehensive Pump Tests have been requested per PRR5 without the need to perform a Pump Verification Test per PRR3. The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR4 and PRR8.				

Parameter (Group B)	1OST (Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1150 rpm.
P	NA	NA	Not required during the Group B test.
Q	36.1 (Q)	X (PRR4) (PRR5)	No instrumentation is provided for flow. Pursuant to NUREG-1482, Rev.1, Section 5.5.2, a level change over time in the day tank will be measured using a ruler at [LG-1EE-201] and converted to flow rate, per PRR4. Expanded Ranges are used per PRR5.
V	NA	NA	Not required during the Group B test.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1150 rpm.
P	36.1 (2YR)	X (PRR5)	Positive displacement pump. Pump discharge pressure shall be determined by the use of a temporary test gauge (local). Expanded Ranges are used per PRR5.
Q	36.1 (2YR)	X (PRR4) (PRR5)	No instrumentation is provided for flow. Pursuant to NUREG-1482, Rev.1, Section 5.5.2, a level change over time in the day tank will be measured using a ruler at [LG-1EE-201] and converted to flow rate, per PRR4. Expanded Ranges are used per PRR5.
V	36.1 (2YR)	X	Portable monitoring equipment using velocity units.

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	Pump Number:	Code Class:	System:
1C DG #2 Fuel Transfer Pump	1EE-P-1C	3	36-Station Service 4KV

Function:	To operate only during emergency diesel generator operation to replenish day tank inventory. The pump is not used during any plant operating evolution and remains in standby during all operating Modes.	**Type:** Positive Displacement	**Dwg. OM No.:** 36-2
		Group: B	**Dwg. Coord.:** F-4

Remarks: Pump is normally tested bi-monthly (Group B test) at full flow from the fuel oil storage tank to the day tank. This same flow path is utilized during the performance of the Comprehensive test once every 2 years. The design point is 10 gpm and accident analysis flow (minimum required flow per EM 115885) is 3.6 gpm. In addition, the use of expanded ranges for the Group B and Comprehensive Pump Tests have been requested per PRR5 without the need to perform a Pump Verification Test per PRR3. The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR4 and PRR8.

Parameter (Group B)	1OST (Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1150 rpm.
P	NA	NA	Not required during the Group B test.
Q	36.2 (Q)	X (PRR4) (PRR5)	No instrumentation is provided for flow. Pursuant to NUREG-1482, Rev.1, Section 5.5.2, a level change over time in the day tank will be measured using a ruler at [LG-1EE-202] and converted to flow rate, per PRR4. Expanded Ranges are used per PRR5.
V	NA	NA	Not required during the Group B test.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1150 rpm.
P	36.2 (2YR)	X (PRR5)	Positive displacement pump. Pump discharge pressure shall be determined by the use of a temporary test gauge (local). Expanded Ranges are used per PRR5.
Q	36.2 (2YR)	X (PRR4) (PRR5)	No instrumentation is provided for flow. Pursuant to NUREG-1482, Rev.1, Section 5.5.2, a level change over time in the day tank will be measured using a ruler at [LG-1EE-202] and converted to flow rate, per PRR4. Expanded Ranges are used per PRR5.
V	36.2 (2YR)	X	Portable monitoring equipment using velocity units.

BVPS-1 IST
PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
1D DG #2 Fuel Transfer Pump	1EE-P-1D	3	36-Station Service 4KV

Function:		**Type:**	**Dwg. OM No.:**
	To operate only during emergency diesel generator operation to replenish day tank inventory. The pump is not used during any plant operating evolution and remains in standby during all operating Modes.	Positive Displacement	36-2
		Group:	**Dwg. Coord.:**
		B	E-4

Remarks: Pump is normally tested bi-monthly (Group B test) at full flow from the fuel oil storage tank to the day tank. This same flow path is utilized during the performance of the Comprehensive test once every 2 years. The design point is 10 gpm and accident analysis flow (minimum required flow per EM 115885) is 3.6 gpm. In addition, the use of expanded ranges for the Group B and Comprehensive Pump Tests have been requested per PRR5 without the need to perform a Pump Verification Test per PRR3. The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR4 and PRR8.

Parameter (Group B)	1OST (Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1150 rpm.
P	NA	NA	Not required during the Group B test.
Q	36.2 (Q)	X (PRR4) (PRR5)	No instrumentation is provided for flow. Pursuant to NUREG-1482, Rev.1, Section 5.5.2, a level change over time in the day tank will be measured using a ruler at [LG-1EE-202] and converted to flow rate, per PRR4. Expanded Ranges are used per PRR5.
V	NA	NA	Not required during the Group B test.

Parameter (CPT)	1OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1150 rpm.
P	36.2 (2YR)	X (PRR5)	Positive displacement pump. Pump discharge pressure shall be determined by the use of a temporary test gauge (local). Expanded Ranges are used per PRR5.
Q	36.2 (2YR)	X (PRR4) (PRR5)	No instrumentation is provided for flow. Pursuant to NUREG-1482, Rev.1, Section 5.5.2, a level change over time in the day tank will be measured using a ruler at [LG-1EE-202] and converted to flow rate, per PRR4. Expanded Ranges are used per PRR5.
V	36.2 (2YR)	X	Portable monitoring equipment using velocity units.

SECTION III: PUMP RELIEF REQUESTS

PUMP RELIEF REQUEST 1

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(2)

-- Hardship Without a Compensating Increase in Quality and Safety --

1. ASME Code Components Affected

All pumps within the Beaver Valley Power Station, Unit No. 1 Inservice Test (IST) Program.

2. Applicable Code Edition and Addenda

ASME OM Code, 2004 Edition with Addenda through OMb-2006.

3. Applicable Code Requirements

This request applies to the frequency specifications of the ASME OM Code for all pump testing contained within the IST Program scope. The applicable ASME OM Code sections include the following.

ISTA-3120, "Inservice Test Interval," (a) states, "The frequency for inservice testing shall be in accordance with the requirements of Section IST."

ISTB-3400, "Frequency of Inservice Tests," states, "An inservice test shall be run on each pump as specified in Table ISTB-3400-1."

Table ISTB-3400-1, "Inservice Test Frequency," notes that Group A and Group B pump tests are to be conducted quarterly and comprehensive pump tests are to be conducted biennially.

4. Reason for Request

Test period requirements for pumps set forth in specific ASME OM Code documents present a hardship without a compensating increase in quality and safety. ASME OM Code Case OMN-20, "Inservice Test Frequency," was approved and is proposed to be used as an alternative to the test periods specified in the ASME OM code.

Operational flexibility is needed when scheduling pump tests to minimize conflicts between the ASME OM Code specified test interval, plant conditions, and other maintenance and test activities. Lack of a frequency tolerance applied to ASME OM Code testing places a hardship on the plant when scheduling pump tests.

Code Case OMN-20 is not referenced in the latest revision of Regulatory Guide 1.192, "Operation and Maintenance Code Case acceptability, ASME OM Code" (August 2014), as an acceptable OM Code Case to comply with 10 CFR 50.55a(f) requirements as allowed by 10 CFR 50.55a(b)(6).

5. Proposed Alternative and Basis for Use

The proposed alternative is OMN-20, "Inservice Test Frequency," which addresses testing periods for pumps specified in ASME OM Division 1, Section IST, 2009 Edition through OMa-2011 Addenda, and all earlier editions and addenda of ASME OM Code.

PUMP RELIEF REQUEST 1

This request is being made in accordance with 10 CFR 50.55a(z)(2), in that the existing requirements are considered a hardship without a compensating increase in quality and safety for the following reasons:

1) For testing periods up to two years, Code Case OMN-20 provides an allowance to extend the testing periods by up to 25 percent. The period extension is to facilitate test scheduling and considers plant operating conditions that may not be suitable for performance of the required testing (for example, 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. Use of the test period extension has been a practice in the nuclear industry for many decades and not applying an extension would be a hardship when there is no evidence that the period extensions affect component reliability.

2) For testing periods of greater than or equal to two years, OMN-20 allows an extension of up to six months. The ASME OM Committee determined that such an extension is appropriate. The six-month extension will have a minimal impact on component reliability considering that the most probable result of performing any inservice test is satisfactory verification of the test acceptance criteria. As such, pumps will continue to be adequately assessed for operational readiness when tested in accordance with the requirements specified in 10 CFR 50.55a(f) with the frequency extensions allowed by Code Case OMN-20.

ASME OM, Division 1, Section IST, and earlier editions and addenda of ASME OM Code specify component test frequencies 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.). 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 the table below.

Frequency	Specified Time Period Between Tests
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

Per OMN-20, the specified time period between tests may be reduced or extended as follows:

1) For periods specified as less than two years, the period may be extended by up to 25 percent for any given test.

2) For periods specified as greater than or equal to two 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).

PUMP RELIEF REQUEST 1

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.

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 the ASME OM Code.

6. **Duration of Proposed Alternative**

   The proposed alternative is requested for use during the fifth 10-year IST interval.

7. **Precedent**

   The NRC approved the use of OMN-20 for Fort Calhoun on February 19, 2016 (NRC Agencywide Documents Access and Management System (ADAMS) Accession Number ML16041A308), and for Grand Gulf Nuclear Station, Unit 1, on June 16, 2016 (ADAMS Accession Number ML16160A092).

PUMP RELIEF REQUEST 2

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. ASME Code Components Affected

1CC-P-1A, B, and C	Component Cooling Water (CCR) Pumps, (Group A, Class 3)
1FW-P-2	Turbine-Driven Auxiliary Feedwater (AFW) Pump, (Group B, Class 3)
1FW-P-3A and B	Motor-Driven Auxiliary Feedwater (AFW) Pumps, (Group B, Class 3)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) (Code) – 2004 Edition, with Addenda through OMb-2006.

3. Applicable Code Requirement

ISTB-3510(b)(1), "Range," states:

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

4. Reason for Request

Certain Instruments used when testing the affected pumps do not meet the requirements of ISTB-3510(b)(1); however, the accuracy of the instruments used is more conservative than the requirements of ISTB-3510(a), "Accuracy," and Table ISTB-3510-1, "Required Instrument Accuracy," for Group A and Group B tests and comprehensive tests. The combination of higher range and better accuracy for each instrument yields a reading at least equivalent to the reading achieved from instruments that meet ISTB-3510(b)(1).

5. Proposed Alternative and Basis for Use

The instruments listed in the attached table may be used as long as the combination of the higher range and better accuracy for each instrument yields a reading at least equivalent to the reading achieved from instruments that meet ISTB-3510(b)(1).

NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," Section 5.5.1, "Range and Accuracy of Analog Instruments," states:

> When the range of a permanently installed analog instrument is greater than three times the reference value, but the accuracy of the instrument is more conservative than that required by the Code, the staff may grant relief when the combination of the range and accuracy yields a reading that is as at least equivalent to that achieved using instruments that meet the Code requirements (i.e., up ±6 percent for Group A and B tests, and ±1.5 percent for pressure and differential pressure instruments for Preservice and Comprehensive tests).

The instruments identified in the attached table satisfy the guidance provided in NUREG-1482, Section 5.5.1. Additional basis for use and the applicable test type are provided in the attached table.

PUMP RELIEF REQUEST 2

Using the provisions of this relief request as an alternative to the requirements of ISTB-3510(b)(1) provides an acceptable level of quality and safety since their use yields a reading that is as at least equivalent to that achieved using instruments that meet the ASME OM Code requirements as described in NUREG-1482, Section 5.5.1.

6. **Duration of Proposed Alternative**

   The proposed alternative is requested for use during the Beaver Valley Power Station, Unit No. 1, fifth 10-year inservice test interval.

7. **Precedent**

   A similar request was approved for the Beaver Valley Power Station, Unit No. 1, fourth 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing the request is referenced below.

   Beaver Valley Power Station, Unit No. 1, Docket No. 50-334, Safety Evaluation of Relief Request PRR2 for the Fourth 10-Year Inservice Testing Program, dated September 27, 2007 (ADAMS Accession No. ML072420376).

PUMP RELIEF REQUEST 2

IST PUMP INSTRUMENTATION			
Pump ID	**Instrument ID**	**Condition Requiring Relief**	**Basis for Relief/Alternate Test**
1CC-P-1A 1CC-P-1B 1CC-P-1C (Group A, Class 3)	PI-1CC-100A PI-1CC-100B PI-1CC-100C	The range of the gauges is slightly greater than three times the reference pressure during quarterly testing.	These gauges are the discharge pressure gauges for the CCR pumps. The range of the gauges is 0 to 400 pounds per square inch gauge (psig). Typical pressure readings are slightly lower than one third the range, and vary between 115 and 123 psig due to the use of a pump curve. The calibration accuracy is 1.0 percent, which would yield a reading more accurate than Code requirements. The use of these pressure instruments is applicable to Group A tests only since the combination of range and accuracy yields a reading of plus or minus (±) 3.5 percent which is less than the ±6 percent required by Code for the Group A test. During comprehensive testing, temporary pressure instrumentation will be used having a calibrated accuracy of at least ±0.5 percent of full scale with a sufficient range to satisfy the ±1.5 percent required by the Code for the comprehensive test.
	FI-1CC-117	The range of [FI-1CC-117] is greater than three times the reference flow.	This flow indicator is in a branch line of the component cooling water system. It is only used if the installed pressure differential indicators (PDIs) are over-ranged. In that case, the typical flow expected would be enough to meet Code requirements, except for flow indicator FI-1CC-117, which could be placed in service with a flow as low as 4000 gallons per minute (gpm). Flow indicator FI-1CC-117 is sized for all flow conditions with a range of 0 to 14,000 gpm and a loop accuracy of 1.58 percent. It is in the 24-inch river water CCR header supplying the cooling loads inside containment. When the residual heat removal (RHR) system is in operation, the flow through this line is significantly higher. The calibration accuracy of this gauge would yield a reading more accurate than Code requirements. This flow instrument may be used during both the Group A tests and comprehensive tests since the combination of range and accuracy yields a reading of ±5.53 percent which is less than the ±6 percent required by Code.

PUMP RELIEF REQUEST 2

IST PUMP INSTRUMENTATION			
Pump ID	**Instrument ID**	**Condition Requiring Relief**	**Basis for Relief/Alternate Test**
1CC-P-1A 1CC-P-1B 1CC-P-1C (Group A, Class 3) Continued	PDI-1CC-118	The range of the differential pressure (d/p) flow meter is greater than three times the reference flow for normal operations.	This d/p flow meter is in the 8-inch CCR header supplying the cooling loads in the auxiliary building, and has a range of 0-100 inch water column (inwc). Since the use of a pump curve is permitted by ASME OM Code Case OMN-16, the reference flow may not be at a specific flow point. Typical test flow d/p is approximately 18 to 21 inwc. The accuracy of the gauge is 0.5 percent, which would yield a reading more accurate than Code requirements. This flow instrument may be used during both the Group A and comprehensive tests since the combination of range and accuracy yields a reading of ±2.8 percent which is less than the ±6 percent required by Code.
	PDI-1CC-119	The range of the d/p flow meter is greater than three times the reference flow for normal operations.	This d/p flow meter is in the 24-inch CCR header supplying the cooling loads in the auxiliary building, has a range of 0-150 inwc. Since the use of a pump curve is permitted by ASME OM Code Case OMN-16, the reference flow may not be at a specific flow point. Typical test flow d/p is approximately 43 to 51 inwc. The accuracy of the gauge is 0.5 percent, which would yield a reading more accurate than Code requirements. This flow instrument may be used during both the Group A and comprehensive tests since the combination of range and accuracy yields a reading of ±1.74 percent which is less than the ±6 percent required by Code.

PUMP RELIEF REQUEST 2

IST PUMP INSTRUMENTATION			
Pump ID	**Instrument ID**	**Condition Requiring Relief**	**Basis for Relief/Alternate Test**
1FW-P-3A 1FW-P-3B (Group B, Class 3)	FI-1FW-100A FI-1FW-100B FI-1FW-100C	The range of the flow indicators is greater than three times the reference flow for the Motor-Driven AFW Pumps.	These flow indicators are in the three lines to the steam generators from the AFW pumps. The flow indicators are sized to measure accident flow from the turbine-driven AFW pump as well as the motor-driven AFW pumps, with a range of 0-400 gpm. For the motor-driven AFW pump full-flow tests, each loop measures approximately 110-115 gpm, which is 27.5 percent of the range. The calibration accuracy of the flow meters is 1.2 percent, which would yield a reading more accurate than Code requirements. These flow instruments will be used during both the Group B tests and comprehensive tests since the combination of range and accuracy yields a reading of ±4.36 percent which is less than the ±6 percent required by Code.
1FW-P-2 1FW-P-3A 1FW-P-3B (Group B, Class 3)	PI-1FW-156 PI-1FW-156A PI-1FW-156B	The range of the gauges is greater than three times the reference pressure.	These gauges are the suction pressure gauges for the AFW pumps. In 1991, the existing 0-160 psig gauges were changed to the present 0-60 psig gauges. This range was selected as a compromise between the IST Program requirements and possible accident pressures (that is, river water supplying the AFW pumps). The 0-60 psig range will accommodate the accident pressure and typical test pressure of 10 psig. With a calibration accuracy of 0.5 percent, this results in a reading more accurate than Code requirements. The use of these pressure instruments is applicable to Group B tests only since the combination of range and accuracy yields a reading of ±3.0 percent, which is less than the ±6 percent required by Code for the Group B test. During comprehensive testing, temporary pressure instrumentation will be used having a calibrated accuracy of at least ±0.5 percent of full scale with a sufficient range to satisfy the ±1.5 percent required by the Code for the comprehensive test.

PUMP RELIEF REQUEST 3

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. ASME Code Components Affected

1CH-P-1A, B and C	Charging Pumps, (Group A, Class 2)
1CH-P-2A and B	Boric Acid Transfer Pumps, (Group A, Class 3)
1RH-P-1A and B	Residual Heat Removal Pumps, (Group A, Class 2)
1SI-P-1A and B	Low Head Safety Injection Pumps, (Group B, Class 2)
1CC-P-1A, B and C	Component Cooling Water Pumps, (Group A, Class 3)
1FW-P-2	Turbine-Driven Auxiliary Feedwater Pump, (Group B, Class 3)
1FW-P-3A and B	Motor-Driven Auxiliary Feedwater Pumps, (Group B, Class 3)
1WR-P-1A, B and C	River Water Pumps, (Group A, Class 3)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. Applicable Code Requirement

ISTB-5123, "Comprehensive Test Procedure," refers to Table ISTB-5121-1, "Centrifugal Pump Test Acceptance Criteria," that requires an upper acceptable range limit of 1.03Qr and 1.03ΔPr where Qr is the reference flow rate and ΔPr is the reference differential pressure.

ISTB-5223, "Comprehensive Test Procedure," refers to Table ISTB-5221-1, "Vertical Line Shaft Centrifugal Pump Test Acceptance Criteria," that requires an upper acceptable range limit of 1.03Qr and 1.03ΔPr.

4. Reason for Request

For some pump tests, there has been difficulty implementing the upper acceptable range limit of 3 percent above the established hydraulic parameter reference value for the comprehensive pump test. Industry experience has shown that test results outside the criteria can easily occur when normal data scatter yields (1) a low measured reference value, and (2) high measured values for subsequent inservice tests. In these cases, some of the test data trend high near the upper acceptable range limit and may exceed the upper limit on occasion. The problem can be more severe for pumps with low differential pressures (50 pounds per square inch differential [psid] or less) due to the smaller acceptable range.

In these cases, the measured values that would exceed the plus 3 percent upper criteria would not represent an actual problem with either the test setup, instrumentation or the pump itself. The scatter induced collectively by the instrumentation and reference value variance is sufficient to approach or exceed the upper criterion.

ASME OM Code Case OMN-19, "Alternate Upper Limit for the Comprehensive Pump Test," from the 2012 Edition of ASME OM Code, allows a multiplier of 1.06 times the reference value in lieu of the 1.03 multiplier for the comprehensive pump test's upper acceptable range and required action range (high) limits. As described in ASME OM Code Case OMN-19, a required action range high

PUMP RELIEF REQUEST 3

limit of plus 6 percent is a realistic value that should allow any true degradation issues to be identified while alleviating the need to unnecessarily declare pumps inoperable.

5. **Proposed Alternative and Basis for Use**

For the affected pumps listed above, an upper acceptable range limit of 1.06 times the reference value will be applied to the comprehensive pump test in accordance with ASME OM Code Case OMN-19. Also, a periodic verification test (PVT) at the design basis accident flow rate will be performed for each of these pumps.

The following requirements shall be applied to the PVT.

1) Apply the PVT to the affected pumps listed in this request.
2) Perform the PVT at least once every two years.
3) Determine if a PVT is required before declaring a pump operable following replacement, repair, or maintenance on the pump.
4) Declare the pump inoperable if the PVT flow rate and associated differential pressure cannot be achieved.
5) Maintain the necessary records for each PVT, including the applicable test parameters (for example, flow rate, the associated differential pressure and speed for variable speed pumps) and their basis.
6) Account for the PVT instrument accuracies in the test acceptance criteria.

The upper limit for differential pressure established by the ASME OM Code is not reflective of any possible degradation mechanism, but is rather a means to identify a potentially incorrect test setup. Exceeding this upper limit while testing would require the pump to be considered inoperable, but primarily as a means to investigate the test instrumentation or other potential problems. The use of a plus 6 percent upper criteria rather than the plus 3 percent upper criteria would not mask any actual pump problem and would still function as an adequate trigger to investigate the test setup.

Using the provisions of this request as an alternative to the specific requirements of ISTB-5123 and ISTB-5223, and Tables ISTB-5121-1 and ISTB-5221-1 as described above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety.

6. **Duration of Proposed Alternative**

The proposed alternative is requested for use during the fifth 10-year IST interval.

7. **Precedent**

A similar request was approved by the Nuclear Regulatory Commission staff in their safety evaluation referenced below.

Virginia Electric and Power Company, Surry Power Station, Unit No. 1, Safety Evaluation of Pump Relief Request P-6 Regarding ASME OM Code Requirements for the Fifth 10-Year Inservice Test Program Interval, dated May 9, 2014 (ADAMS Accession No. ML14125A471).

PUMP RELIEF REQUEST 4

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. **ASME Code Components Affected**

   1EE-P-1A, B, C and D   Diesel Fuel Oil Transfer Pumps, (Group B, Class 3)

2. **Applicable Code Edition and Addenda**

   American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. **Applicable Code Requirement**

   ISTB-5322, "Group B Test Procedure," states in part that:

   > Group B tests shall be conducted with the pump operating at a specified reference point. The test parameter value identified in Table ISTB-3000-1 shall be determined and recorder as required by this paragraph.

   Table ISTB-3000-1, "Inservice Test Parameters," identifies flow rate as a test parameter, and Note 1 of the table states in part that:

   > For positive displacement pumps, flow rate shall be measured or determined; . . .

4. **Reason for Request**

   The diesel fuel oil transfer pumps transfer fuel oil from the underground emergency diesel generator fuel oil storage tank to the day tank in order to provide continuous operation of the diesel at rated load for up to seven days during an emergency.

   ISTB-5322 requires that the test parameters shown in Table ISTB-3000-1 be determined and recorded during Group B testing. For positive displacement pumps, flow rate is one of the test parameters listed in Table ISTB-3000-1. However, there is no installed instrumentation provided to measure flow rate for these emergency diesel generator fuel oil transfer pumps. A level sight glass does exist on the side of the diesel generator fuel oil day tank, which can be used to measure a change in level over time as the pumps transfer fuel oil from the underground storage tank to the day tank. The reading scale for measuring the level change over time, and the calculation method, yield an accuracy within plus or minus 2 percent as required by Table ISTB-3510-1, "Required Instrument Accuracy."

5. **Proposed Alternative and Basis for Use**

   Flow rate will be calculated by measuring the level change over time in the diesel generator fuel oil day tank, and converting this data into fuel oil transfer pump flow rate during both the Group B tests and comprehensive tests per emergency diesel generator and fuel oil transfer pump operating surveillance tests.

   This proposed alternative is consistent with the guidelines provided in NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," Revision 2, Section 5.5.2, "Use of Tank Level to Calculate Flow Rate for Positive Displacement Pumps." Section 5.5.2 states in part that:

PUMP RELIEF REQUEST 4

> When flow meters are not installed in the flow loop of a system with a positive displacement pump, it is impractical to directly measure flow rate for the pump. The staff has determined that, if the licensee uses the tank level to calculate the flow rate as described in Subsection ISTB-3550, the implementing procedure must include the calculational method and any test conditions needed to achieve the required accuracy. Specifically, the licensee must verify that the reading scale for measuring the tank level and the calculational method yield an accuracy within ±2 percent for Group A and B tests, and Preservice and Comprehensive Tests. If the meter does not directly indicate the flow rate, the record of the test shall identify the method used to reduce the flow data.

Calculating flow rate by a level change in the day tank is acceptable since the level of accuracy required by Table ISTB-3510-1 (and NUREG-1482 as noted above) is satisfied.

Using the provisions of this relief request as an alternative to the requirements of ISTB-5322 and Table ISTB-3000-1 provides an acceptable level of quality and safety since the alternative provides reasonable assurance of pump operational readiness.

6. **Duration of Proposed Alternative**

The proposed alternative is requested for use during the fifth 10-year IST interval.

7. **Precedent**

A similar request was approved for the Beaver Valley Power Station, Unit No. 1 fourth 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing the requested alternative is referenced below.

Beaver Valley Power Station, Unit No. 1, Docket No. 50-334, Safety Evaluation of Relief Request PRR4 for the Fourth 10-Year Inservice Testing Program, dated September 27, 2007 (ADAMS Accession No. ML072420376).

PUMP RELIEF REQUEST 5

Relief Request In Accordance with 10 CFR 50.55a(f)(5)(iii)

-- Inservice Testing Impracticality --

1. ASME Code Components Affected

1EE-P-1A, B, C, and D   Diesel Fuel Oil Transfer Pumps, (Group B, Class 3)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. Applicable Code Requirement

ISTB-5322, "Group B Test Procedure," Paragraph ISTB-5322(d), states:

> All deviations from the reference values shall be compared with the ranges of Table ISTB-5321-1 or ISTB-5321-2, as applicable, and corrective action taken as specified in ISTB-6200.

ISTB-5323, "Comprehensive Test Procedure," Paragraph ISTB-5323(e), states in part that:

> All deviations from the reference values shall be compared with the ranges of Table ISTB-5321-1 or Table ISTB-5321-2, as applicable, and corrective action taken as specified in ISTB-6200.

4. Impracticality of Compliance

The diesel fuel oil transfer pumps transfer fuel oil from the underground emergency diesel generator fuel oil storage tank to the day tank in order to support continuous operation of the diesel at rated load for up to seven days during an emergency.

Of the two tables referenced in the applicable code requirements, only Table ISTB-5321-1, "Positive Displacement Pump (Except Reciprocating) Test Acceptance Criteria," is applicable to the diesel fuel oil transfer pumps. The Group B and comprehensive test acceptance criteria for reference discharge pressure (P_r) and reference flow (Q_r) given in Table ISTB-5321-1 are as follows:

Group B Tests

Acceptable Range	Alert Range	Required Action Range Low	Required Action Range High
0.90 to 1.10Q_r	None	less than 0.90Q_r	greater than 1.10Q_r

Comprehensive Tests

Acceptable Range	Alert Range	Required Action Range Low	Required Action Range High
0.95 to 1.03Q_r	0.93 to less than 0.95Q_r	less than 0.93Q_r	greater than 1.03Q_r
0.93 to 1.03P_r	0.90 to less than 0.93P_r	less than 0.90P_r	greater than 1.03P_r

These limits are too restrictive for the fuel oil transfer pumps. The baseline discharge pressures for these four affected pumps range from 6.7 pounds per square inch gauge (psig) to 13.0 psig. Applying the acceptable limits from the ASME OM Code for these values, the average allowable degradation from the reference value is only 0.7 psig for the comprehensive test. The discharge pressure has historically varied by as much as 1 psig from one test to the next and between 1 to 2 psig over the course of a year, which is more than the acceptable range for discharge pressure.

PUMP RELIEF REQUEST 5

The baseline flows for these four pumps range from 9.0 to 13.3 gallons per minute (gpm). The average allowable degradation for flow is therefore only 1.1 gpm for the Group B test and only 0.56 gpm for the comprehensive test. The flow values also vary from test to test and between 1 to 1.5 gpm over the course of a year, which is more than the acceptable range for flow.

The ASME OM Code limits are too restrictive and therefore impractical to apply. Normal historic variation in discharge pressure and flow would require the pumps to enter the alert or required action ranges. An allowable variation larger than 0.7 psig or 0.56 gpm, is needed for both the Group B test and comprehensive test, as applicable, to trend pump performance.

The following expanded ranges for flow during the Group B tests and discharge pressure and flow during the comprehensive tests of the fuel oil transfer pumps are proposed.

Group B Tests

Acceptable Range	Alert Range	Required Action Range Low	Required Action Range High
0.80 to 1.15Q_r	None	less than 0.80 Q_r	greater than 1.15Q_r

Comprehensive Tests

Acceptable Range	Alert Range	Required Action Range Low	Required Action Range High
0.90 to 1.15Q_r	0.80 to less than 0.90Q_r	less than 0.80Q_r	greater than 1.15Q_r
0.80 to 1.20P_r	0.70 to less than 0.80P_r	less than 0.70P_r	greater than 1.20P_r

The function of these pumps is to be able to deliver fuel to the day tank to supply the diesel generator under rated load. The amount of fuel that is required to be delivered is 3.6 gpm, significantly lower than the reference values for all of the pumps. In addition, due to the nature of positive displacement pumps, flow should be the more consistent parameter.

The proposed range for the flow value is more restrictive because the flow rate is the more critical parameter for the system. The high flow limit is based on approximately half of the allowable variation expected in pumps with this rated flow rate, from the Hydraulic Institute Test Standard for Rotary Pumps, 14th edition.

These ranges would only result in an allowed variation of -2.01 psig and +1.34 psig for the lowest reference pressure reading (6.7 psig) of the four pumps, and -1.8 gpm and +1.35 gpm for the lowest reference flow reading (9.0 gpm) of the four pumps. In addition, during discussions with Ingersoll-Dresser Pumps, the pump manufacturer, when questioned about a limiting value for pump performance, the pump manufacturer has stated that as the pump wears and the clearances open, the performance will gradually change. No limiting value for either flow or discharge pressure was provided, and sudden performance degradation is not expected. These expanded ranges will allow degrading conditions to be identified and provide assurance that the fuel oil transfer pumps will be capable of fulfilling their safety function.

5. **Burden Caused by Compliance**

Extensive hardware changes would be required in order to comply with the requirements of Table ISTB-5321-1 with little or no enhancement or compensating increase to the quality of the tests or the ability to detect pump degradation.

PUMP RELIEF REQUEST 5

6. **Proposed Alternative and Basis for Use**

   Expanded limits for test acceptance criteria may be used in lieu of the test acceptance criteria specified in Table ISTB-5321-1. Testing will be performed per the diesel generator monthly test procedures using expanded ranges for flow and discharge pressure during the comprehensive tests and for flow during the Group B tests. These expanded ranges will allow degrading conditions to be identified without needlessly declaring the pumps inoperable and provide assurance that the fuel oil transfer pumps will be capable of fulfilling their safety function.

   Using the provisions of this relief request as an alternative to the requirements of Table ISTB-5321-1 provides a reasonable alternative to the code requirements and assurance that the pumps are operationally ready.

7. **Duration of Proposed Alternative**

   The proposed alternative is requested for use during the fifth 10-year inservice test interval.

8. **Precedent**

   A similar request was approved for the Beaver Valley Power Station, Unit No. 1 fourth 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing the alternative is referenced below.

   Beaver Valley Power Station, Unit No. 1, Docket No. 50-334, Safety Evaluation of Relief Request PRR5 for the Fourth 10-Year Inservice Testing Program, dated September 27, 2007 (ADAMS Accession No. ML072420376).

PUMP RELIEF REQUEST 6

Relief Request In Accordance with 10 CFR 50.55a(f)(5)(iii)

-- Inservice Testing Impracticality --

1. ASME Code Components Affected

1CH-P-2A and B Boric Acid Transfer Pumps, (Group A, Class 3)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. Applicable Code Requirement

ISTB-5121, "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.

Table ISTB-3000-1, "Inservice Test Parameters," identifies flow rate as a test parameter for Group A pumps.

4. Impracticality of Compliance

Testing the boric acid transfer pumps using the emergency boration flow path is impractical during power operation because it would inject water with a higher concentration of boric acid into the reactor coolant system, which would result in a reactivity transient. Therefore, the Code-required quarterly Group A testing is performed using an alternate test loop as shown on Figure 1. The pumps are Group A tested quarterly through RO-CH-ORBA-1(2), the restricting orifices in the minimum flow fixed resistance recirculation lines.

ISTB-5121 requires that the test parameters shown in Table ISTB-3000-1 be determined and recorded during Group A quarterly tests. Flow rate is one of the test parameters listed in Table ISTB-3000-1. However, there are no installed flow instruments in these recirculation lines to measure flow rate as required by ISTB-5121 and Table ISTB-3000-1. Because of the restricting orifices, the flow is assumed to be fixed and at its reference value. Delta-P and vibration are then measured and compared to the acceptance criteria.

NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," Revision 2, Section 5.9, "Pump Testing Using Minimum Flow Return Lines With or Without Flow Measuring Devices," states in part that:

> In cases where only the minimum-flow return line is available for pump testing, regardless of the test interval, the staff's position is that flow instrumentation that meets the requirements of Subsection ISTB-3500 should be installed in the mini-flow return line. Installation of this instrumentation is necessary to provide flow rate measurements during pump testing so that this data can be evaluated with the measured pump differential pressure to monitor for pump hydraulic degradation.

PUMP RELIEF REQUEST 6

The guidance provided in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," Attachment 1, Position 9, "Pump Testing using Minimum-flow Return line With or Without Flow Measuring Devices," still applies. Since a full flow loop exists that can be easily instrumented and utilized only during certain plant operating modes, the guidance provided in GL 89-04, Position 9, for non-instrumented minimum flow paths shall be followed during the quarterly Group A test. Position 9 of GL 89-04 states in part that:

> In cases where flow can only be established through a non-instrumented minimum flow path during quarterly pump testing and a path exists at cold shutdowns or refueling outages to perform a test of the pump under full or substantial flow conditions, the staff has determined that the increased interval is an acceptable alternative to the Code requirements, provided that pump differential pressure, flow rate, and bearing vibration measurements are taken during this testing and that quarterly testing also measuring at least pump differential pressure and vibrations is continued.

In accordance with Position 9 of the GL 89-04, the pumps have been shown capable of being tested through their full-flow recirculation flow paths (through valves HCV-1CH-110 [-105]), at a refueling frequency, and are also capable of being tested on-line at the two-year comprehensive pump test frequency. For the full-flow recirculation test, the flow is measured by a portable ultrasonic flow meter that has been "wet-flow" calibrated to within the plus or minus 2 percent accuracy required by Table ISTB-3510-1.

In order to install the flow meters, however, the insulation on the piping must be removed and the heat trace elements must be moved away from where the transducers and tracks will be installed. Moving the heat trace elements places stresses on them, which increases the probability of failure of the heat trace elements. The heat tracing on the boric acid piping is needed to support system operability. Therefore, it is impractical to test the pumps quarterly and at a cold shutdown frequency in this manner.

A review of past test results has shown that this combination of quarterly Group A testing and refueling or two-year on-line frequency comprehensive pump testing is capable of assessing pump performance and detecting degradation.

5. Burden Caused by Compliance

Use of a portable ultrasonic flow meter and full-flow recirculation flow path was considered for the quarterly test, but was determined to be impractical. Testing quarterly using the temporary ultrasonic flow meter would lead to the increased probability of failure of the heat trace elements.

Also, additional calibrated flow instrumentation would have to be purchased to ensure the availability of equipment. Permanently installing the flow meters would require a design change to the plant and the purchase of additional flow instrumentation. Performing the full-flow test quarterly and during cold shutdowns would not enhance the ability to assess operability of the pumps enough to justify the increased cost of a system design change.

In addition, testing during refueling outages diverts manpower from other refueling tasks. These tests must be scheduled at a time in the outage when the boric acid tanks are not required to be part of the boration flow path and must be coordinated with power supply outages. Even though the actual performance of these tests may be completed in a relatively short time, the set-up and restoration is approximately eight to ten hours for each pump. Removing the tests from the outage schedule would allow a greater focus on other safety-related tasks without impacting the level of quality and safety of the boric acid transfer pumps. In addition, a probabilistic risk

PUMP RELIEF REQUEST 6

assessment evaluation has determined that there is no increase in risk for the performance of this test, whether on-line or during refueling outages. Therefore, it is requested to perform the full-flow test at least once every two years, which satisfies the inservice test frequency of biennially specified in Table ISTB-3400-1 for the comprehensive test. Overall, proper monitoring of pump performance will be maintained via the quarterly Group A testing and full-flow comprehensive testing at least once every two years while on-line or during shutdown conditions.

6. **Proposed Alternative and Basis for Use**

Perform the quarterly Group A test through a fixed-resistance non-instrumented minimum-flow recirculation line assuming flow to be constant and measuring differential pressure (delta-P) in boric acid transfer pump operational test procedures. Perform the periodic verification test (as described in Mandatory Appendix V, "Pump Periodic Verification Test Program," of the 2012 ASME OM Code), and full flow comprehensive test at least once every two years.

Separate vibration reference and acceptance criteria values will be used for the different test conditions of the recirculation and full-flow tests.

This proposed alternative is consistent with the guidelines provided in NUREG-1482, Section 5.9 and GL 89-04, Position 9 and provides reasonable assurance of pump operational readiness without causing operational concerns, such as reactivity transients.

Using the provisions of this relief request as an alternative to the requirements of ISTB-5121 provides a reasonable alternative to the Code requirements.

7. **Duration of Proposed Alternative**

The proposed alternative is requested for use during the fifth 10-year IST interval.

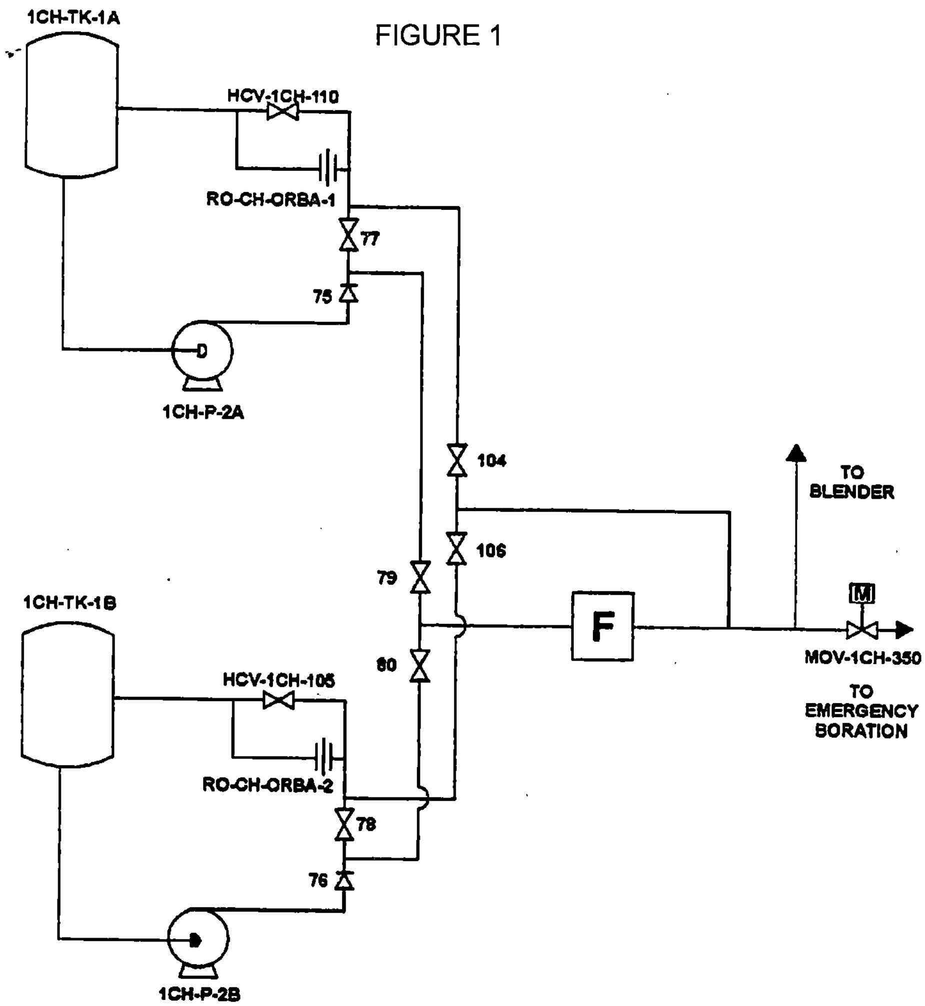
8. **Precedent**

A similar request was approved for the Beaver Valley Power Station, Unit No. 1 Fourth Ten-Year Inservice Test Interval. The Nuclear Regulatory Commission staff letter authorizing the alternative is referenced below.

Beaver Valley Power Station, Unit No. 1, Docket No. 50-334, Safety Evaluation of Relief Request PRR6 for the Fourth 10-Year Inservice Testing Program, dated September 27, 2007 (ADAMS Accession No. ML072420376).

PUMP RELIEF REQUEST 6

FIGURE 1



PUMP RELIEF REQUEST 7

Relief Request In Accordance with 10 CFR 50.55a(f)(5)(iii)

-- Inservice Testing Impracticality --

1. **ASME Code Components Affected**

1RH-P-1A and B   Residual Heat Removal Pumps, (Group A, Class 2)

2. **Applicable Code Edition and Addenda**

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. **Applicable Code Requirement**

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

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

Table ISTB-3400-1, "Inservice Test Frequency," requires Group A pumps to be tested on a quarterly frequency.

4. **Impracticality of Compliance**

The residual heat removal (RHR) pumps are in a standby condition during power operation, and are not required to be in service until the reactor coolant system (RCS) temperature is less than or equal to (≤) 350 degrees Fahrenheit (°F) and RCS pressure is ≤ 430 pounds per square inch gauge (psig). Therefore, they are not exposed to operational wear except when the RCS is at low temperature and pressure and the RHR system is in operation for normal shutdown cooling.

The RHR pumps have a design pressure of 600 psig. They take suction from the RCS, pass flow through the RHR heat exchangers, and then discharge back to the RCS. The RHR System is considered to be a low pressure system that could be damaged if exposed to the normal operating RCS pressure of approximately 2235 psig. In order to prevent this, the RHR inlet and return isolation valves are interlocked with an output signal from the RCS pressure transmitters, which prevent the valves from being opened when the RCS pressure exceeds 430 psig. In addition, these valves are also maintained shut with their breakers de-energized and administratively controlled. Therefore, testing of the RHR pumps during normal operation is not practicable since there are no alternate supply sources and aligning the RCS to the suction of the RHR pumps, during operation at power, would result in damage to piping and components due to over-pressurization. Major plant and system modifications would be needed to allow quarterly Group A testing of the RHR pumps according to ASME OM Code requirements.

Based on the above, compliance with the ASME OM Code test frequency requirement for Group A pump tests is impractical.

5. **Burden Caused by Compliance**

Testing is only possible during a surveillance interval frequency of cold shutdown and refueling unless major plant and system modifications are made.

PUMP RELIEF REQUEST 7

6. **Proposed Alternative and Basis for Use**

These pumps will be tested during cold shutdowns and refueling outages, not more often than once every 92 days, per 1OST-10.1 (Residual Heat Removal Pumps Performance Test). For a cold shutdown or refueling outage that extends longer than three months, the pumps will be tested every three months in accordance with Table ISTB-3400-1. In the instance of an extended outage, a Group A test may be performed; otherwise, a comprehensive test will be performed each refueling outage.

This proposed alternative is necessary to prevent the potential for piping and component damage as a result of over-pressurization.

Using the provisions of this relief request as an alternative to the frequency requirements of Table ISTB-3400-1 provides a reasonable alternative to the Code requirements and assurance that the pumps are operationally ready.

7. **Duration of Proposed Alternative**

The proposed alternative is requested for use during the fifth 10-year inservice test interval.

8. **Precedent**

A similar request was approved for the Beaver Valley Power Station, Unit No. 1 fourth 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing the alternative is referenced below.

Beaver Valley Power Station, Unit No. 1, Docket No. 50-334, Safety Evaluation of Relief Request PRR7 for the Fourth 10-Year Inservice Testing Program, dated September 27, 2007 (ADAMS Accession No. ML072420376).

PUMP RELIEF REQUEST 8

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. ASME Code Components Affected

1CH-P-2A and B	Boric Acid Transfer Pumps, (Group A, Class 3)
1RH-P-1A and B	Residual Heat Removal Pumps, (Group A, Class 2)
1SI-P-1A and B	Low Head Safety Injection Pumps, (Group B, Class 2)
1FW-P-3A and B	Motor-Driven Auxiliary Feedwater Pumps, (Group B, Class 3)
1WR-P-1A, B and C	River Water Pumps, (Group A, Class 3)
1EE-P-1A, B, C, and D	Fuel Oil Transfer Pumps, (Group B, Class 3)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. Applicable Code Requirement

ISTB-5121, "Group A Test Procedure," and ISTB-5123, "Comprehensive Test Procedure," state in subparagraphs ISTB-5121(e) and ISTB-5123(e):

> All deviations from the reference values shall be compared with the ranges of Table ISTB-5121-1 and corrective action taken as specified in ISTB-6200. Vibration [The vibration] measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges of Table ISTB-5121-1. For example, if vibration exceeds either 6Vr, or 0.7 in./sec [inches per second] (1.7 cm/sec) [centimeters per second], the pump is in the required action range.

ISTB-5221, "Group A Test Procedure," and ISTB-5223, "Comprehensive Test Procedure," state in subparagraphs ISTB-5221(e) and ISTB-5223(e):

> All deviations from the reference values shall be compared with the ranges of Table ISTB-5221-1 and corrective action taken as specified in ISTB-6200. Vibration [The vibration] measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges of Table-ISTB-5221-1. For example, if vibration exceeds either 6Vr, or 0.7 in/sec (1.7 cm/sec), the pump is in the required action range.

ISTB-5321, "Group A Test Procedure," and ISTB-5323, "Comprehensive Test Procedure," state in subparagraphs ISTB-5321(e) and ISTB-5323(e):

> All deviations from the reference values shall be compared with the ranges of Table ISTB-5321-1 or Table-5321-2, as applicable, and corrective action taken as specified in ISTB-6200. For reciprocating positive displacement pumps, vibration measurements shall be compared to both the relative criteria shown in the alert and required action ranges of Table ISTB-5321-2 [Table ISTB-5321-1]. For all other positive displacement pumps, vibration measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges of Table ISTB-5321-1 [Table ISTB-5321-2]. For example, if vibration exceeds either 6Vr, or 0.7 in/sec (1.7 cm/sec), the pump is in the required action range.

PUMP RELIEF REQUEST 8

Note: Beaver Valley Power Station (BVPS), Unit No. 1, (BVPS-1) has no reciprocating positive displacement pumps in the Inservice Test (IST) Program. Therefore, Table ISTB-5321-2 is not applicable.

4. Reason for Request

The pumps listed above tend to be smooth running pumps in the BVPS-1 IST Program. Each has at least one vibration reference value (Vr) that is currently less than 0.05 in/sec. A small value for Vr produces a small acceptable range for pump operation. The ASME OM Code acceptable range limit for pump vibrations from Table ISTB-5121-1, Table ISTB-5221-1, and Table ISTB-5321-1 for both the Group A test and comprehensive test is less than or equal to 2.5 Vr. Based on a small acceptable range, a smooth running pump could be subject to unnecessary corrective action if the measured vibration parameter exceeds this limit. ISTB-6200, "Corrective Action," subarticle ISTB-6200(a), "Alert Range," states:

> If the measured test parameter values fall within the alert range of Table ISTB-5121-1, Table ISTB-5221-1, Table ISTB-5321-1, or Table ISTB-5321-2, as applicable, the frequency of testing specified in ISTB-3400 shall be doubled until the cause of the deviation is determined and the condition is corrected.

For very small vibration reference values, flow variations, hydraulic noise, and instrument error can be a significant portion of the reading and affect the repeatability of subsequent measurements. Also, experience gathered by the BVPS Predictive Maintenance (PdM) Group has shown that changes in vibration levels in the range of 0.05 in/sec do not normally indicate significant degradation in pump performance.

In order to avoid unnecessary corrective actions, a minimum value for V_r of 0.05 in/sec is proposed. This minimum value would be applied to individual vibration locations for those pumps with reference vibration values less than 0.05 in/sec. Therefore, the smallest ASME OM Code acceptable range limit for any IST pump vibration measurement location would be no lower than 2.5 times V_r, or 0.125 in/sec, which is within the "fair" range of the "General Machinery Vibration Severity Chart" provided by IRD Mechanalysis, Inc. Likewise, the smallest ASME OM Code alert range limit for any IST pump vibration measurement location for which the pump would be inoperable would be no lower than 6 times V_r, or 0.300 in/sec.

When new reference values are established per ISTB-3310, ISTB-3320 or ISTB-6200(c), the measured parameters will be evaluated for each location in order to determine if the provisions of this relief request still apply.

In addition to the requirements of ISTB for inservice testing, the pumps in the IST Program are also included in the BVPS PdM Program. The BVPS PdM Program currently employs predictive monitoring techniques such as: vibration monitoring and analysis beyond that required by ISTB, bearing temperature trending, oil sampling and analysis, and thermography analysis, as applicable.

If the measured parameters are outside the normal operating range or are determined by analysis to be trending toward an unacceptable degraded state, appropriate actions are taken that may include: initiation of a condition report, increased monitoring to establish a rate of change, review of component specific information to identify the cause of the condition, and removal of the pump from service to perform maintenance.

PUMP RELIEF REQUEST 8

5. **Proposed Alternative and Basis for Use**

In lieu of applying the vibration acceptance criteria ranges specified in Table ISTB-5121-1, Table ISTB-5221-1, or Table ISTB-5321-1, as applicable, smooth running pumps with a measured reference value below 0.05 in/sec for a particular vibration measurement location will have subsequent test results for that location compared to an acceptable range limit of 0.125 in/sec and an alert range limit of 0.300 in/sec (based on a minimum reference value 0.05 in/sec). These proposed ranges shall be applied to vibration test results during both Group A tests and comprehensive tests.

In addition to the Code requirements, the affected pumps listed in this request are included in and will remain in the BVPS PdM Program.

Using the provisions of this relief request as an alternative to the specific requirements of ISTB identified above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety without unnecessarily imposing corrective action since changes in vibration levels in the range of 0.05 in/sec do not normally indicate significant degradation in pump performance.

Using the provisions of this relief request as an alternative to the vibration acceptance criteria ranges specified in Table ISTB-5121-1, Table ISTB-5221-1, or Table ISTB-5321-1 provides an acceptable level of quality and safety since the alternative provides reasonable assurance of pump operational readiness and the ability to detect pump degradation.

6. **Duration of Proposed Alternative**

The proposed alternative is requested for use during the fifth 10-year IST interval.

7. **Precedent**

A similar request was approved by the Nuclear Regulatory Commission staff in their safety evaluation referenced below.

Beaver Valley Power Station, Unit No. 1, Docket No. 50-334, Safety Evaluation of Relief Request PRR8 for the Fourth 10-Year Inservice Testing Program, Dated September 27, 2007 (ADAMS Accession No. ML072420376).

PUMP RELIEF REQUEST 9

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(2)

-- Hardship Without a Compensating Increase in Quality and Safety --

1. **ASME Code Components Affected**

   1FW-P-3A and B — Motor-Driven Auxiliary Feedwater Pumps, (Group B, Class 3)

2. **Applicable Code Edition and Addenda**

   American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. **Applicable Code Requirement**

   ISTB-5122, "Group B Test Procedure," states in part that:

   > Group B tests shall be conducted with the pump operating at a specified reference point. The test parameter value identified in Table ISTB-3000-1 shall be determined and recorded as required by this paragraph.

   Table ISTB-3000-1, "Inservice Test Parameters," identifies flow rate as a test parameter and Note 1 states in part that:

   > . . . differential pressure or flow rate shall be measured or determined.

4. **Reason for Request**

   Introduction of relatively cold auxiliary feedwater into the steam generators for quarterly testing would produce a potential for thermal shock to both the main feed piping (thermal sleeves) and the secondary side of the steam generators. Although the thermal sleeves and steam generators are designed for thermal shock, exposure to these events is minimized in order to ensure that the benefits of plant life extension can be realized. In addition, feeding the steam generators with a large volume of relatively cold water would also result in a large level transient in the steam generators and could cause a reactor trip.

   Additionally, these pumps receive their suction from the demineralized water storage tank. The water in the demineralized water storage tank is not treated for pH or oxygen; therefore, it could have an impact on the corrosion rates in the steam generators. For this reason, it is preferred to minimize the use of this water while in Modes 1, 2, or 3.

   In order to perform the quarterly Group B test, a recirculation flow path must be used that recirculates the demineralized water storage tank. Although the installed suction flow indicating switch for each pump has a 0 to 350 gallon per minute (gpm) logarithmic scale that is calibrated to an accuracy of plus or minus 1 percent of full scale, the smallest increments between 100 and 200 gpm is 5 gpm. These increments are too large to read flow accurately at a throttled recirculation flow rate of 200 gpm.

   ISTB-5122 requires that the test parameters in Table ISTB-3000-1 be determined and recorded during Group B quarterly tests. Flow rate is one of the test parameters listed in Table ISTB-3000-1. Section ISTB-3510(a) requires that instruments used for testing be accurate within the specifications in Table ISTB-3510-1. Table ISTB-3510-1 requires that the flow rate be accurate to within plus or minus 2 percent of the actual flow rate.

PUMP RELIEF REQUEST 9

An allowed ASME accuracy of 2.0 percent for flow minus the calibrated accuracy of 1.0 percent for the installed suction flow indicating switches multiplied by the reference flow rate of 200 gpm results in the flow reading needing to be capable of being read to at least plus or minus 2.0 gpm. Being able to accurately read flow half-way between the smallest increments of 5 gpm on the flow indicators yields a reading that is only capable of being read to 2.5 gpm. Therefore, the installed suction flow indicating switches cannot be used for ASME pump testing. The installation of temporary flow instrumentation during the performance of the Group B quarterly test is an undue burden when compared to the limited benefits gained by the results of the quarterly pump tests.

Since an instrumented full flow loop exists that can be utilized during refueling outages, the guidance provided in Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," Attachment 1, Position 9, "Pump Testing Using Minimum Flow Return Line With or Without Flow Measuring Devices," for minimum flow paths shall be followed during the quarterly Group B test.

Position 9 of Generic Letter 89-04 states in part that:

> In cases where flow can only be established through a non-instrumented minimum flow path during quarterly pump testing and a path exists at cold shutdowns or refueling outages to perform a test of the pump under full or substantial flow conditions, the staff has determined that the increased interval is an acceptable alternative to the Code requirements, provided that pump differential pressure, flow rate, and bearing vibration measurements are taken during this testing and that quarterly testing also measuring at least pump differential pressure and vibrations is continued.

In accordance with Position 9 of the Generic Letter 89-04, the pumps are capable of being tested through their full-flow paths by injecting flow into the steam generators via flow instrumentation, at a refueling frequency.

5. <u>Proposed Alternative and Basis for Use</u>

As an alternative to the requirements of ISTB-5122 and Table ISTB-3000-1, the quarterly Group B test will be performed using the recirculation flow path while measuring differential pressure per motor-driven auxiliary feedwater pump tests, with flow assumed to be fixed and at its reference value. The periodic verification test (as described in Mandatory Appendix V, "Pump Periodic Verification Test Program," of the 2012 ASME OM Code) and biennial comprehensive test will be performed during refueling outages when plant conditions permit directing flow to the steam generators. Full flow will be measured using the flow instrumentation in the steam generator supply headers while also measuring differential pressure and vibrations per motor-driven auxiliary feedwater pump check valve and full-flow tests. Separate differential pressure reference and acceptance criteria values will be used for the different test conditions of the recirculation and full-flow tests. Motor-driven auxiliary feedwater pump check valve and full-flow test procedures may be performed in lieu of the quarterly tests, if their scheduled performances coincide.

This proposed alternative is in accordance with the guidelines provided in Generic Letter 89-04, Position 9.

Compliance with the requirements of ISTB-5122 and Table ISTB-3000-1 would require hardware changes and cause a hardship without a compensating increase in the level of quality and safety as previously described.

PUMP RELIEF REQUEST 9

6. Duration of Proposed Alternative

The proposed alternative is requested for use during the fifth 10-year inservice test interval.

7. Precedent

A similar request was approved for the Beaver Valley Power Station, Unit No. 1 fourth 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing the alternative is referenced below.

Beaver Valley Power Station, Unit No. 1, Docket No. 50-334, Safety Evaluation of Relief Request PRR9 for the Fourth 10-Year Inservice Testing Program, dated September 27, 2007 (ADAMS Accession No. ML072420376).

PUMP RELIEF REQUEST 10

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(2)
-- Hardship Without a Compensating Increase in Quality and Safety --

1. **ASME Code Components Affected**

   1FW-P-2 Turbine-Driven Auxiliary Feedwater Pump, (Group B, Class 3)

2. **Applicable Code Edition and Addenda**

   American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. **Applicable Code Requirement**

   ISTB-5122, "Group B Test Procedure," states in part that:

   > Group B tests shall be conducted with the pump operating at a specified reference point. The test parameter value identified in Table ISTB-3000-1 shall be determined and recorded as required by this paragraph.

   Table ISTB-3000-1, "Inservice Test Parameters," identifies flow rate as a test parameter and Note 1 states in part that:

   > . . . differential pressure or flow rate shall be measured or determined.

4. **Reason for Request**

   Introduction of relatively cold auxiliary feedwater into the steam generators for quarterly testing would produce a potential for thermal shock to both the main feed piping (thermal sleeves) and the secondary side of the steam generators. Although the thermal sleeves and steam generators are designed for thermal shock, exposure to these events is minimized in order to ensure that the benefits of plant life extension can be realized. In addition, feeding the steam generators with a large volume of relatively cold water would also result in a large level transient in the steam generators and could cause a reactor trip.

   Additionally, this pump receives suction from the demineralized water storage tank. The water in the demineralized water storage tank is not treated for pH or oxygen; therefore, it could have some impact on the corrosion rates in the steam generators. For this reason, it is preferred to minimize the use of this water while in Modes 1, 2, or 3.

   In order to perform the quarterly Group B test, a recirculation flow path must be used that recirculates the demineralized water storage tank. Although the installed suction flow indicating switch has a 0 to 700 gallon per minute (gpm) logarithmic scale that is calibrated to an accuracy of plus or minus 1 percent of full scale, the smallest increments between 100 and 400 gpm are 10 gpm. These increments are too large to read flow accurately at a throttled recirculation flow rate of 300 gpm.

   ISTB-5122 requires that the test parameters in Table ISTB-3000-1 be determined and recorded during Group B quarterly tests. Flow rate is one of the test parameters listed in Table ISTB-3000-1. Section ISTB-3510(a) requires that instruments used for testing be accurate within the specifications in Table ISTB-3510-1. Table ISTB-3510-1 requires that the flow rate be accurate to within plus or minus 2 percent of the actual flow rate.

PUMP RELIEF REQUEST 10

Based on an allowed ASME accuracy of 2.0 percent for flow minus the calibrated accuracy of 1.0 percent for FIS-1FW-152 multiplied by the reference flow rate of 300 gpm, flow readings need to be capable of being read to at least plus or minus 3.0 gpm. Being able to accurately read flow half way between the smallest increments of 10 gpm on the flow indicator yields a reading that is only capable of being read to 5 gpm. Therefore, the installed suction flow indicating switch cannot be used for ASME pump testing. The installation of temporary flow instrumentation during the performance of the Group B quarterly test is an undue burden when compared to the limited benefits gained by the results of the quarterly pump tests.

Since an instrumented full flow loop exists that can be utilized during refueling outages, the guidance provided in Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," Attachment 1, Position 9, "Pump Testing Using Minimum Flow Return Line With or Without Flow Measuring Devices," for minimum flow paths shall be followed during the quarterly Group B test.

Position 9 of Generic Letter 89-04 states in part that:

> In cases where flow can only be established through a non-instrumented minimum flow path during quarterly pump testing and a path exists at cold shutdowns or refueling outages to perform a test of the pump under full or substantial flow conditions, the staff has determined that the increased interval is an acceptable alternative to the Code requirements, provided that pump differential pressure, flow rate, and bearing vibration measurements are taken during this testing and that quarterly testing also measuring at least pump differential pressure and vibrations is continued.

As stated above, Generic Letter 89-04 requires full flow testing during cold shutdowns or refueling outages. Full flow testing of the turbine driven auxiliary feedwater pump can only be performed in Mode 3 because the turbine requires steam from any of the three steam generators to drive the pump. It is not desirable to test the pump during cold shutdown, but rather only in Mode 3 during shutdown or during startup after a refueling outage for the following reasons.

In Mode 3, the introduction of relatively cold auxiliary feedwater into the steam generators produces a potential for thermal shock to both the main feed piping (thermal sleeves) and the secondary side of the steam generators. Although the thermal sleeves and steam generators are designed for thermal shock, the exposure to these events is minimized in order to ensure that the benefits of plant life extension can be realized.

As previously stated, this pump takes suction from the demineralized water storage tank. The water in the demineralized water storage tank is not treated for pH or oxygen; therefore, it could have some impact on the corrosion rates in the steam generators. For this reason, it is preferred to minimize the use of this water while in Modes 1, 2, or 3.

In addition during startup, this test can only be performed once the steam pressure exceeds 600 psig. Testing at this time during startup causes a temperature transient. The turbine draws steam from the steam generators, causing the reactor coolant system to cool down. In addition, the relatively cold auxiliary feedwater is injected into the steam generators, causing the reactor coolant system to cool even more. This cool down delays startup and is critical path time. Thus, any cool down is costly in the amount of time required to heat back up again.

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For the reasons stated above, performing a full-flow test of the turbine-driven auxiliary feedwater pump at each cold shutdown is not desired. Testing will be performed in Mode 3 during shutdown or during startup after a refueling outage by injecting flow into the steam generators via flow instrumentation.

5. **Proposed Alternative and Basis for Use**

As an alternative to the requirements of ISTB-5122 and Table ISTB-3000-1, the quarterly Group B test will be performed using the recirculation flow path while measuring differential pressure per steam-driven auxiliary feedwater pump test, with flow assumed to be fixed and at its reference value. The periodic verification test (as described in Mandatory Appendix V, "Pump Periodic Verification Test Program," of the 2012 ASME OM Code) and comprehensive test will be performed in Mode 3 during shutdown or during startup after refueling outages when plant conditions permit directing flow to the steam generators. Full flow will be measured using the flow instrumentation in the steam generator supply headers while also measuring differential pressure and vibrations per turbine-driven auxiliary feedwater pump operability test. Separate differential pressure reference and acceptance criteria values will be used for the different test conditions of the recirculation and full-flow tests. The turbine-driven auxiliary feedwater pump operability test procedure will be performed in lieu of the quarterly Group B test, during refueling outages.

This proposed alternative is in accordance with the guidelines provided in Generic Letter 89-04, Position 9.

Compliance with the requirements of ISTB-5122 and Table ISTB-3000-1 would require hardware changes and cause a hardship without a compensating increase in the level of quality and safety as previously described.

6. **Duration of Proposed Alternative**

The proposed alternative is requested for use during the fifth 10-year inservice test interval.

7. **Precedent**

A similar request was approved for the Beaver Valley Power Station, Unit No. 1 fourth 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing the alternative is referenced below.

Beaver Valley Power Station, Unit No. 1, Docket No. 50-334, Safety Evaluation of Relief Request PRR10 for the Fourth 10-Year Inservice Testing Program, dated September 27, 2007 (ADAMS Accession No. ML072420376).

PUMP RELIEF REQUEST 11

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(2)

-- Hardship Without a Compensating Increase in Quality and Safety --

1. ASME Code Components Affected

1RS-P-1A and B	Inside Recirculation Spray Pumps, (Group B, Class 2)
1RS-P-2A and B	Outside Recirculation Spray Pumps, (Group B, Class 2)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. Applicable Code Requirement

ISTB-3300, "Reference Values," ISTB-3300(e)(1), requires reference values to be established within plus or minus 20 percent of pump design flow rate for the comprehensive test.

4. Reason for Request

Prior to initial startup, the inside and outside recirculation spray pumps were subject to long term full flow testing. This testing was performed in 1972 as follows:

a) With the nozzle openings blocked off (195 per header), temporary connections were made between the nozzle headers and containment sumps.

b) Sufficient water was then added to the containment sump so that a recirculation spray pump could recirculate water up through its respective cooler and header.

c) The full flow test through the shell side of the cooler initially ensured that the required recirculation spray for containment depressurization was achieved.

d) Upon completion of the above system test, the water was drained from each recirculation cooler, the pumps, the headers and the sumps. The temporary connections between the header and sumps were removed and the nozzles installed.

Since the system was left in a dry, ready condition after the initial full flow tests, no further testing with water flow through the shell side of the recirculation spray heat exchangers is deemed necessary to ensure system capability. Further, the spray nozzles are inaccessible without a significant amount of scaffolding. Even if accessibility was not a concern, the plugging of 780 spray nozzles, the installation of temporary piping, the performance of the full flow test and the return of the system to its operable configuration present substantial challenges. The effort would present challenges in terms of complexity of the temporary modifications, labor intensive nature of the modifications, as well as the controls and post modification testing to ensure that the system is returned to the original configuration.

Re-establishing this full flow test circuit for the purpose of periodic design flow rate testing would require a similar modification every two years. The expensive and time consuming temporary changes described above would be necessary to duplicate the initial full flow tests, and would cause a hardship without a compensating increase in the level of quality and safety. Likewise, replacement of the four-inch recirculation test line with a line of sufficient size to accommodate design flow rate testing would cause a hardship without a compensating increase in the level of quality and safety.

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The recirculation spray pumps have a design point and best efficiency flow rate of 3500 gallons per minute (gpm). To be within 20 percent of pump design flow rate on the low end requires a minimum reference flow rate of 2800 gpm. The code requirements that direct the Owner to establish reference values at this flow rate were adopted after the test circuit was installed. Due to the flow restrictions associated with the existing piping configuration, plus or minus 20 percent of the 3500 gpm design flow rate cannot be achieved through the four-inch recirculation test line. A maximum flow rate of approximately 2050 gpm is achievable through the four-inch recirculation test line. Presently, the inservice test reference flow rates are established with the existing test circuit at approximately 2050 gpm. Simple diagrams of the inside and outside recirculation spray pump test circuits are attached to this relief request.

Reference flow rates are not within the 20 percent of design flow rate required during the comprehensive test. The test flows are lower than the design flow rate as a result of restrictions due to the small four-inch recirculation line. With the recirculation line restrictions, the highest flow rate that can be measured (approximately 2050 gpm) while maintaining stable test conditions is within approximately 41 percent of the pump design point/best efficiency flow rate.

5. Proposed Alternative and Basis for Use

As an alternative to testing within plus or minus 20 percent of the design flow rate during the comprehensive test, as required by ISTB-3300(e)(1), the reference values will be established at approximately 2050 gpm, which is within approximately 41 percent of the design flow rate and to within approximately 38 to 40 percent of the maximum required accident flow rates.

Testing will be conducted as follows:

The test circuits as shown in the diagrams attached to this relief request will be used to satisfy preservice testing requirements.

The inside recirculation spray pumps shall have a 30-inch high temporary dike constructed around the containment sump encompassing the pump suction and four-inch recirculation test line return. Sufficient inventory will be provided to establish stable flow conditions through the four-inch recirculation test line. Temporary test instrumentation, of required accuracy, shall be installed as required, in the pump test circuit.

The outside recirculation spray pumps shall be tested by establishing the hydraulic test circuit in a solid condition. Flow shall be recirculated through the pump casing while measuring flow with flow indication provided in the four-inch recirculation test line. Temporary pressure instrumentation shall be utilized at the pumps' suction and discharge.

Pump vibration will be measured and recorded in accordance with the criteria specified in the Code. In addition, vibration spectral analysis will also be performed, which is a more accurate method of detecting mechanical degradation or changes than that of the traditional inservice test vibration requirements.

The inside and outside recirculation spray pumps have a design point and best efficiency flow rate of 3500 gpm with varying maximum required accident flow rates. The table below shows the maximum required accident flow rates for each pump and the range of values within which test flows are established.

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The reference flow rate for inside recirculation spray pump 1RS-P-1A is within 38 percent of the maximum required accident flow rate of 3320 gpm. This percentage of the maximum required accident flow rate is specified for recirculation spray pump 1RS-P-1A and the other recirculation spray pumps in the table below.

Pump ID	Accident Flow	Test Flow	Percent Within Accident Flow
1RS-P-1A	3320 gpm	2050-2075 gpm	-38 %
1RS-P-1B	3370 gpm	2050-2075 gpm	-39 %
1RS-P-2A	3385 gpm	2040-2060 gpm	-40 %
1RS-P-2B	3340 gpm	2040-2060 gpm	-39 %

Presently, the inservice test reference flow rates are typically established with the existing test circuit in the range of 2040 to 2075 gpm. The low reference flow rates result from restrictions due to the small four-inch recirculation line and the limited volume of water in the test circuit.

With the restrictions described, the highest flow rate that can be measured while maintaining stable test conditions is within approximately 41 percent of the 3500 gpm design flow rate and within approximately 38 to 40 percent of the maximum required accident flow rates.

In the 2040 to 2075 gpm range of the head curve for these pumps, the curve is not flat but well sloped. The pump head curves are attached at the end of this relief request. Therefore, as performance degrades due to internal recirculation caused by increasing internal pump clearances, the differential pressure will measurably decrease for a given reference flow rate.

To be within 20 percent of pump design flow rate on the low end requires a minimum reference flow rate of 2800 gpm. To be within 20 percent of the maximum required accident flow rate on the low end would require minimum reference flow rates ranging from 2656 to 2708 gpm, depending on the pump being tested. For the reasons previously stated, reference flow rates are procedurally controlled within a range of 2040 to 2075 gpm, which is not within the 20 percent of the design flow rate required during the comprehensive test.

Testing at near design flow rate conditions is important for pumps with characteristic head-flow curves that are flat or gently sloping in the low flow region (little change in developed head with increasing flow rate). In the low flow region, increasing internal flow rates, as a result of internal wear, are difficult to detect. Pumps with the flat portion of the curve at low flow rates should be tested at or near design conditions to determine if increasing internal recirculation flow rates have degraded pump performance to the point where design performance cannot be met.

This situation does not apply to the inside and outside recirculation spray pumps if they are tested within approximately 41 percent of the design flow rate when considering the slope of the curve. Testing at the proposed reference flow rates will detect degradation since the pump head-curve is well sloped at the point of testing.

These recirculation spray pumps are Group B standby pumps run only for surveillance testing. The pumps do not see prolonged use. The low number of operating hours makes degradation of each pump unlikely. Significant changes in pump operation are not expected when each pump's run time is typically less than 2 hours once every 18 month cycle.

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In order to compensate for testing all four pumps at the reduced flow rates, the inside and outside recirculation spray pumps are included in the Beaver Valley Predictive Maintenance (PdM) Program. All pumps have enhanced vibration monitoring with spectral analysis data obtained each refueling outage. The outside recirculation spray pumps are subject to periodic oil sample analysis. The bearings associated with the inside recirculation spray pumps are grease lubricated. These activities are beyond that required by ISTB and provide further assurance as to the ability to detect pump degradation. Also, as a preventive maintenance activity, the outside recirculation spray pumps' mechanical seals are replaced every seventh refueling outage.

If measured parameters are outside the normal operating range or are determined by analysis to be trending towards a degraded state, appropriate actions are taken. These actions may include monitoring of additional parameters, review of component specific information to identify cause and removal of the pump from service to perform corrective maintenance.

Compliance with the specific ISTB Code requirements identified in this relief request would require significant temporary modifications or permanent hardware changes and cause a hardship without a compensating increase in the level of quality and safety as previously described. In order to achieve a flow rate near the design point of 3500 gpm, an 8-inch test loop would have to be installed in place of the current 4-inch test loop for each pump. These modifications are estimated to cost approximately $760,000 dollars.

Performing the required temporary modifications used during plant startup testing in 1972 or enlarging the size of the test loops to achieve the required accident flow rates is not warranted since there will be no improvement in our ability to detect pump degradation. Testing the pumps utilizing the current test loops provides for substantial flow testing in a sloped and stable region of the pump curve (that is, at approximately 2050 gpm), well above the minimum continuous flow rate of 1400 gpm specified by the pump manufacturer. Testing the pumps at reference values established in this region of the pump curves will not cause damage to the pumps and will provide meaningful data to assess pump operational readiness. In order to compensate for testing these pumps at a reduced flow rate during the comprehensive pump test, the inside and outside recirculation spray pumps are also included in the predictive maintenance program where enhanced vibration monitoring is done. Testing using the current test loops in conjunction with the additional predictive maintenance technologies will ensure reliable operation of the inside and outside recirculation spray pumps.

Based on the above evaluation, compliance with ISTB-3300(e)(1) reference value requirements for the inside and outside recirculation spray pumps would result in a hardship without a compensating increase in the level of quality or safety. The proposed alternative to the requirements specified in ISTB-3300(e)(1) provides sufficient indication of any potential degradation occurring to the pumps and reasonable assurance that the pumps are operationally ready and able to perform their function.

6. **Duration of Proposed Alternative**

The proposed alternative is requested for use during the fifth 10-year inservice test interval.

7. **Precedent**

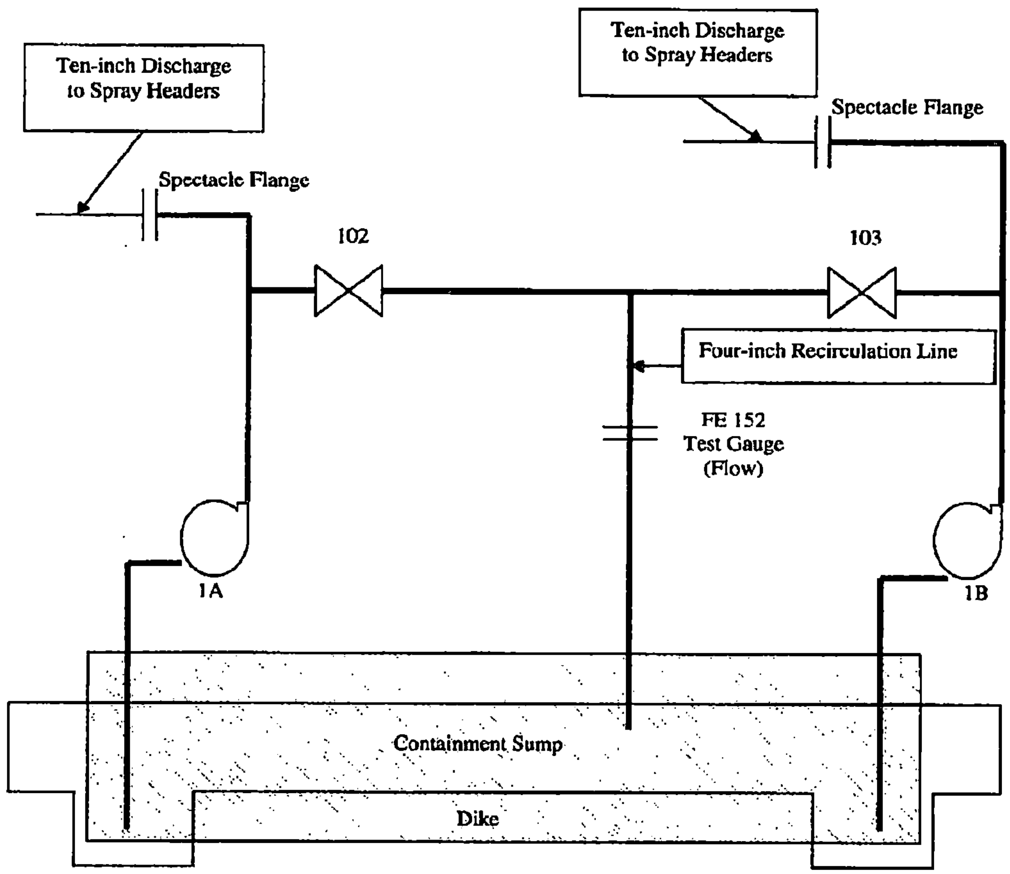
A similar request was approved for Beaver Valley Power Station, Unit No. 1, fourth 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing the alternative is referenced below.

PUMP RELIEF REQUEST 11

Beaver Valley Power Station, Unit No. 1, Docket No. 50-334, Safety Evaluation of Relief Request PRR11 for the Fourth 10-Year Inservice Testing Program, dated September 27, 2007 (ADAMS Accession Number ML072420376).

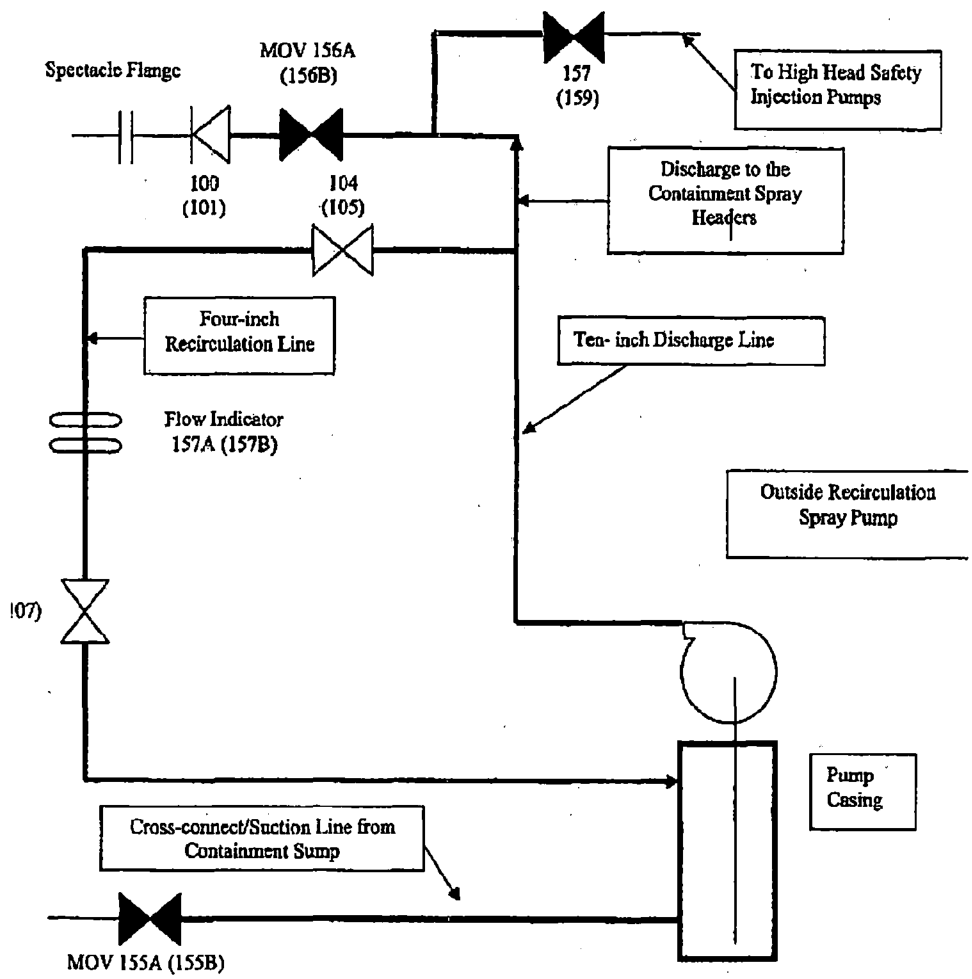
PUMP RELIEF REQUEST 11

Inside Recirculation Spray Pump [1RS-P-1A, 1B] Test Circuit



PUMP RELIEF REQUEST 11

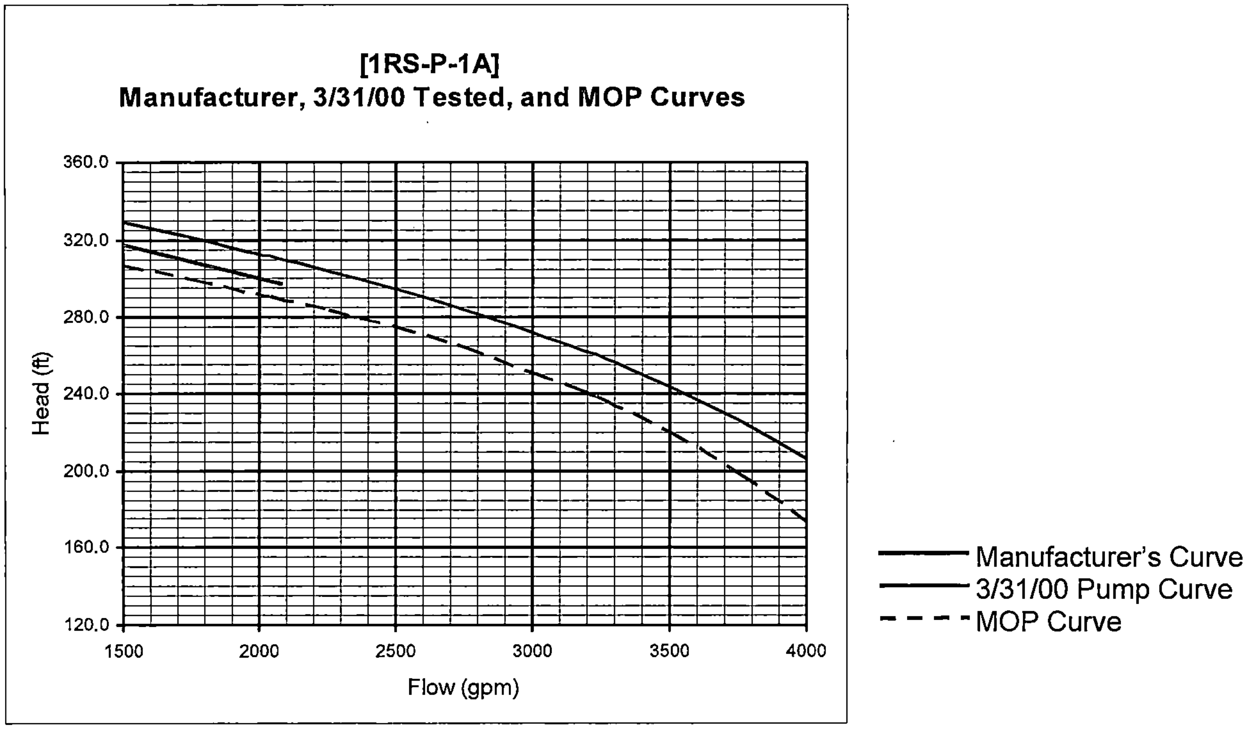
Outside Recirculation Spray Pump [1RS-P-2A, 2B] Test Circuit



PUMP RELIEF REQUEST 11

MANUFACTURER'S AND MINIMUM OPERATING POINT (MOP) PUMP CURVES

Pump Name: 1A Inside Recirculation Spray Pump — Pump Number: 1RS-P-1A



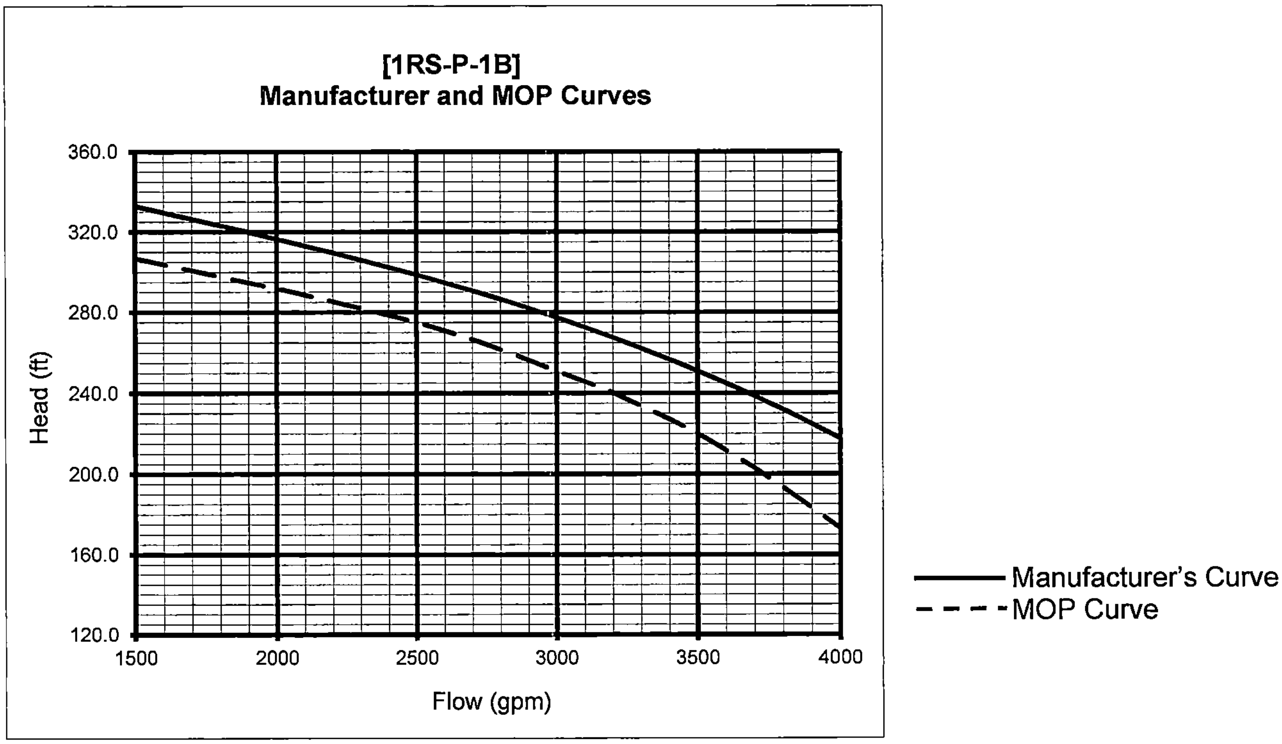
Flow (gpm)	3/31/00 Pump Curve Head (ft)
1376	322.0
1579	317.4
1889	303.5
2065	300.1
2077	297.7

Flow (gpm)	Manufacturer's Curve Head (ft)	MOP Curve Head (ft)
0	393.1	380.0
1500	329.2	306.9
1750	321.0	299.3
2000	312.7	291.7
2050	311.0	290.2
2250	304.0	283.7
2500	294.6	275.0
2750	284.2	264.2
3000	272.4	251.0
3180	263.0	241.4
3250	259.1	237.0
3500	243.8	220.0
3750	226.3	198.2
4000	206.2	173.0

PUMP RELIEF REQUEST 11

MANUFACTURER'S AND MINIMUM OPERATING POINT (MOP) PUMP CURVES

Pump Name: 1B Inside Recirculation Spray Pump Pump Number: 1RS-P-1B

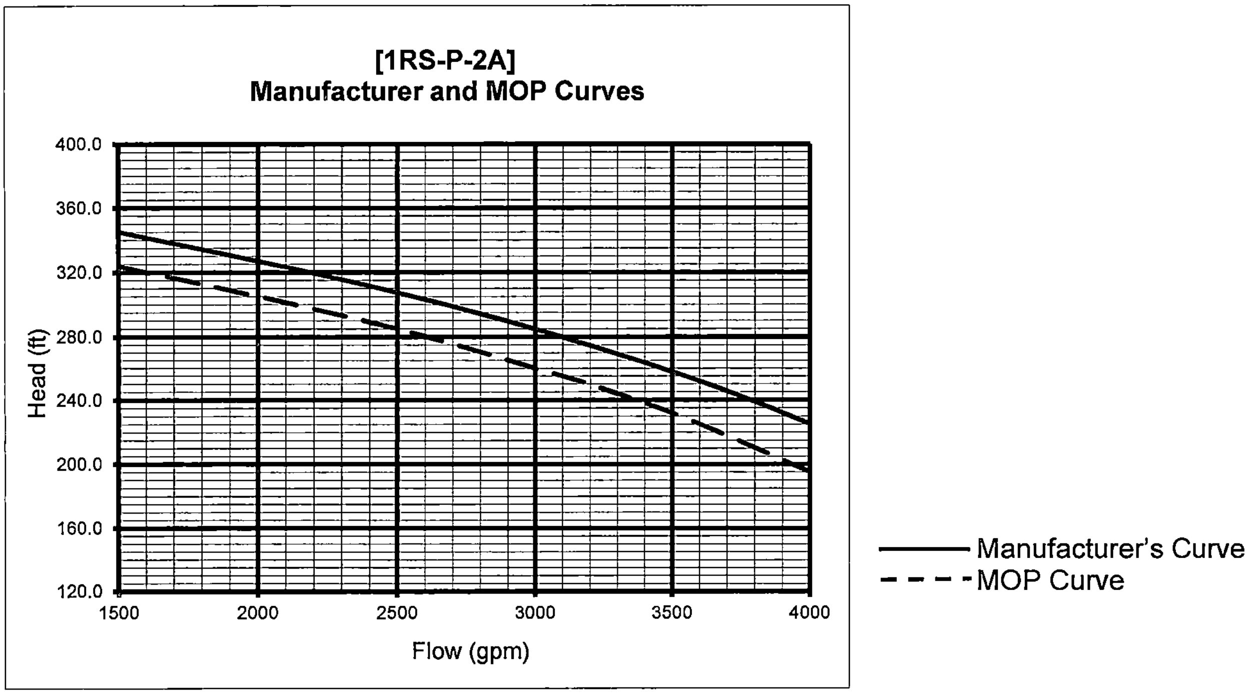


Flow (gpm)	Manufacturer's Curve Head (ft)	MOP Curve Head (ft)
0	389.7	380.0
1500	332.8	306.9
1750	324.8	299.3
2000	316.6	291.7
2050	314.9	290.2
2250	308.0	283.7
2500	298.7	275.0
2750	288.6	264.2
3000	277.5	251.0
3180	268.6	241.4
3250	265.0	237.0
3500	251.0	220.0
3750	235.3	198.2
4000	217.7	173.0

PUMP RELIEF REQUEST 11

MANUFACTURER'S AND MINIMUM OPERATING POINT (MOP) PUMP CURVES

Pump Name: 2A Outside Recirculation Spray Pump Pump Number: 1RS-P-2A

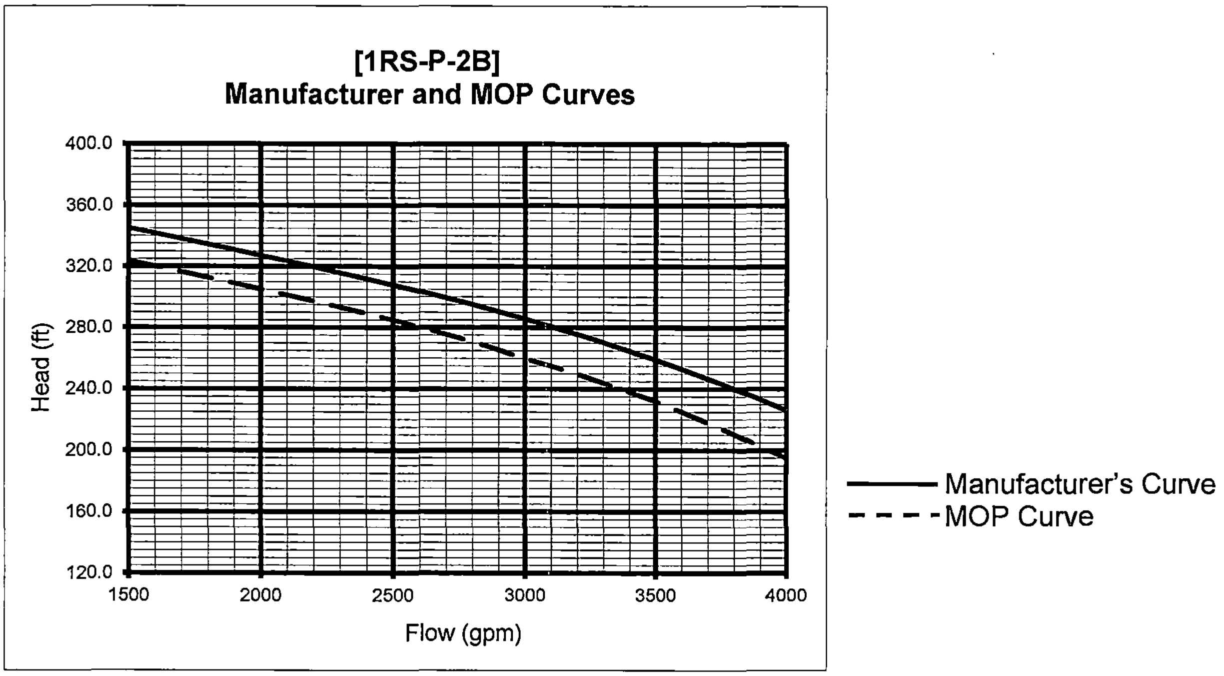


Flow (gpm)	Manufacturer's Curve Head (ft)	MOP Curve Head (ft)
0	404.9	385.0
1500	345.1	323.7
1750	336.2	314.6
2000	327.0	305.2
2040	325.5	303.6
2050	325.2	303.2
2250	317.5	295.3
2500	307.4	285.0
2750	296.6	273.3
3000	284.9	260.0
3165	276.6	251.7
3250	272.1	246.8
3500	258.0	232.0
3750	242.4	214.3
4000	225.1	195.0

PUMP RELIEF REQUEST 11

MANUFACTURER'S AND MINIMUM OPERATING POINT (MOP) PUMP CURVES

Pump Name: 2B Outside Recirculation Spray Pump, Pump Number: 1RS-P-2B



Flow (gpm)	Manufacturer's Curve Head (ft)	MOP Curve Head (ft)
0	407.0	385.0
1500	345.1	323.7
1750	336.2	314.6
2000	327.2	305.2
2040	325.7	303.6
2050	325.4	303.2
2250	317.9	295.3
2500	308.0	285.0
2750	297.4	273.3
3000	285.8	260.0
3165	277.6	251.7
3250	273.1	246.8
3500	259.1	232.0
3750	243.5	214.3
4000	226.1	195.0

PUMP RELIEF REQUEST 12

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(2)

-- Hardship Without a Compensating Increase in Quality and Safety --

1. ASME Code Components Affected

1QS-P-1A and B   Quench Spray Pumps, (Group B, Class 2)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. Applicable Code Requirement

ISTB-3300, "Reference Values," ISTB-3300(e)(1), requires reference values to be established within plus or minus 20 percent of pump design flow rate for the comprehensive test.

4. Reason for Request

Prior to initial startup, the quench spray pumps were subject to long term full flow testing. Temporary connections were made on the quench spray headers and pipe plugs were placed in the spray nozzle sockets and the header drain lines. The quench spray pumps were started and tested, circulating water through the spray header supply lines to the spray headers and out the temporary test connections. This system capability test was conducted to ensure that the system meets flow requirements. It also provided a complete flush of the system to remove any particulate matter, which could conceivably result in plugging of the spray nozzles at a future time. At the completion of this test, the temporary test connections were removed, the pipe plugs were removed and the spray nozzles were installed. The system was then ready for operation. The spray header piping has no remnants of the temporary test connections used to facilitate preoperational full flow testing.

Re-establishing this full flow test circuit for the purpose of periodic design flow rate testing would require a similar modification once every two years. The expensive and time consuming temporary changes described above would be necessary to duplicate the initial full flow tests, and would cause a hardship without a compensating increase in the level of quality and safety. Likewise, replacement of the four-inch recirculation test line with a line of sufficient size to accommodate design flow rate testing would cause a hardship without a compensating increase in the level of quality and safety.

The quench spray pumps have a design point and best efficiency flow rate of 2500 gallons per minute (gpm). To be within 20 percent of pump design flow rate on the low end requires a minimum reference flow rate of 2000 gpm. The code requirements that direct the Owner to establish reference values at this flow rate were adopted after the test circuit was installed. Due to the flow restrictions associated with the existing piping configuration, plus or minus 20 percent of the 2500 gpm design flow rate cannot be achieved through the four-inch recirculation test line. A maximum flow rate of approximately 1800 gpm is achievable through the four-inch recirculation test line. Presently, the inservice test reference flow rates are established with the existing test circuit at approximately 1800 gpm. A simple diagram of the quench spray pumps test circuit is attached to this relief request.

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Reference flow rates are not within the 20 percent of design flow rate required during the comprehensive test. The test flows are lower than the design flow rate as a result of restrictions due to the small four-inch recirculation line. With the recirculation line restrictions, the highest flow rate that can be measured (approximately 1800 gpm) while maintaining stable test conditions is within approximately 30 percent of the pump design point/best efficiency flow rate.

5. Proposed Alternative and Basis for Use

As an alternative to testing within 20 percent of the design flow rate during the comprehensive test, as required by ISTB-3300(e)(1), the reference values will be established at approximately 1800 gpm, which is within approximately 28 percent of the design flow rate.

Testing will be conducted as follows:

> The quench spray pumps shall be tested by establishing a recirculation flow path back to the refueling water storage tank (RWST) via the four-inch recirculation test line. Temporary pressure instrumentation shall be utilized in the pump suction and discharge, and shall have sufficient calibrated accuracy to satisfy ASME OM Code requirements.
>
> Pump vibration will be measured and recorded in accordance with the criteria specified in the Code. In addition, vibration spectral analysis will be performed. Vibration spectral analysis is a more accurate method of detecting mechanical degradation or changes than that of the traditional inservice test vibration requirements.

At approximately 1800 gpm, the head curve for the quench spray pumps is not flat but well sloped. Therefore, as performance degrades due to internal recirculation caused by increasing internal pump clearances, the differential pressure will measurably decrease for a given reference flow rate.

Testing at near design flow rate conditions is important for pumps with characteristic head-flow curves that are flat or gently sloping in the low flow region (little change in developed head with increasing flow rate). In the low flow region, increasing internal flows, as a result of internal wear, are difficult to detect. Pumps with the flat portion of the curve at low flow rates should be tested at or near design conditions to determine if increasing internal recirculation flows have degraded pump performance to the point where design performance cannot be achieved. This situation does not apply to the quench spray pumps if they are tested to within approximately 30 percent of the design flow rate. Testing at the proposed reference flow rates will detect degradation since the pump head-curve is well sloped at the point of testing.

These quench spray pumps are Group B standby pumps run only for surveillance testing once per quarter. The pumps do not see prolonged use. The low number of operating hours makes degradation of each pump very unlikely. Significant changes in pump operation are not expected when each pump's run time is typically less than 1 hour each quarter.

In order to compensate for testing both pumps at the reduced flow rate, the quench spray pumps are included in the Beaver Valley Predictive Maintenance (PdM) Program. The pumps have enhanced vibration monitoring with spectral analysis data obtained each refueling outage and are subject to periodic oil sample analysis. Also, as a preventive maintenance activity, the pumps' bearing oil is changed and their couplings are lubricated every 72 weeks.

PUMP RELIEF REQUEST 12

If measured parameters are outside the normal operating range or are determined by analysis to be trending towards a degraded state, appropriate actions are taken. These actions may include monitoring additional parameters, review of component specific information to identify cause and removal of the pump from service to perform corrective maintenance.

Compliance with the specific ISTB Code requirements identified in this relief request would require significant temporary modifications or permanent hardware changes and cause a hardship without a compensating increase in the level of quality and safety as previously described. Performing the required temporary modifications used during initial system startup testing or enlarging the size of the test loops to achieve the required accident flow rates is not warranted since there will be no improvement in our ability to detect pump degradation.

Testing the pumps utilizing the current test loops provides for substantial flow testing in a sloped and stable region of the pump curve (that is, at approximately 1800 gpm), and is well above the minimum continuous flow rate of 1350 gpm specified by the pump manufacturer. Testing the pumps at reference values established in this region of the pump curves will not cause damage to the pumps and will provide meaningful data to assess pump operational readiness.

In order to compensate for testing these pumps at a reduced flow rate during comprehensive pump testing, the quench spray pumps are also included in the Predictive Maintenance Program where enhanced vibration monitoring is done. Testing using the current test loops in conjunction with the additional predictive maintenance technologies will ensure reliable operation of the quench spray pumps.

Based on the above evaluation, compliance with ISTB-3300(e)(1) reference value requirements for the quench spray pumps would result in a hardship without a compensating increase in the level of quality or safety. The proposed alternative to the requirements specified in ISTB-3300(e)(1) provides sufficient indication of any potential degradation occurring to the pumps and reasonable assurance that the pumps are operationally ready and able to perform their function.

6. Duration of Proposed Alternative

The proposed alternative is requested for use during the fifth 10-year inservice test interval.

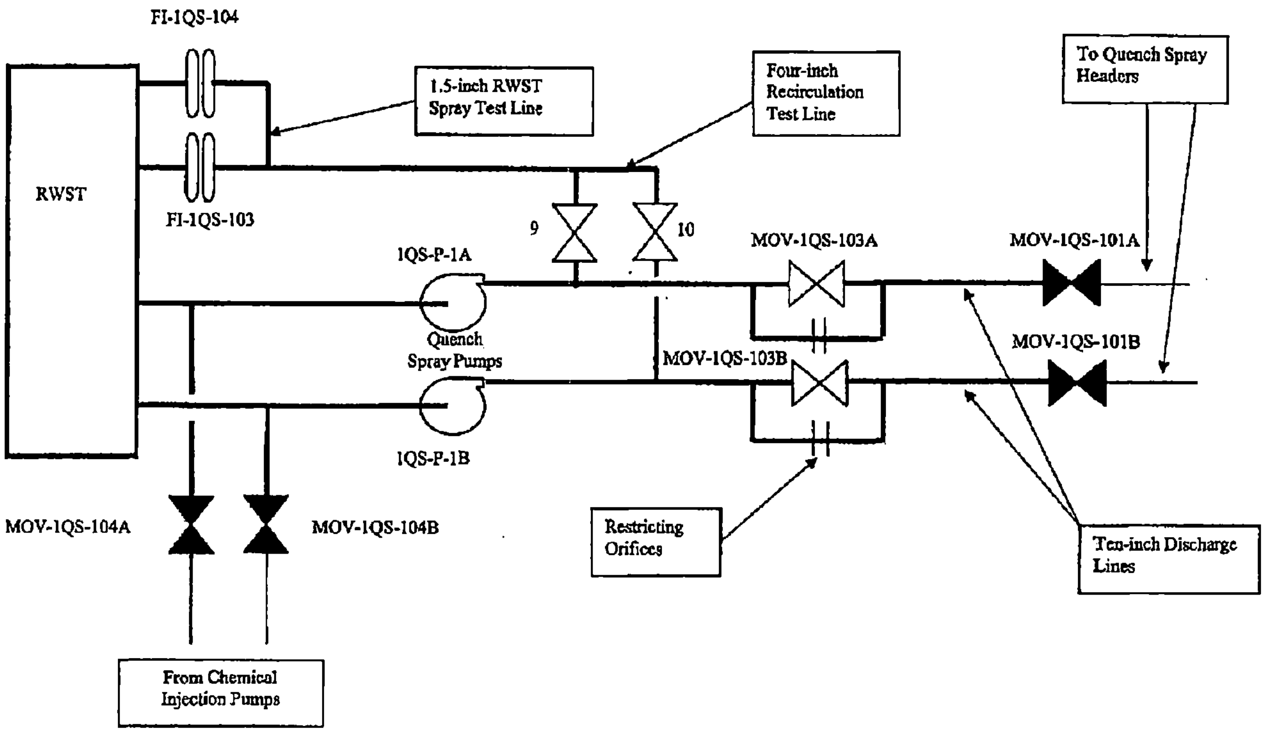
7. Precedent

A similar request was approved for the Beaver Valley Power Station Unit No. 1, fourth 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing the alternative is referenced below.

Beaver Valley Power Station, Unit No. 1, Docket No. 50-334, Safety Evaluation of Relief Request PRR12 for the Fourth 10-Year Inservice Testing Program, dated September 27, 2007 (ADAMS Accession Number ML072420376).

PUMP RELIEF REQUEST 12

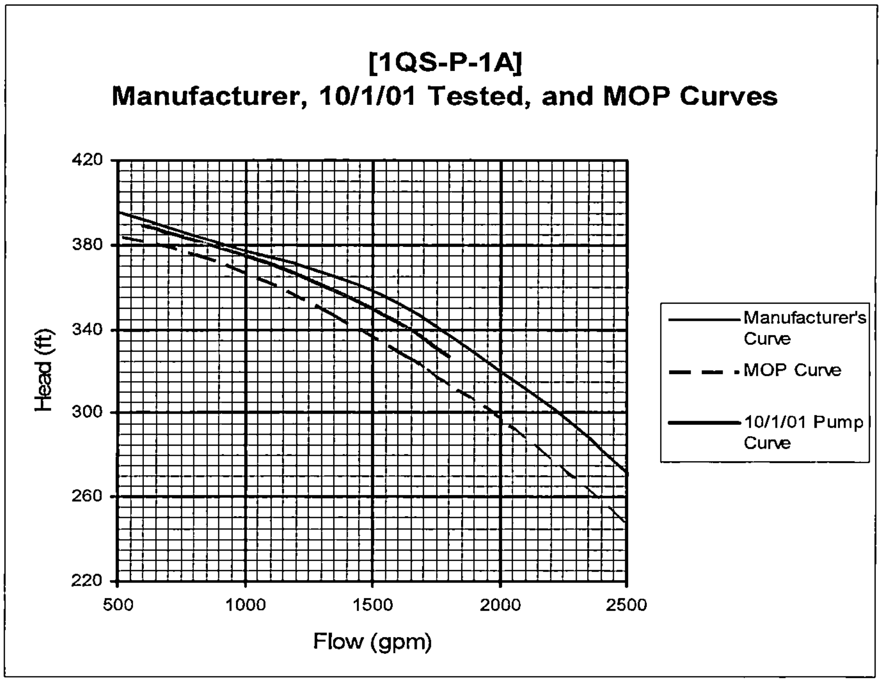
Quench Spray Pump [1QS-P-1A, 1B] Test Circuit



PUMP RELIEF REQUEST 12

MANUFACTURER'S AND MINIMUM OPERATING POINT (MOP) PUMP CURVES

Pump Name: 1A Quench Spray Pump Pump Number: 1QS-P-1A

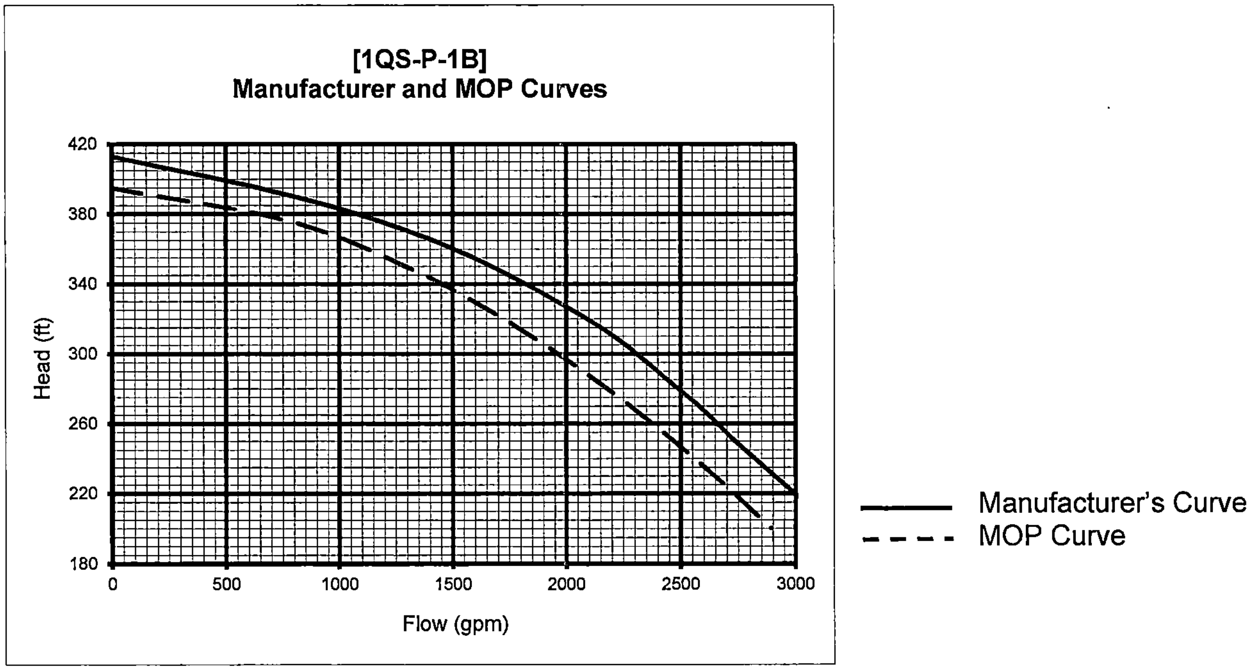


Manufacturer's Curve		MOP Curve	
Flow (gpm)	Head (ft)	Flow (gpm)	Head (ft)
0	414	0	395
803	384	800	375
1522	357	1330	348
2119	310	1630	327
2516	270	1712	321
2597	261	1730	320
2769	240	1830	312
3222	191	1930	303
		2030	294
Tested Curve (10/1/01)		2230	275
Flow (gpm)	Head (ft)	2330	265
600	389.0	2430	254
800	382.1	2530	243
1200	366.1	2630	232
1600	343.1	2730	220
1797	327.6	2893	200

PUMP RELIEF REQUEST 12

MANUFACTURER'S AND MINIMUM OPERATING POINT (MOP) PUMP CURVES

Pump Name: 1B Quench Spray Pump　　Pump Number: 1QS-P-1B



Manufacturer's Curve		MOP Curve	
Flow (gpm)	Head (ft)	Flow (gpm)	Head (ft)
0	413	0	395
866	388	800	375
1527	359	1330	348
2141	316	1630	327
2496	279	1700	322
2597	268	1730	320
2769	246	1830	312
3181	199	1930	303
		2030	294
		2230	275
		2330	265
		2430	254
		2530	243
		2630	232
		2730	220
		2893	200

PUMP RELIEF REQUEST 13

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. ASME Code Components Affected

1WR-P-1A, B and C River Water Pumps, (Group A, Class 3)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. Applicable Code Requirement

Table ISTB-3510-1, "Required Instrument Accuracy," requires pressure instruments to be calibrated to at least 0.5 percent when used during the comprehensive pump test.

4. Reason for Request

Subsubarticle ISTB-3510(a), "Accuracy," states that:

> Instrument accuracy shall be within the limits of Table ISTB-3510-1. If a parameter is determined by analytical methods instead of measurement, then the determination shall meet the parameter accuracy requirement of Table ISTB-3510-1 (e.g., flow rate determination shall be accurate to within ±2% of actual). For individual analog instruments, the required accuracy is percent of full scale. For digital instruments, the required accuracy is over the calibrated range. For a combination of instruments, the required accuracy is loop accuracy.

The Beaver Valley Power Station, Unit No. 1 (BVPS-1), river water pumps are vertical line-shaft pumps that receive their suction from a pit that communicates with the Ohio River. Differential pressure is calculated using pump discharge pressure indicators and the calculated suction pressure using river water elevation from the Ohio River level recorder. The transmitter associated with the level recorder is calibrated to 1.5 percent of full scale, and the recorder is calibrated to 1.0 percent of full scale resulting in a loop accuracy of 1.8 percent of full scale. The overall loop accuracy exceeds the maximum 0.5 percent required by Table ISTB-3510-1 when performing a comprehensive or preservice test.

Typical Ohio River elevation is between 665 and 666 feet resulting in a small variance between calculated suction pressure when determined by the calculation method provided by the procedure. However, during the spring, river elevations may be higher due to rain. This condition is evaluated with the test results to ensure operational readiness of the pumps.

5. Proposed Alternative and Basis for Use

As an alternative to Table ISTB-3510-1, FENOC proposes to use the installed Ohio River level recorder with a loop accuracy of 1.8 percent (to determine river water pump suction pressure), and a 0 to 100 pounds per square inch gauge (psig), 0.1 percent or better accurate test pressure gauge (to determine river water pump discharge pressure). These instrument readings are used to determine river water pump differential pressure. Differential pressure for the river water pumps is determined by taking the difference between the pump discharge pressure measured in psig, minus the river elevation corrected for elevation in feet back to the floor elevation of the pump and converted to pressure.

PUMP RELIEF REQUEST 13

Suction pressure for the river water pumps (1WR-P-1A, B and C) is determined by converting a river elevation reading measured by a level recorder to a calculated pressure. This level recorder has a full scale range from 648 feet to 705 feet (which corresponds to river elevation above sea level). Normal river elevation is 665 to 666 feet. The loop accuracy for the level recorder is 1.8 percent. The suction pressure reading over the range of the installed level recorder is accurate to within 0.45 psig. This accuracy is obtained by taking the full scale range of 57 feet, converting it to a pressure ([57 feet] / [2.31 feet/psig] = 25 psig), and multiplying it by 1.8 percent accuracy. The ASME OM Code would require this suction pressure reading to be accurate within 0.125 psig (25 psig x 0.5 percent accuracy).

Discharge pressure for the river water pumps (1WR-P-1A, B and C) is to be obtained from a temporary test pressure gauge with a full scale range of 0 to 100 psig. The ASME OM Code would require this discharge pressure reading to be accurate to 0.5 psig (100 psig x 0.5 percent accuracy). In order to compensate for the 1.8 percent suction pressure loop accuracy not meeting the 0.5 percent accuracy required for comprehensive pump testing, a 0.1 percent accurate temporary test pressure gauge will be used. This temporary test pressure gauge is to be used in place of the installed 0 to 100 psig, 0.5 percent accurate discharge pressure indicators will provide a discharge pressure reading over the range of the instrument with an accuracy of 0.1 psig (100 psig x 0.1 percent). Adding this to the installed 1.8 percent accurate suction pressure instrument reading yields an overall combined reading able to be read within 0.55 psig (0.45 psig plus 0.1 psig) for the combination of instruments.

When the Table ISTB-3510-1 required instrument accuracy of plus or minus (±) 0.5 percent is applied to the river level readings, the suction pressure reading over the range of the instrument is required to be accurate to within 0.125 psig (25 psig x 0.5 percent). When the Table ISTB-3510-1 required instrument accuracy of ±0.5 percent is applied to the pump discharge pressure test gauge readings, the discharge pressure reading over the range of the test instrument is required to be accurate to within 0.5 psig (100 psig x 0.5 percent). Adding these required instrument accuracies together would yield an overall worst case (allowed) error of 0.625 psig (0.125 psig plus 0.5 psig). Therefore, the overall differential pressure reading, which can be read to within 0.55 psig, is better than the effective 0.625 psig differential pressure reading required by the ASME OM code for comprehensive pump testing.

The proposed alternative, using the 0.1 percent accurate test pressure gauge in place of the installed discharge pressure indicator, will yield an effective differential pressure reading (considering both suction and discharge pressure instrumentation together) that is more accurate than the ±0.5 percent instrument accuracy required by Table ISTB-3510-1 for comprehensive pump testing.

Other activities are implemented at BVPS-1, in addition to those required by the ASME OM Code, that enhance the ability to detect pump degradation. As part of the BVPS-1 Predictive Maintenance Program, spectral analysis is also used to determine the mechanical condition of a pump. Spectral data can provide information to determine if misalignment, unbalance, resonance, looseness or a bearing problem is present. Through a review of the spectral data over a period of time, changes in the condition of the pump may also be determined. Additionally, as part of the BVPS-1 Preventive Maintenance Program, the pump motors are inspected, lubricated, and tested every 144 weeks. The pump and motor are completely overhauled every 312 weeks and every 624 weeks, respectively. This frequency is based on the expected condition of the pumps as a result of historical overhauls and was established to allow overhaul prior to the point of degradation resulting in questionable operational readiness.

PUMP RELIEF REQUEST 13

The alternative to the accuracy requirements of Table ISTB-3510-1, when performing comprehensive or preservice tests, provides an acceptable level of quality and safety

6. Duration of Proposed Alternative

The proposed alternative is requested for use during the fifth 10-year inservice test interval.

7. Precedent

A similar request was approved for the BVPS-1 fourth 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing this similar alternative is referenced below.

BVPS-1, Docket No. 50-334, Safety Evaluation of Relief Request PRR13 for the Fourth 10-Year Inservice Testing Program, Dated September 27, 2007 (ADAMS Accession No. ML072420376).

PUMP RELIEF REQUEST 14

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. ASME Code Components Affected

1CH-P-1A, B and C	Charging Pumps, (Group A, Class 2)
1CH-P-2A and B	Boric Acid Transfer Pumps, (Group A, Class 3)
1RH-P-1A and B	Residual Heat Removal Pumps, (Group A, Class 2)
1SI-P-1A and B	Low Head Safety Injection Pumps, (Group B, Class 2)
1RS-P-1A and B	Inside Recirculation Spray Pumps, (Group B, Class 2)
1RS-P-2A and B	Outside Recirculation Spray Pumps, (Group B, Class 2)
1FW-P-2	Turbine-Driven Auxiliary Feedwater Pump, (Group B, Class 3)
1FW-P-3A and B	Motor-Driven Auxiliary Feedwater Pumps, (Group B, Class 3)
1WR-P-1A, B and C	River Water Pumps, (Group A, Class 3)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. Applicable Code Requirement

ISTB-5121, "Group A Test Procedure," ISTB-5121(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," ISTB-5122(c) states:

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

ISTB-5123, "Comprehensive Test Procedure," ISTB-5123(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," ISTB-5221(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," ISTB-5222(c) states:

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

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

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

PUMP RELIEF REQUEST 14

4. Reason for Request

There is difficulty in adjusting system throttle valves with sufficient precision to achieve an exact flow reference value during pump testing. Paragraphs ISTB-5121(b), ISTB-5122(c), ISTB-5123(b), ISTB-5221(b), ISTB-5222(c) and ISTB-5223(b) do not allow for a variance in flow rate from a fixed reference point for pump testing.

5. Proposed Alternative and Basis for Use

When pump flow rate is required to be throttled for the pumps listed above, it will be adjusted by plant operators as close as practical to the reference flow value, but within a procedure flow limit of plus 2 percent or minus 1 percent of the reference value in accordance with ASME OM Code Case OMN-21, "Alternate Requirements for Adjusting Hydraulic Parameters to Specified Reference Points," updated January 29, 2013.

NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," Revision 2, Section 5.3, "Allowable Variance from Reference Points and Fixed-Resistance Systems," states in part 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.

ASME OM Code Case OMN-21 provides guidance for adjusting reference flow to within a specified tolerance during pump 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 + 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.

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

6. Duration of Proposed Alternative

The proposed alternative is requested for use during the fifth 10-year inservice test interval.

7. Precedent

A similar request was approved for the Fort Calhoun Station, Unit No. 1, fifth 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing the alternative is referenced below.

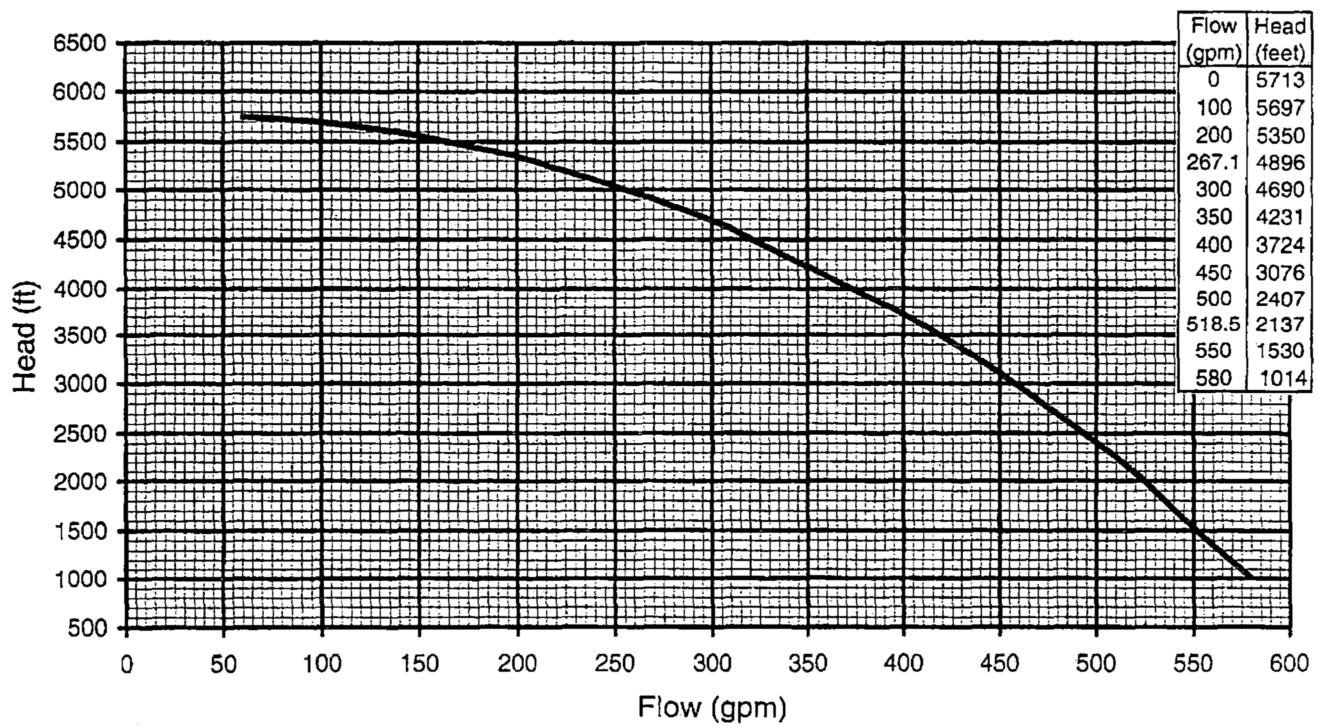
Fort Calhoun Station, Unit No. 1, Docket No. 50-285, Safety Evaluation of Request for Relief P-2 for the Fifth 10-Year Inservice Testing Program Interval, dated February 19, 2016

SECTION IV: PUMP MINIMUM OPERATING POINT (MOP) CURVES

Pump Name: Charging/High Head Safety Injection Pumps

Pump Number: [1CH-P-1A]
[1CH-P-1B]
[1CH-P-1C]

[1CH-P-1A, 1B, 1C] MOP Curve



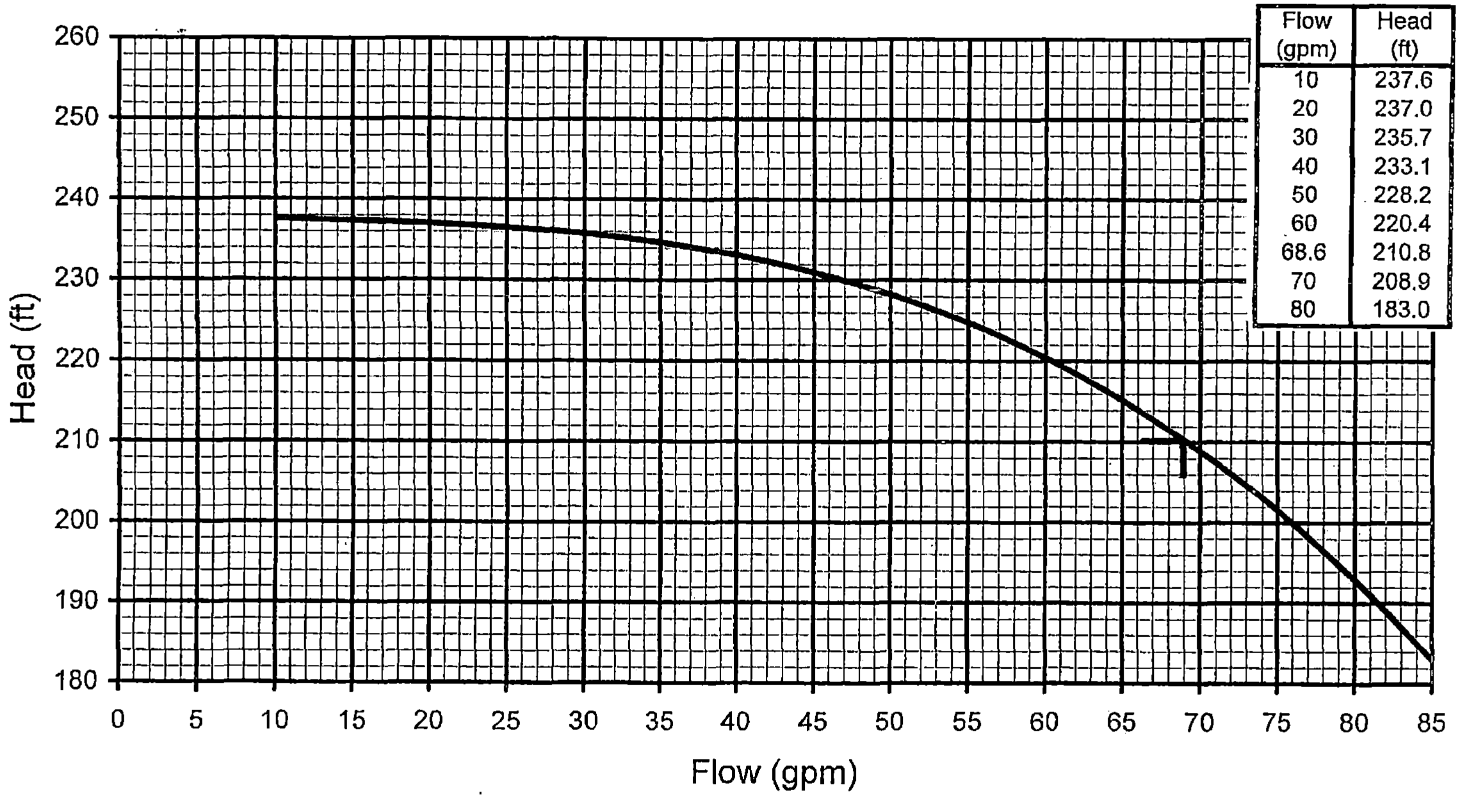
Flow (gpm)	Head (feet)
0	5713
100	5697
200	5350
267.1	4896
300	4690
350	4231
400	3724
450	3076
500	2407
518.5	2137
550	1530
580	1014

MOP Curve is based on Calc. 8700-DMC-1430, Rev. 1, Add. 1 (2/10/06) & ECP 02-0246 (2/17/06).

Pump Name: 2A Boric Acid Transfer Pump

Pump Number: [1CH-P-2A]

[1CH-P-2A]
MOP Curve

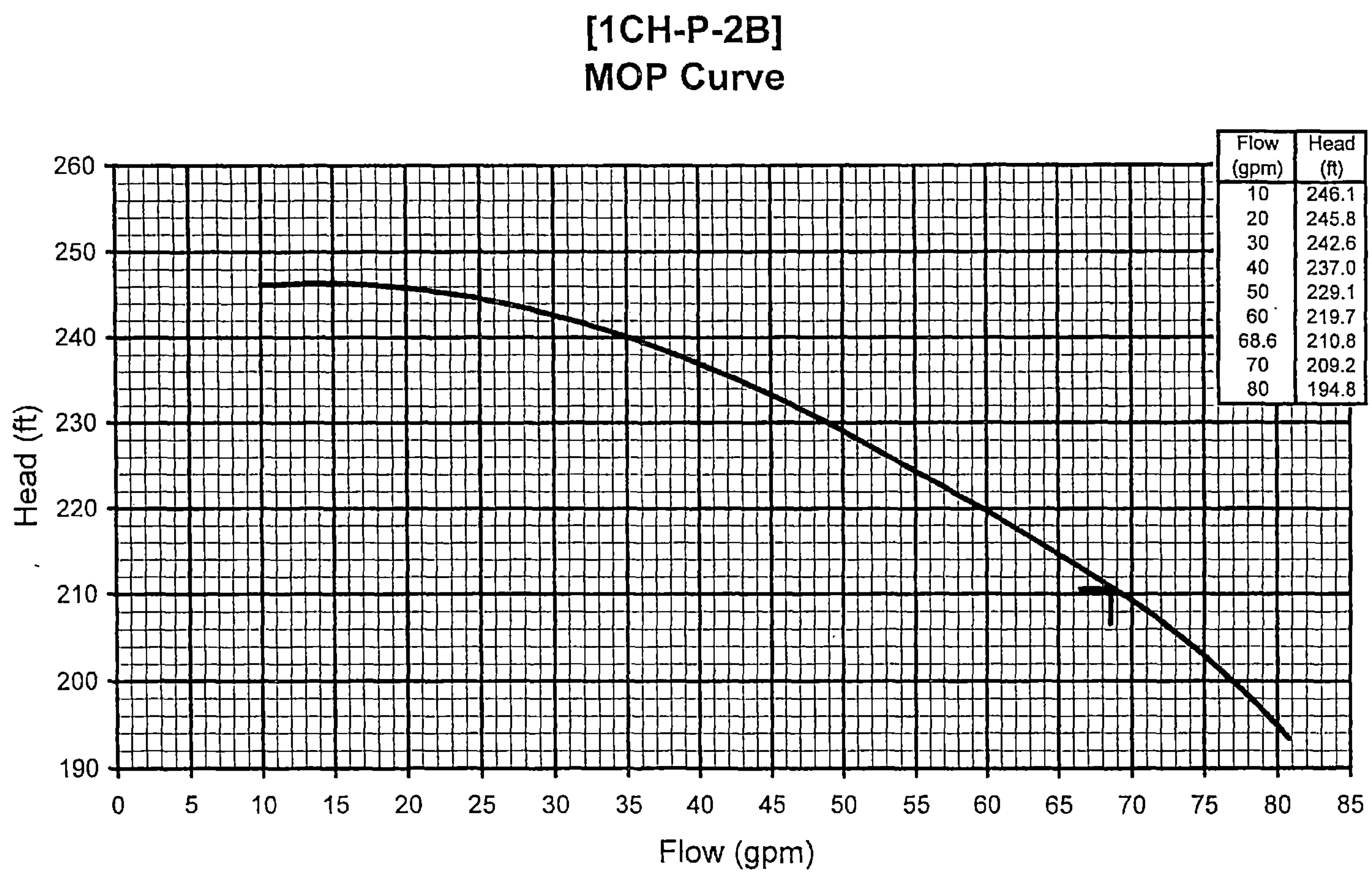


Flow (gpm)	Head (ft)
10	237.6
20	237.0
30	235.7
40	233.1
50	228.2
60	220.4
68.6	210.8
70	208.9
80	183.0

The MOP point is at 210.8 ft at 68.6 gpm per Calculation 8700-DMC-2384 (Rev.1, 12/16/99). The MOP Curve is derived as 91.6% of the flow adjusted pump curve.

Pump Name: 2B Boric Acid Transfer Pump

Pump Number: [1CH-P-2B]



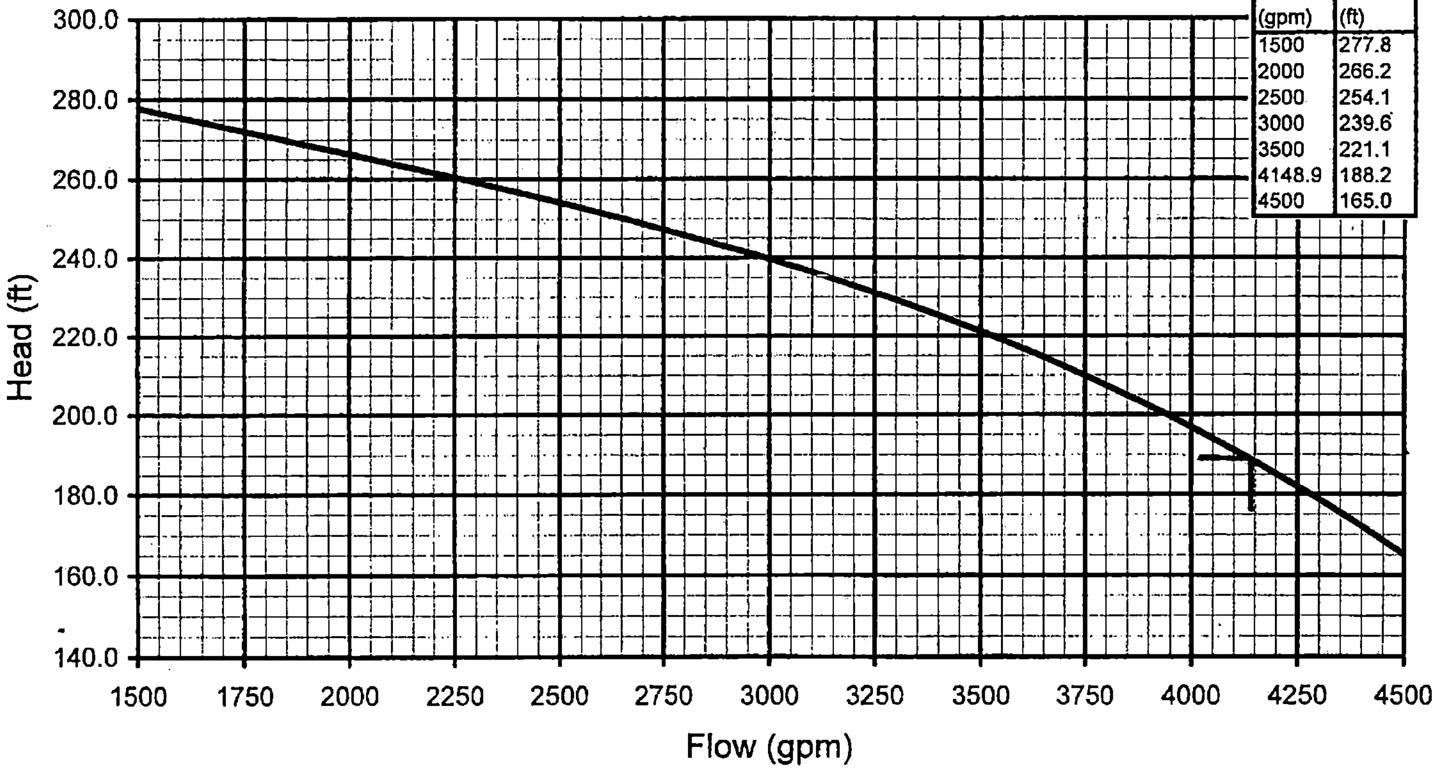
Flow (gpm)	Head (ft)
10	246.1
20	245.8
30	242.6
40	237.0
50	229.1
60	219.7
68.6	210.8
70	209.2
80	194.8

The MOP point is at 210.8 ft at 68.6 gpm per Calculation 8700-DMC-2384 (Rev.1, 12/16/99). The MOP Curve is derived as 92.25% of the pump curve.

Pump Name: 1A Residual Heat Removal Pump

Pump Number: [1RH-P-1A]

[1RH-P-1A]
MOP CURVE



Flow (gpm)	Head (ft)
1500	277.8
2000	266.2
2500	254.1
3000	239.6
3500	221.1
4148.9	188.2
4500	165.0

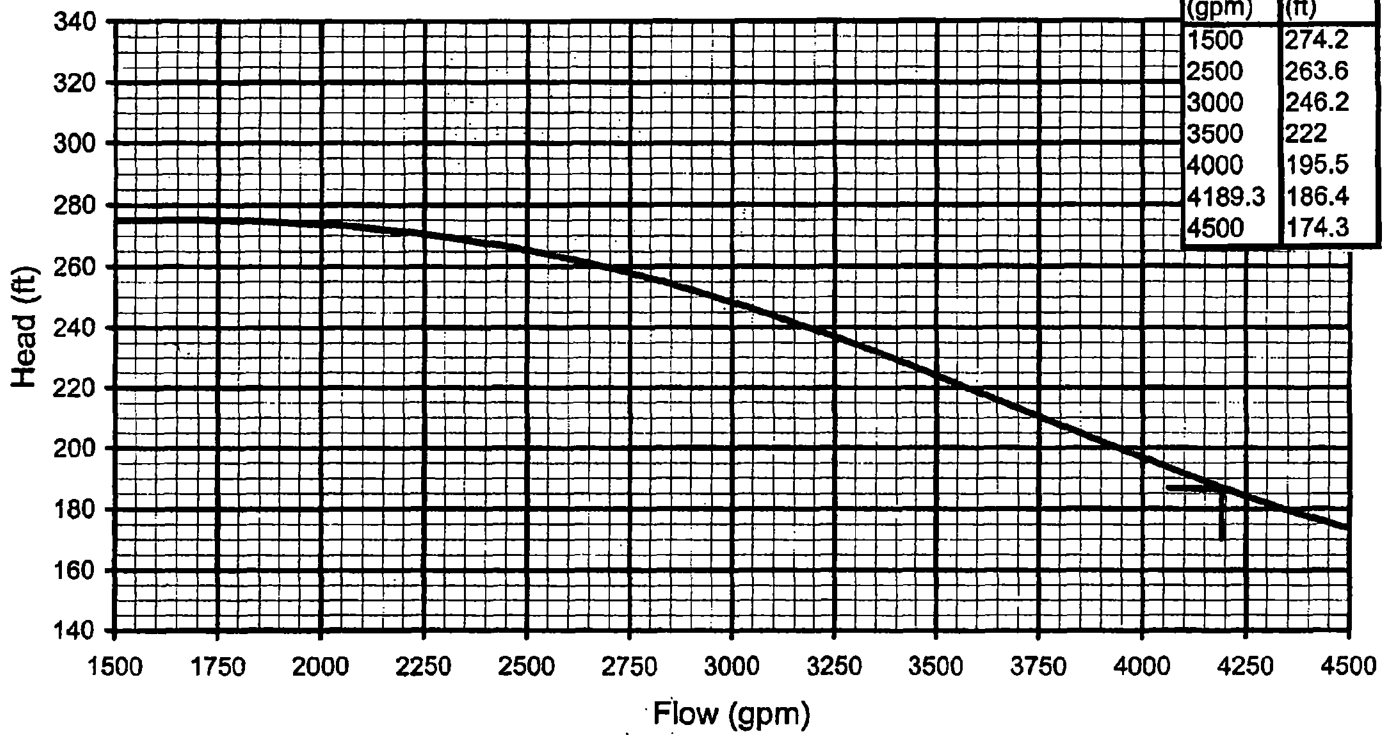
MOP is at 188.2 ft at 4148.9 gpm per Calculation 8700-DMC-2924, Rev.0 (3/27/95).
MOP Curve was derived as 94.29% of the pump performance curve.

Pump Name: 1B Residual Heat Removal Pump

Pump Number: [1RH-P-1B]

[1RH-P-1B]
MOP CURVE

Flow (gpm)	Head (ft)
1500	274.2
2500	263.6
3000	246.2
3500	222
4000	195.5
4189.3	186.4
4500	174.3

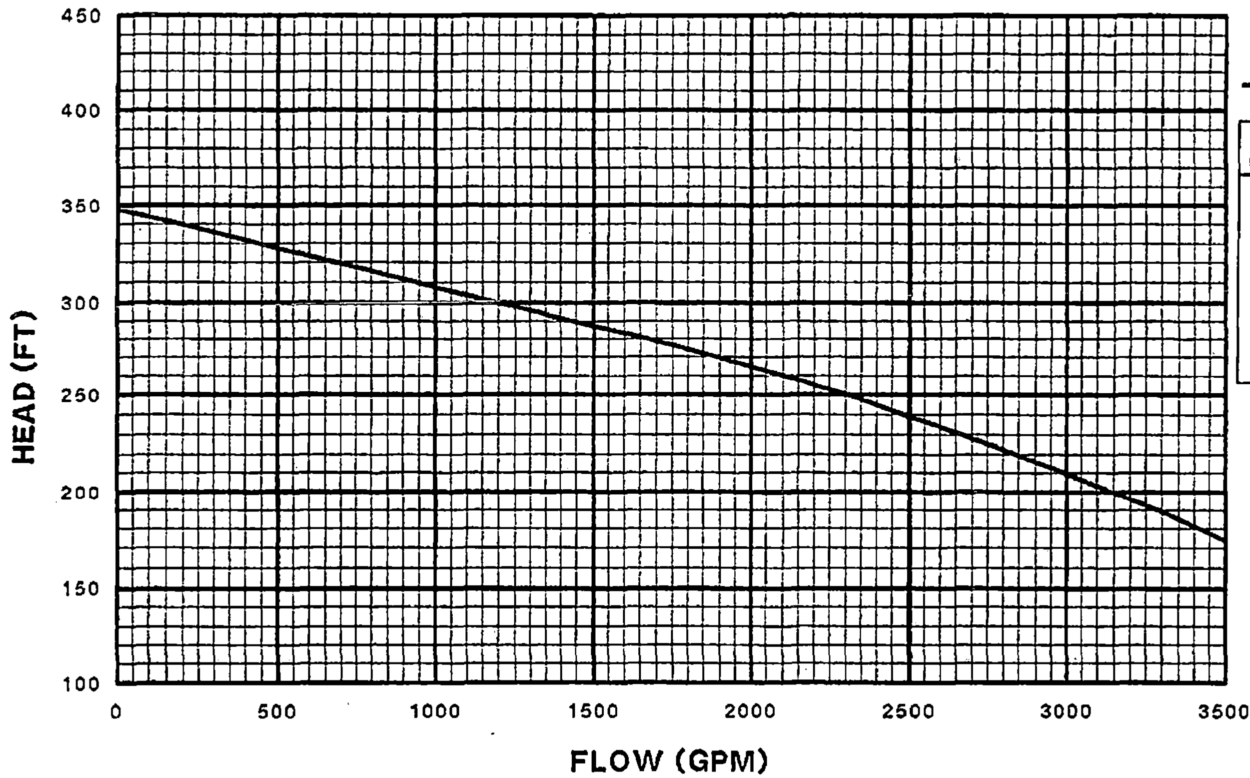


MOP is at 186.4 ft at 4189.3 gpm per Calculation 8700-DMC-2924, Rev.0 (3/27/95).
MOP Curve was derived as 89.80% of the pump performance curve obtained on 9/21/01.

Pump Name: Low Head Safety Injection Pumps

Pump Number: [1SI-P-1A]
[1SI-P-1B]

[1SI-P-1A and 1B]
MOP CURVE



MOP CURVE

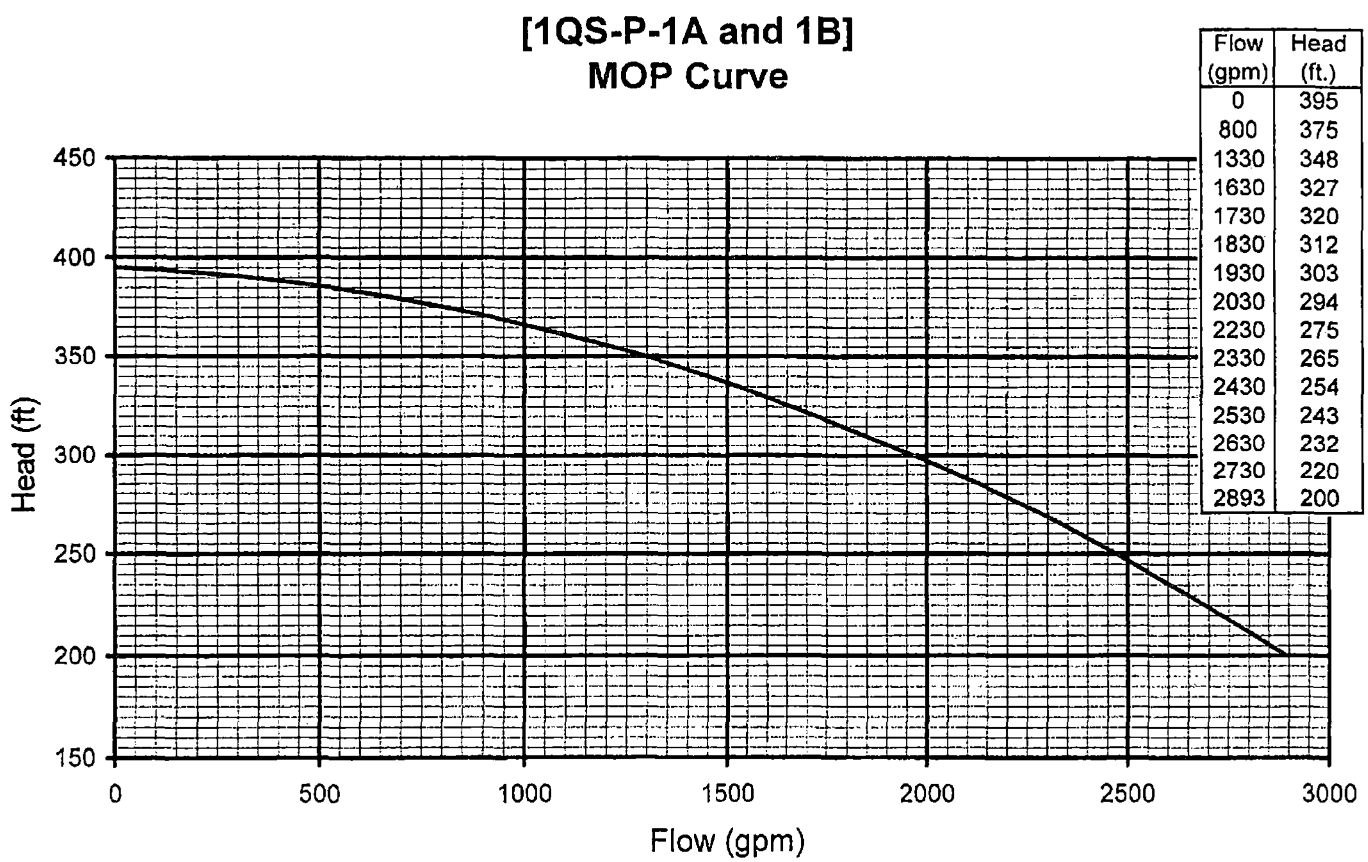
Flow (gpm)	Head (feet)
0	348
500	328
1000	307
1500	288
2000	266
2500	239
3000	210
3500	173

THE MOP CURVE IS BASED ON CALCULATION
8700-DMC-1430, REV. 1 (9/30/05).

Pump Name: Quench Spray Pumps

Pump Number: [1QS-P-1A]
[1QS-P-1B]

[1QS-P-1A and 1B] MOP Curve

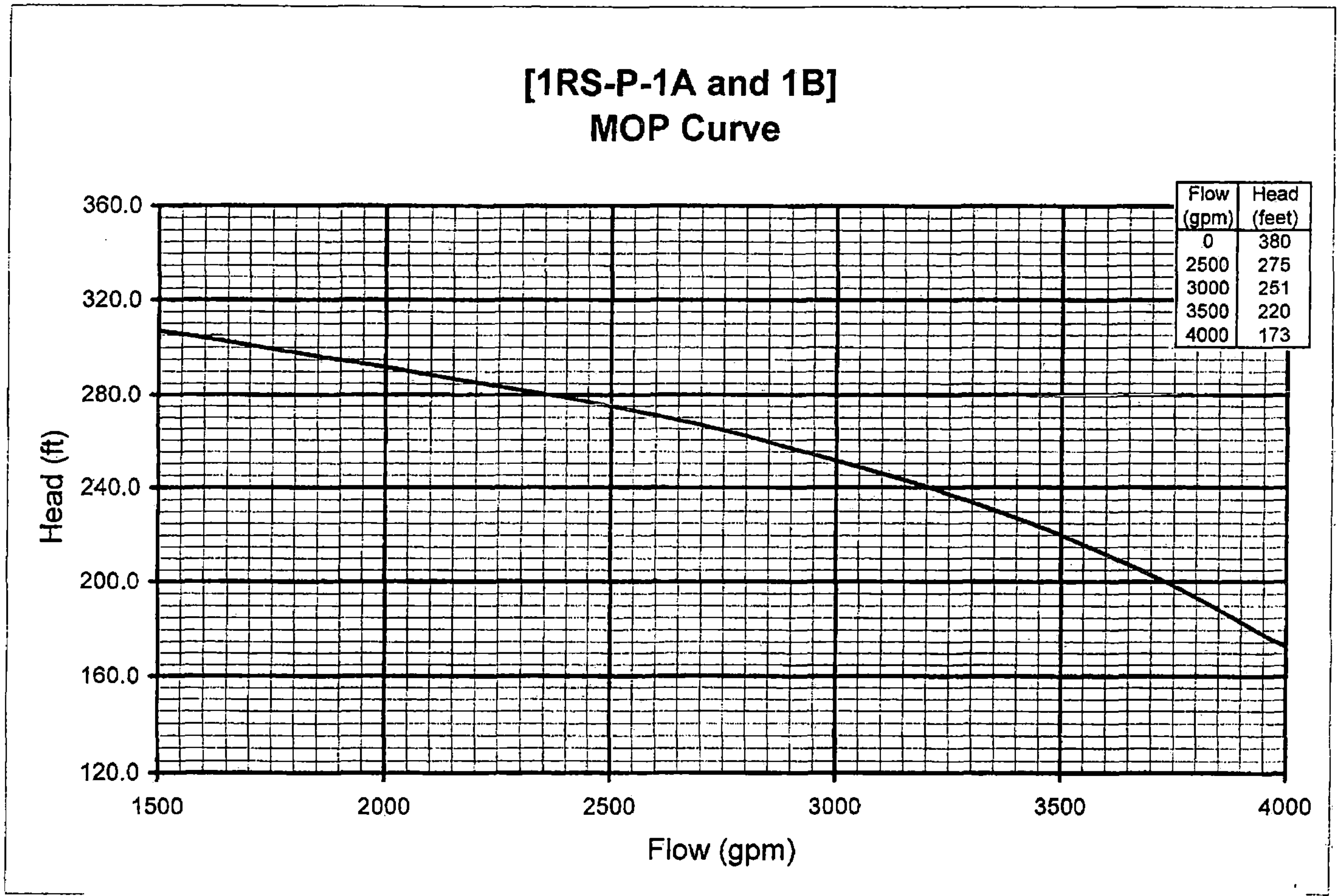


Flow (gpm)	Head (ft.)
0	395
800	375
1330	348
1630	327
1730	320
1830	312
1930	303
2030	294
2230	275
2330	265
2430	254
2530	243
2630	232
2730	220
2893	200

MOP Curve is based on Calculation 8700-DMC-3523, Rev. 1 (2/17/04).

Pump Name: 1A and 1B Inside Recirculation Spray Pump

Pump Number: [1RS-P-1A] [1RS-P-1B]

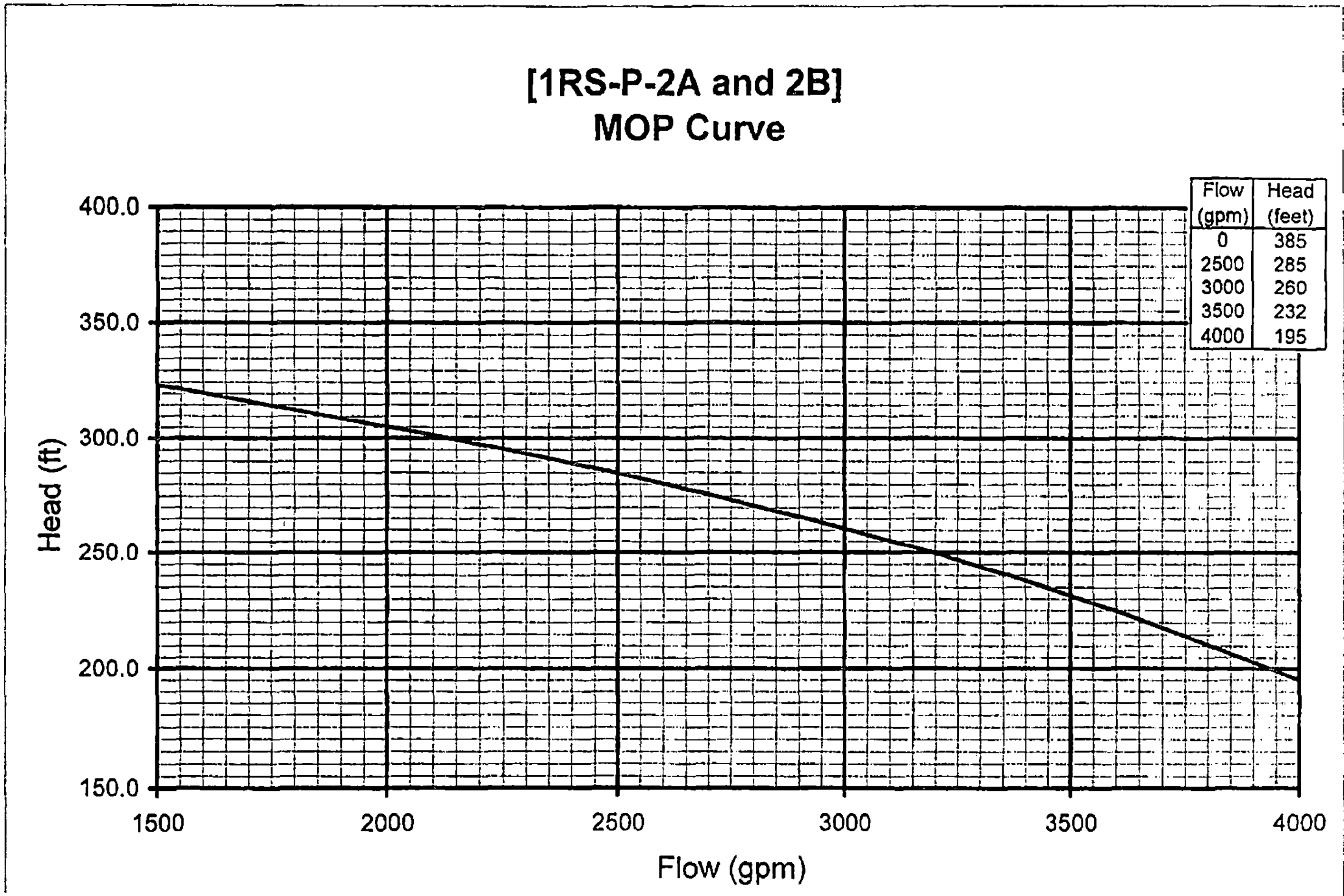


Flow (gpm)	Head (feet)
0	380
2500	275
3000	251
3500	220
4000	173

MOP Curve is based on Calculation 8700-DMC-1567, Rev. 0 (11/13/03).

Pump Name: 2A and 2B Outside Recirculation Spray Pump

Pump Number: [1RS-P-2A]
[1RS-P-2B]

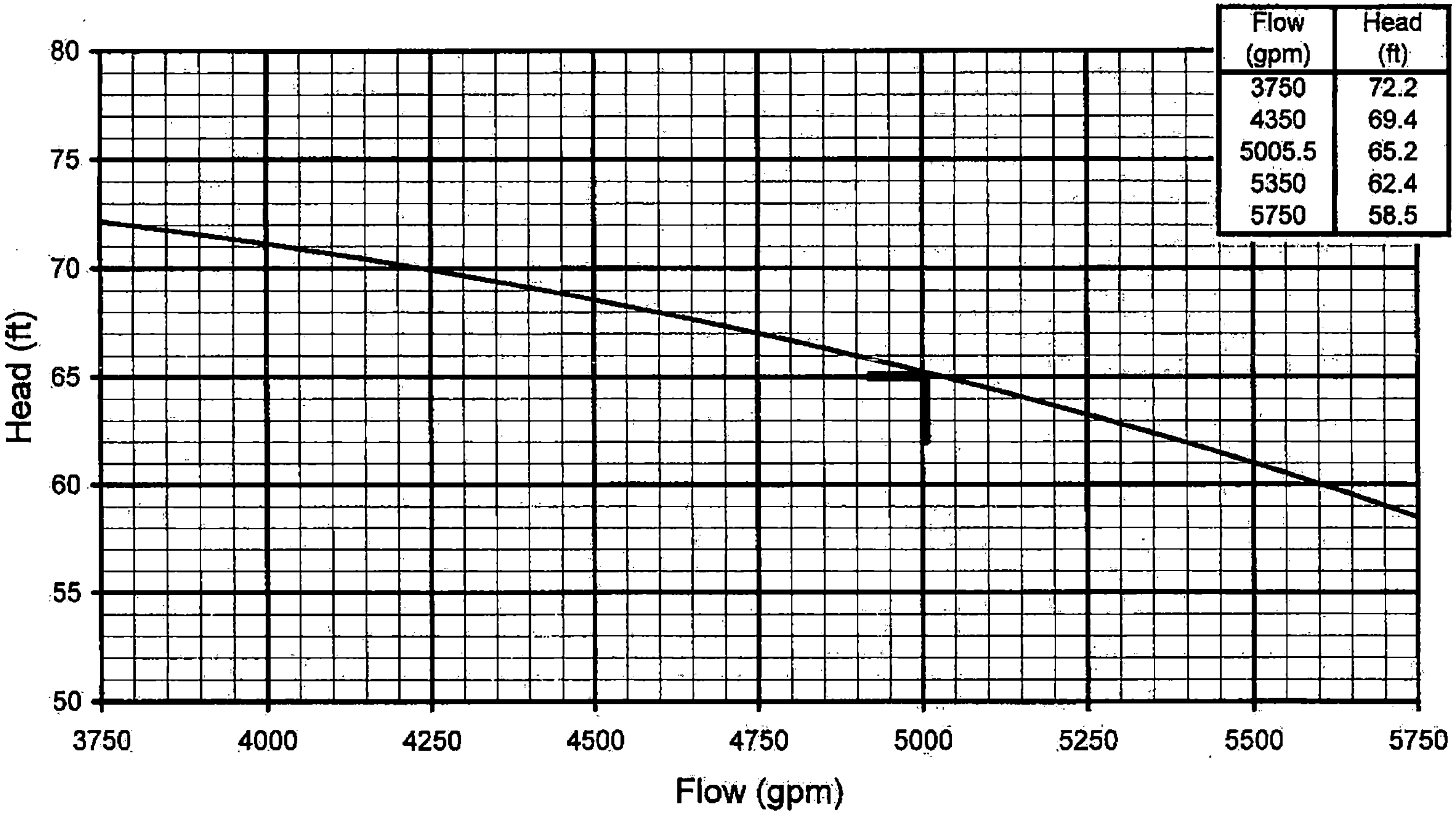


MOP Curve is based on Calculation 8700-DMC-1567, Rev. 0 (11/13/03).

Pump Name: 1A Component Cooling Water Pump

Pump Number: [1CC-P-1A]

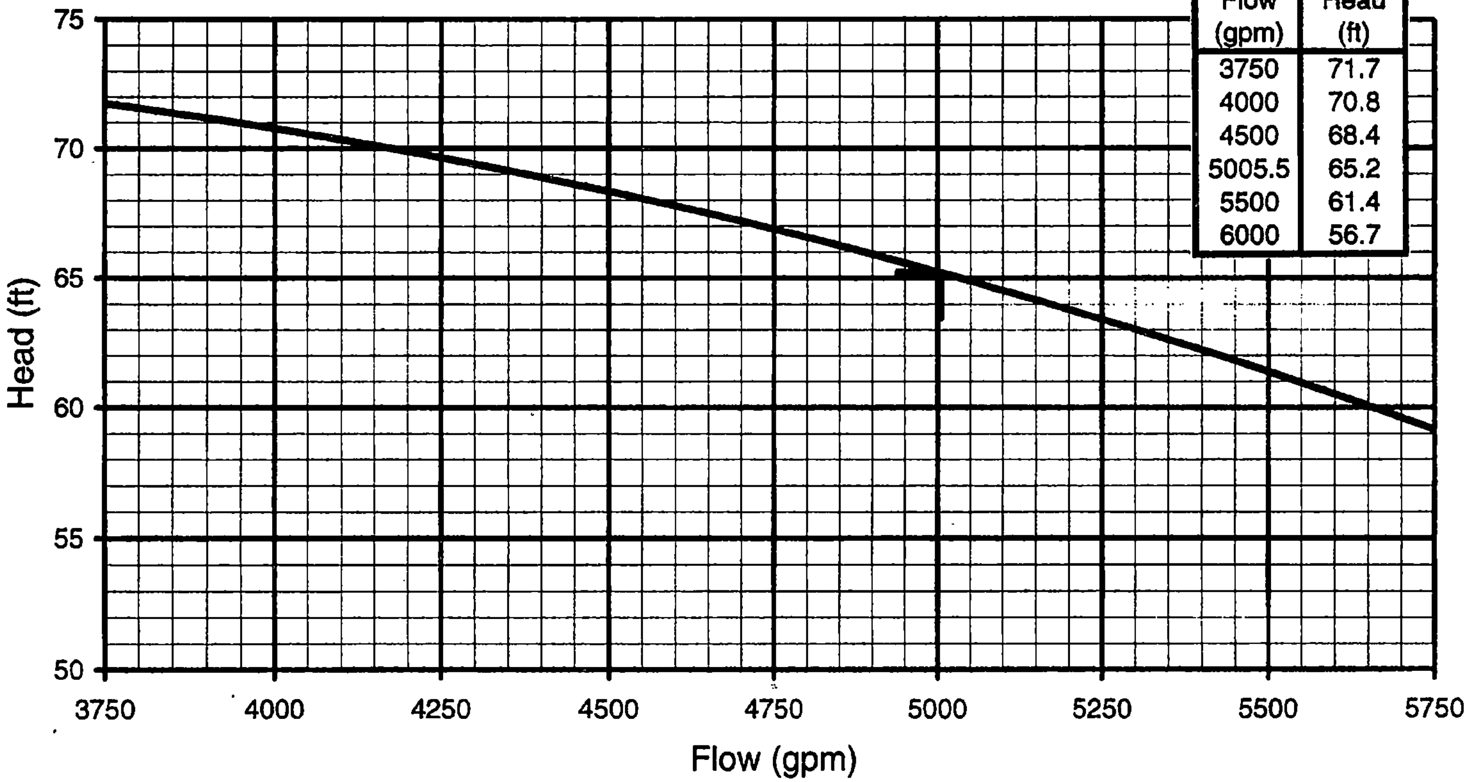
[1CC-P-1A]
MOP CURVE



Flow (gpm)	Head (ft)
3750	72.2
4350	69.4
5005.5	65.2
5350	62.4
5750	58.5

MOP is at 65.2 ft at 5005.5 gpm (Ref. Calc 8700-DMC-3052, Rev.0, 5/28/96).
MOP Curve is derived as 27.90% of the pump performance curve obtained on 6/21/01.

[1CC-P-1B]
MOP Curve

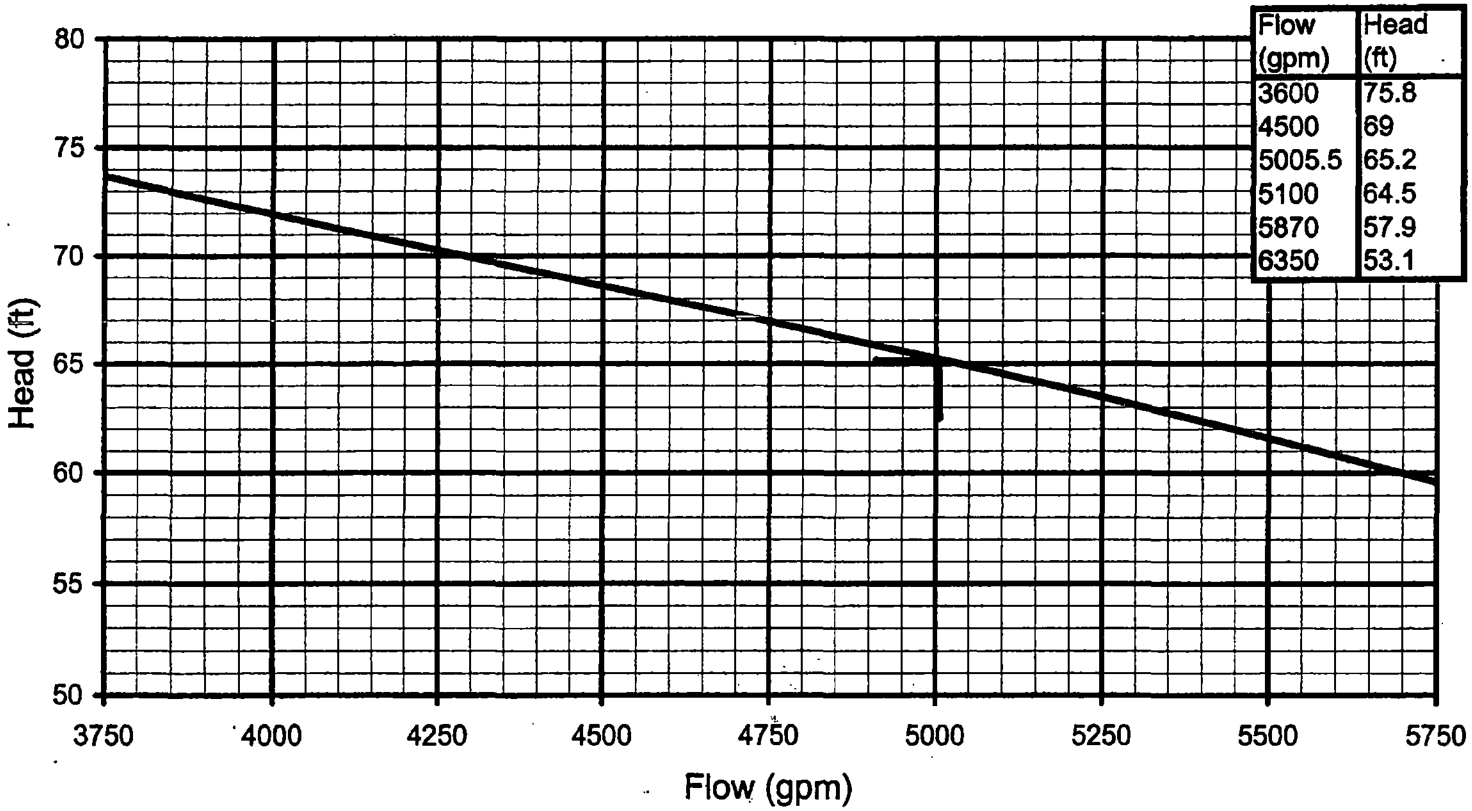


Flow (gpm)	Head (ft)
3750	71.7
4000	70.8
4500	68.4
5005.5	65.2
5500	61.4
6000	56.7

The MOP is at 65.2 ft at 5005.5 gpm (Ref. Calc. 8700-DMC-3052, Rev.0, dated 5/28/96).
The MOP Curve is derived as 27.65% of pump performance curve obtained on 12/23/03.

Pump Name: 1C Component Cooling Water Pump
Pump Number: [1CC-P-1C]

[1CC-P-1C]
MOP CURVE



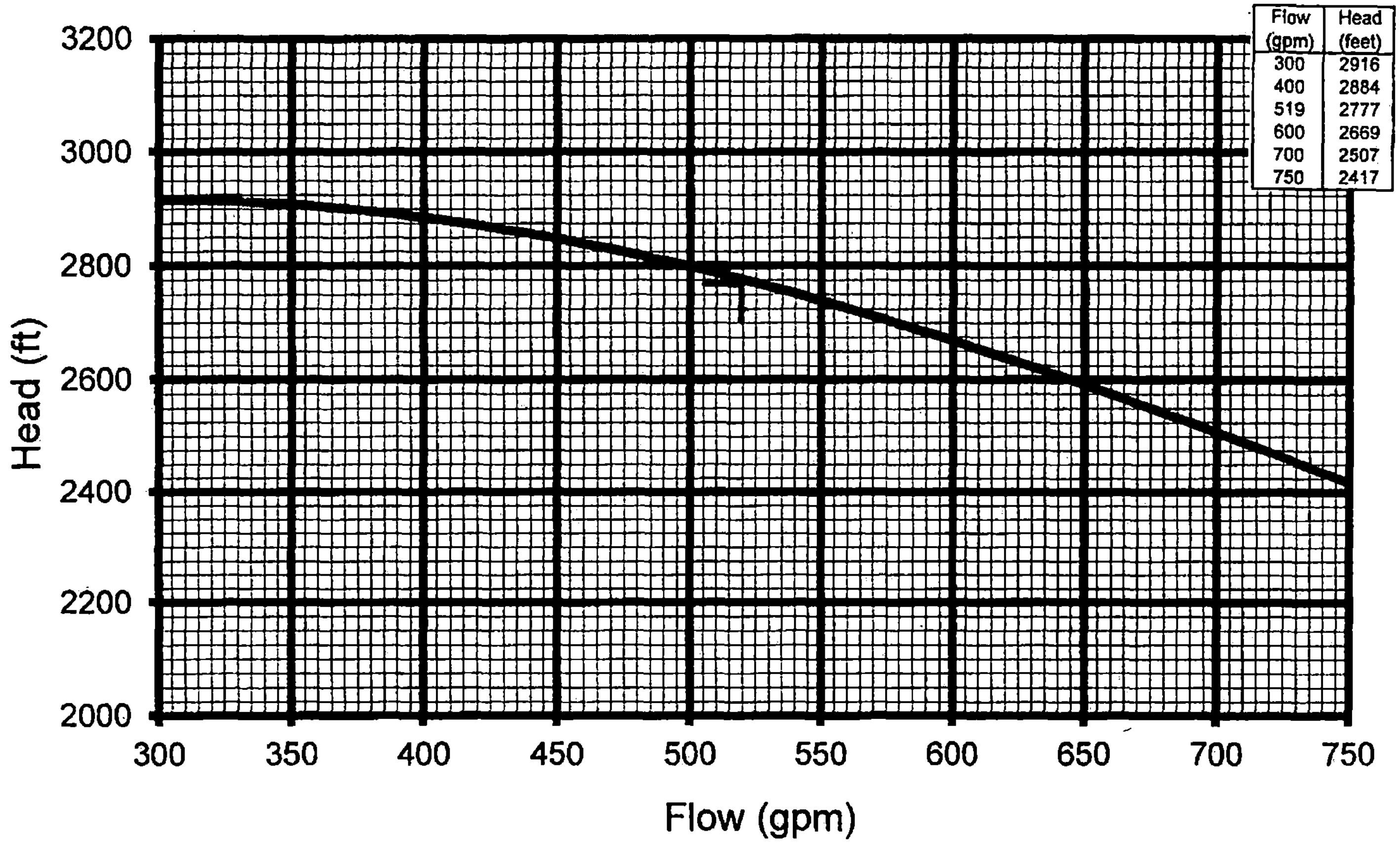
Flow (gpm)	Head (ft)
3600	75.8
4500	69
5005.5	65.2
5100	64.5
5870	57.9
6350	53.1

MOP is at 65.2 ft at 5005.5 gpm (Ref Calc. 8700-DMC-3052, Rev.0, 5/28/96).
MOP Curve is derived as 28.25% of the pump curve obtained on 9/18/01.

Pump Name: Turbine Driven Auxiliary Feed Pump

Pump Number: [1FW-P-2]

[1FW-P-2]
MOP Curve



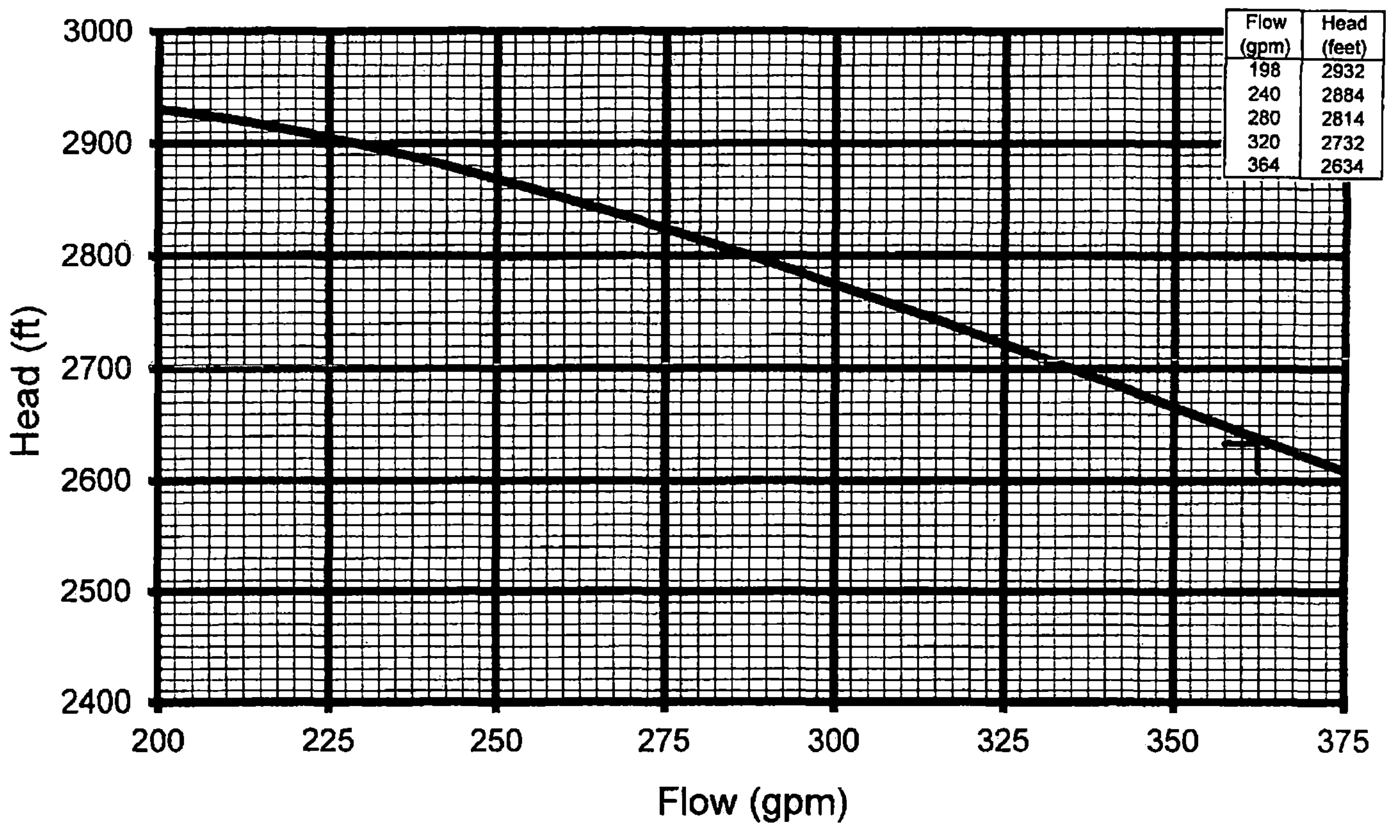
Flow (gpm)	Head (feet)
300	2916
400	2884
519	2777
600	2669
700	2507
750	2417

Reference pump curve was obtained using test pressure gauge data on 7/2/91 corrected to 4200 rpm. The MOP of 2777 ft at 519 gpm is based on Calculation 8700-DMC-3615, Rev. 0, and includes an intra-system leakage rate of 50 gpm. The MOP Curve is derived as 91.50% of the reference pump curve.

Pump Name: Motor Driven Auxiliary Feed Pump

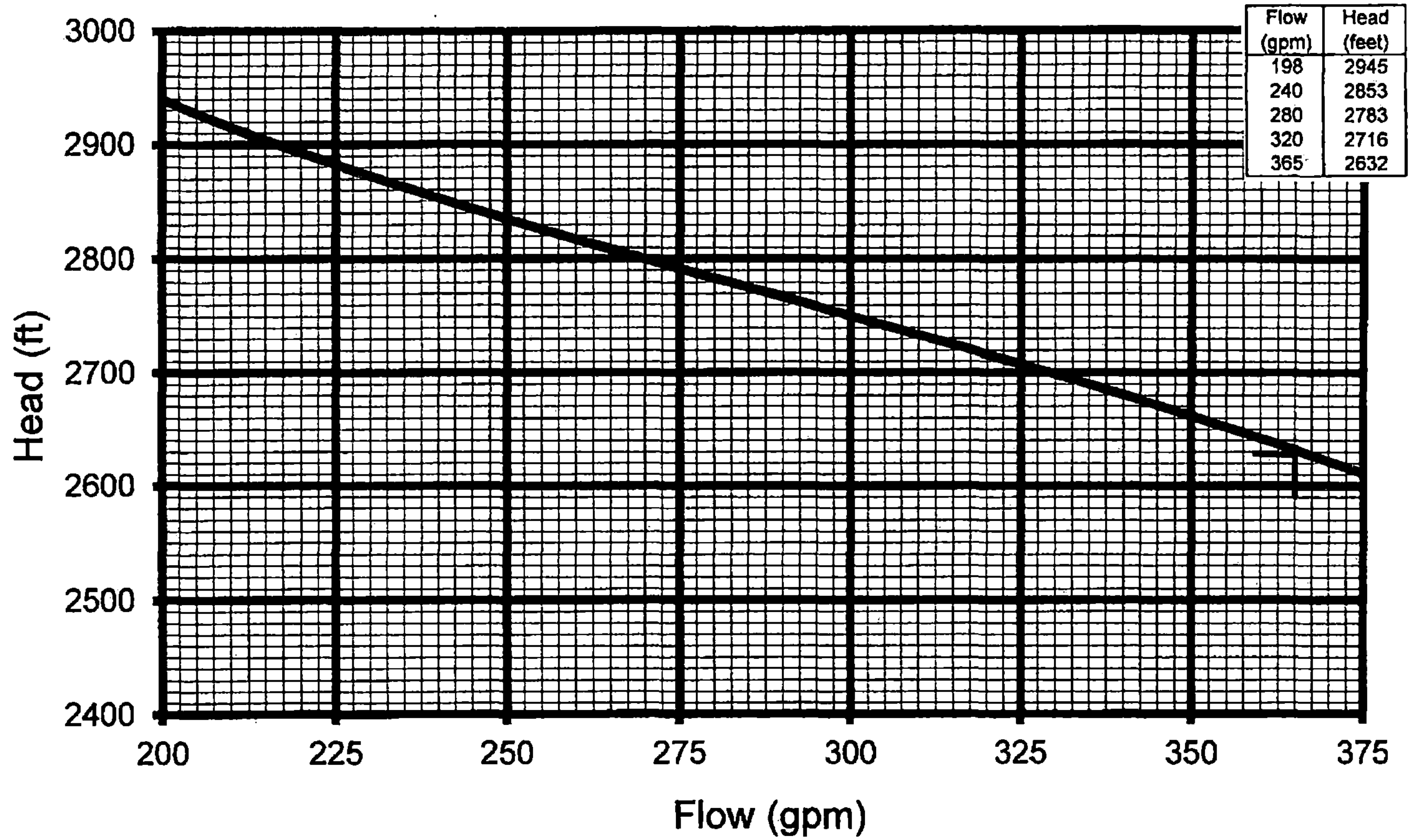
Pump Number: [1FW-P-3A]

[1FW-P-3A]
MOP Curve



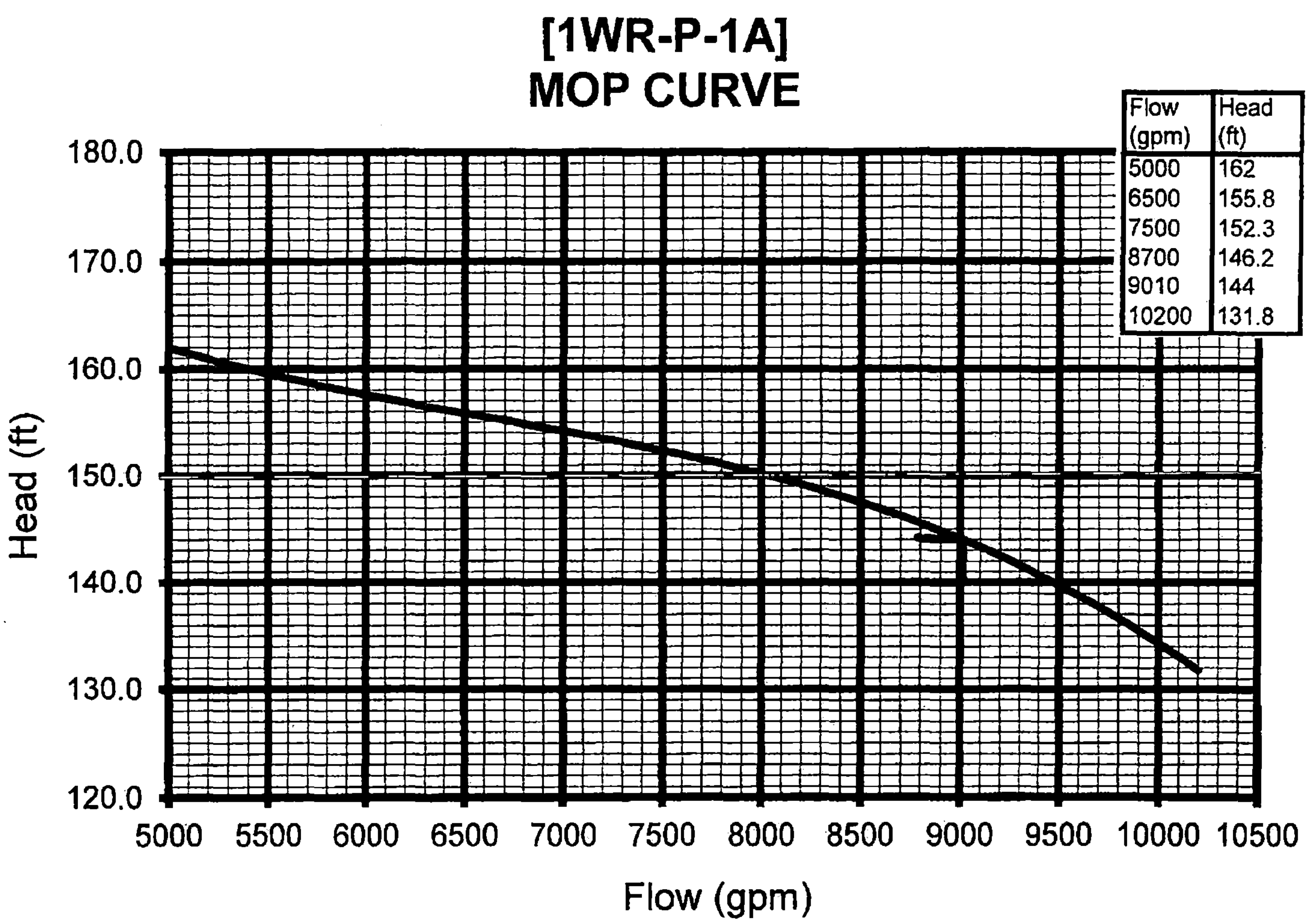
Reference pump curve was obtained using test pressure gauge data on 11/3/97 with flow through [FI-1FW-100A, B and C]. The MOP point is at 2634 ft at 364 gpm per Calculation 8700-DMC-3615, Rev. 0, and includes an intra-system leakage rate of 50 gpm. The MOP Curve is derived as 95.33% of the reference pump curve.

[1FW-P-3B]
MOP Curve



Flow (gpm)	Head (feet)
198	2945
240	2853
280	2783
320	2716
365	2632

Reference pump curve was obtained using installed indicators by an OMCN to 1OST-24.8 on 5/21/93. (Ref: EM 105637, 5/21/93). The MOP Point is at 2632 ft at 365 gpm per Calculation 8700-DMC-3615, Rev. 0, and includes an intra-system leakage rate of 50 gpm. The MOP Cure is derived as 92.48% of the reference pump curve.

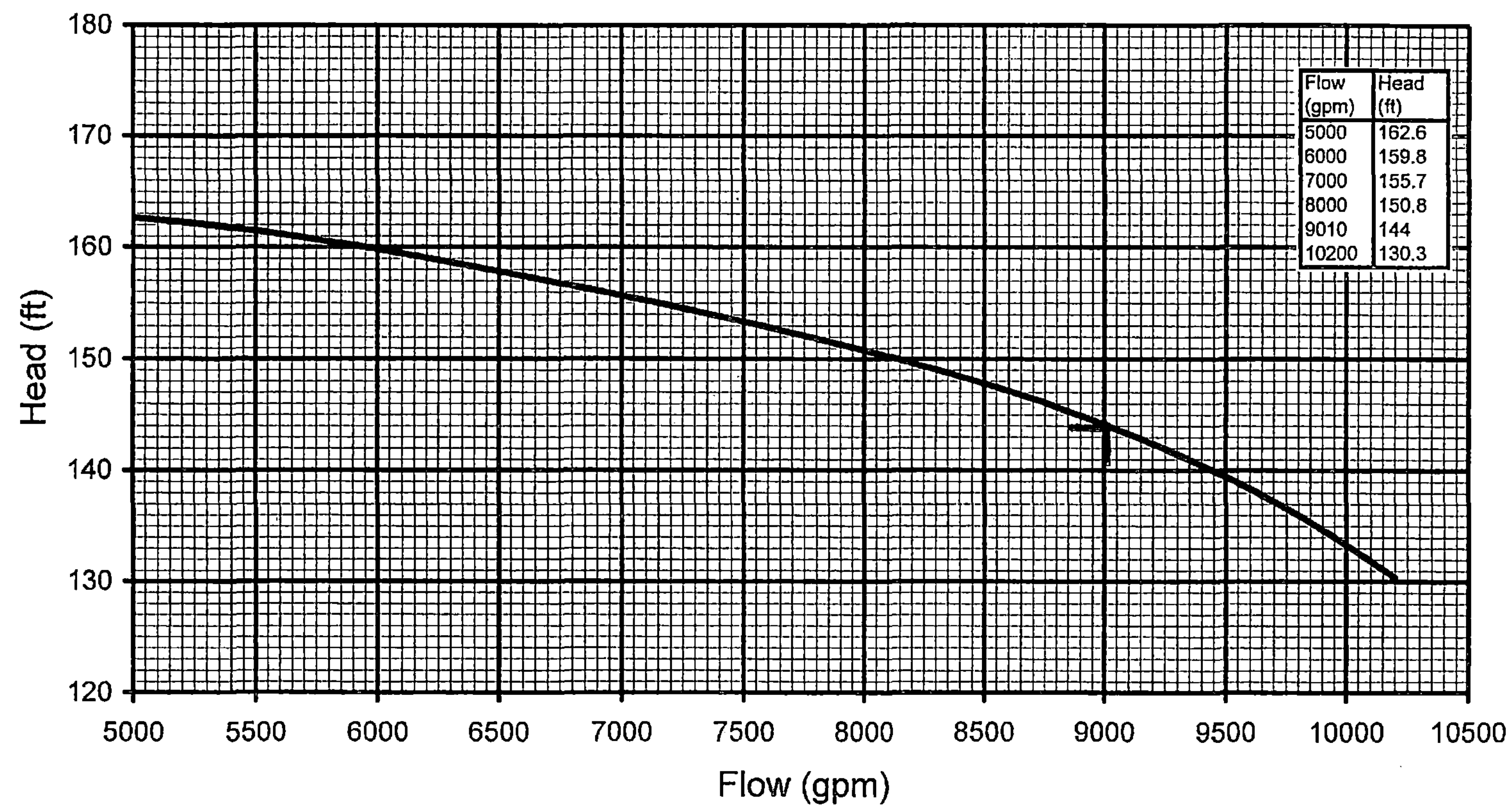


Flow (gpm)	Head (ft)
5000	162
6500	155.8
7500	152.3
8700	146.2
9010	144
10200	131.8

Ref. pump curve obtained per 1BVT 2.30.1 using a test disch. pres. gauge on 12/22/15.
The MOP Curve is derived as 90.17% of the reference pump curve obtained on 12/22/15.
The MOP Point is at 144 ft at 9010 gpm per Calc. 8700-DMC-3136, Rev.3 (5/12/04) and ECP-04-0219 (6/11/04).

Pump Name: 1B Reactor Plant River Water Pump Pump Number: [1WR-P-1B]

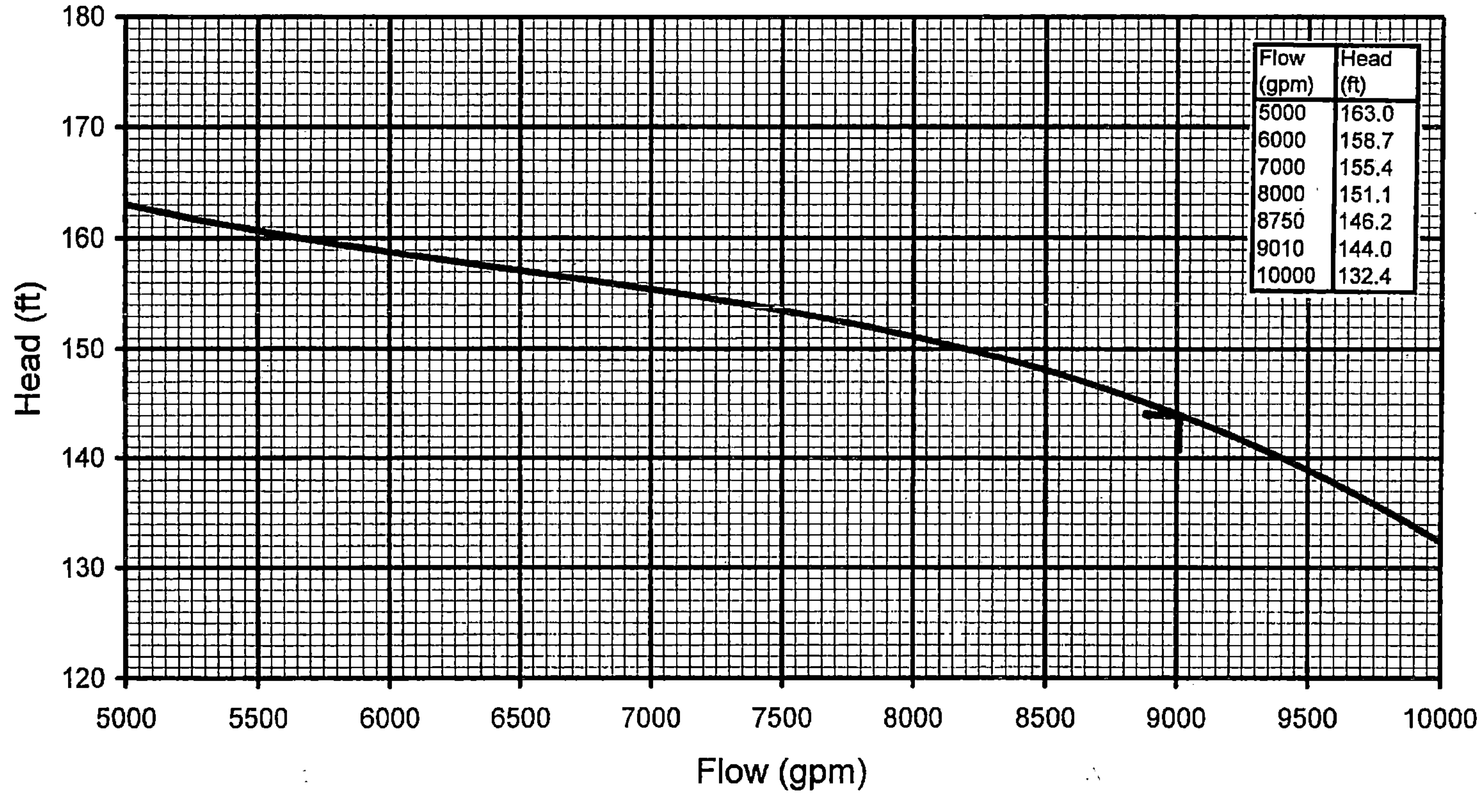
[1WR-P-1B]
MOP Curve



Flow (gpm)	Head (ft)
5000	162.6
6000	159.8
7000	155.7
8000	150.8
9010	144
10200	130.3

The MOP Curve is derived as 92.25% of the reference pump curve obtained on 1/31/13. The MOP Point is at 144 ft at 9010 gpm per Calc. 8700-DMC-3136, Rev.3 (5/12/04) and ECP-04-0219 (6/11/04).

[1WR-P-1C]
MOP CURVE



Flow (gpm)	Head (ft)
5000	163.0
6000	158.7
7000	155.4
8000	151.1
8750	146.2
9010	144.0
10000	132.4

Reference pump curve was obtained per 1BVT 2.30.3 using a test disch. pres. gauge on 1/18/14.
The MOP Curve is derived as 90.62% of the reference pump curve obtained on 1/18/14.
The MOP Point is at 144 ft at 9010 gpm per Calc. 8700-DMC-3136, Rev.3 (5/12/04) and ECP-04-0219 (6/11/04).

SECTION V: VALVE TESTING REQUIREMENTS

The Inservice Test (IST) Program for valves at Beaver Valley Power Station (BVPS), Unit 1, is based on the following:

- American Society of Mechanical Engineers (ASME) OM Code-2004 Edition, Code for Operation and Maintenance of Nuclear Plants, with Addenda through OMb-2006.
- Generic Letter No. 89-04, "Guidance on Developing Acceptable Inservice Testing Programs"
- NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants"
- US NRC Regulatory Guide 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code"
- ASME OM Code Case OMN-1, "Alternative Rules for Preservice and Inservice Testing of Active Electric Motor-Operated Valve Assemblies in Light-Water Reactor Power Plants."

The valves included in this program are all required to perform a specific function in shutting down a reactor to the safe shutdown condition, in maintaining the safe shutdown condition, or in mitigating the consequences of an accident. The pressure-relief devices covered are those for protecting systems or portions of systems which perform one or more of the three aforementioned functions at BVPS-1. Unit 1 was not designed and licensed for a safe shutdown of cold shutdown (Per NUREG-1482, Section 2.2, "If the plant was licensed for a safe shutdown condition of hot standby or hot shutdown rather than cold shutdown, the IST Program document will stipulate that the plant was not designed and licensed for a safe shutdown of cold shutdown"). Although Unit 1 was not designed and licensed for a safe shutdown of cold shutdown, it will generally be treated as such for consistency with BVPS-2.

Exemptions

The following valves are excluded from the requirements of Subsection ISTC, provided they are not required to perform a specific function as described in Paragraph ISTA-1100, "Scope".

- Valves used only for operating convenience such as vent, drain, instrument, and test valves.
- Valves used only for system control, such as pressure regulating valves.
- Valves used only for system or component maintenance.
- Skid-mounted valves provided they are tested as part of the major component and are justified by BVPS-1 to be adequately tested. NUREG-1482, Sections 3.4 and 4.1.10, "Skid-mounted Components [Valves] and Component Subassemblies" provide further discussion pertaining to skid-mounted components. Skid-Mounted valves are valves which are integral to or that support operation of major components, even though these pumps and valves may not be located on the skid. In general, these valves are supplied by the manufacturer of the major component. Examples include: steam admission and trip throttle valves for turbines, and solenoid operated pilot valves used to control air operated valves.
- External control and protection systems responsible for sensing plant conditions and providing signals for valve operation.

- Category A and B safety and relief valves are excluded from the requirements of Paragraphs ISTC-3700, "Valve Position Verification" and ISTC-3500, "Valve Testing Requirements".

Category A and B Valves

Category A valves are valves for which seat leakage in the closed position is limited to a specific maximum amount for fulfillment of their function. Category B valves are valves for which seat leakage in the closed position is inconsequential for fulfillment of their function. Active Category A and B valves shall be full-stroke exercised nominally every three months to the position required to fulfill their function unless such operation is not practicable during operation at power. If only limited operation is practicable during operation at power, the valves may be part-stroke exercised during operation at power and full-stroke exercised during cold shutdowns. If exercising is not practicable during operation at power, the valves may be limited to full-stroke exercising during cold shutdowns. If exercising is not practicable during operation at power and full-stroke during cold shutdowns is also not practicable, the valves may be limited to part-stroke exercising during cold shutdowns, and full-stroke exercising during refueling outages. If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages. Power-operated relief valves shall be tested once per fuel cycle per ISTC-3510. Exception is taken to part-stroke exercising motor-operated valves, unless specifically stated. This is necessary because the motor-operated valve circuitry prevents throttling of these valves. Under normal operation, all valves must travel to either the full open or shut position prior to reversing direction. In the case of frequent cold shutdowns, these valves need not be exercised more often than once every three months. However, during extended shutdowns, valves required to remain operable shall be tested every 3 months, if practicable. All valve exercising required to be performed during a refueling outage shall be completed prior to returning the plant to operation. For a valve in a system declared inoperable or not required to be operable, the exercising test schedule need not be followed. Within 3 months prior to placing the system in an operable status, the valves shall be exercised and the schedule resumed.

Stroke Time Limits and Testing Requirements for Category A and B Valves

The stroke time of all active power-operated valves shall be measured to at least the nearest second. Full-stroke time is the time interval from initiation of the actuating signal to the end of the actuating stroke. The time to full-stroke exercise each power-operated valve will be measured and compared to a reference value (baseline time) and an acceptable range and/or an ASME limiting stroke time as follows:

1. Motor-operated valves (MOVs) with reference stroke times greater than 10 seconds shall exhibit no more than a ±15% change in stroke time when compared to the reference time. MOVs with reference stroke times less than or equal to 10 seconds shall exhibit no more than a ±25% or ±1 second change in stroke time, whichever is greater, when compared to the reference time.

NOTE:	As an alternative to the requirements of paragraph ISTC-5120 of the ASME OM Code-2004 through OMb-2006, Code Case OMN-1 "Alternative Rules for Preservice and Inservice Testing of Active Electric Motor-Operated Valve Assemblies in Light-Water Reactor Power Plants" provides an alternative to MOV stroke time testing. The licensee will meet the requirements of ASME OM Code Case OMN-1 which is conditionally approved for use by Regulatory Guide 1.92 (Rev. 1), "Operation and Maintenance Code Case Acceptability, ASME OM Code."

BVPS-1 shall adopt the alternative test requirements specified in ASME OM Code Case OMN-1 in lieu of stroke timing certain motor operated valves (MOVs) in accordance with the requirements specified in paragraph ISTC-5120 and in lieu of position indication testing in accordance with the requirements specified in paragraph ISTC-3700. The BVPS MOV Program satisfies the criteria specified in ASME OM Code Case OMN-1 and the conditional acceptance specified in Reg. Guide 1.192 (Rev. 1), "Operation and Maintenance Code Case Acceptability, ASME OM Code". Paragraph 3.6 of OMN-1 requires MOVs to be full stroke exercised (not timed)open and closed at least once per refueling cycle (18 months) with the maximum time between exercises to be not greater than 24 months. More frequent exercising (i.e., quarterly) may be required for MOVs with high-risk significance, adverse or harsh environmental conditions, or abnormal characteristics (operational, design or maintenance conditions). MOVs that are ranked by PRA as high-safety significant that can be operated during plant operation will be exercised quarterly. Medium-risk MOVs would typically meet the requirements for a low-safety significant classification, however, they should be considered for quarterly exercising as a function of their enhanced safety importance. MOVs that are ranked by PRA as low-safety significant will be exercised once every 18 months or at refueling. Additionally, full-stroke exercising is based on the practicality of exercising during power operation, cold shutdown, or refueling. Justification for extended full stroke exercising of ASME OM Code Case OMN-1 scoped MOVs beyond a quarterly frequency are provided in Sections VI and VII of the BVPS-1 IST Program. In addition, MOV's with plant safety analysis limits (i.e., for Containment Isolation, ESF, etc.) should be stroke time tested at the exercise frequency in order to verify these limits are met. Further guidance regarding the use of ASME OM Code Case OMN-1 is provided in NUREG-1482, Section 4.2.5, "Alternatives to Stoke-Time Testing". Refer to the following MOV Program administrative procedures: NOP-ER-3601, and NOBP-ER-3601A, B, C and D for further discussion regarding the implementation of ASME OM Code Case OMN-1.

Implementation of ASME OM Code Case OMN-1 for diagnostic testing and stroke timing of MOVs at increased test intervals shall be performed using Corrective Maintenance Procedure (CMP) 1/2-CMP-E-75-021 for rising stem MOVs and 1/2CMP-75-Quarter Turn-1E for butterfly and ball valves.

2. All other power-operated valves (TV, HYV, SOV, etc.) with reference stroke times greater than 10 seconds shall exhibit no more than a ±25% change in stroke time when compared to the reference time. All other power-operated valves with reference stroke times less than or equal to 10 seconds shall exhibit no more than a ±50% change in stroke time when compared to the reference time.

3. Valves that stroke in less than 2 seconds may be exempted from 1 and 2 above, in such cases the maximum limiting stroke time shall be 2.0 seconds.

4. The limiting value of full-stroke time is based on the following:

   a. The Technical Specification or License Requirements Manual value.

   b. Containment isolation or ESF response time requirements.

   c. The reference stroke time times 2 for valves with reference stroke times less than or equal to 10 seconds.

   d. The reference stroke time times 1.5 for valves with reference stroke times greater than 10 seconds.

   e. The design basis time listed in the UFSAR or design time from vendor recommendations.

   A limiting value of full-stroke time is the calculated maximum allowable valve stroke time limit established to assure that corrective action is taken on a degraded valve before it reaches the point where there is a high probability of failure to perform its safety function if called upon. If a design, Technical Specification, UFSAR, or accident analysis limit exists which is more limiting, then it shall be used as the limiting value of full-stroke time in lieu of the calculated value.

5. Since MOV's included in OMN-1 are not required to follow the stroke time requirements of ISTC-5120, stroke timing to the position(s) required to fulfill their function(s) will only be performed during diagnostic testing or for PMT except for those MOV's with plant safety analysis limits (i.e., for Containment Isolation, ESF, etc.). These MOV's should be stroke time tested at their exercise frequency in order to verify these limits are met. The stroke times during diagnostic testing or for PMT will only be compared to a reference value and a limiting value of full-stroke time contained in the applicable OST's, and will be used for trending purposes. Acceptable Range limits specified in ISTC-5122 are not required to be used.

Per ISTC-3530, the necessary valve disk movement shall be determined by exercising the valve while observing an appropriate indicator, such as indicating lights which signal the required change of disk position, or by observing other evidence, such as changes in system pressure, flow rate, level, or temperature, which reflect disk position. Control Room position indicating lights (or arrows for modulating valves) are used for valve stroke indication for all testing of power-operated valves with remote position indicators on the Control Board. In addition per ISTC-3700, valves with remote position indicators shall be observed locally at least once every 2 years (except where extended by OMN-1) to verify that valve operation is accurately indicated in the direction required to fulfill its safety function. In addition for active valves, remote position verification will also be performed in the non-safety direction. Where practicable, this local observation may be supplemented by other indications such as use of flow meters or other suitable instrumentation to verify disk position. However, these observations need not be concurrent. Where local observation is not possible other indications shall be used for verification that valve operation is accurately indicated.

Fail-Safe Testing for Category A and B Valves

Fail-safe valves are valves equipped with fail-safe actuators that are required to move to a position to fulfill the intended safety function upon a loss of actuating power (typically instrument air and/or electrical control power). All valves with fail-safe actuators (e.g., solenoid operated valves, air operated valves or air operated control valves) shall be tested by observing the operation of the actuator upon loss of valve actuating power. Solenoid operated valves (SOVs) are tested from the Control Room by their remote operating (control) switch. Placing the control switch to the fail-safe position de-energizes the solenoid thus positioning the valve in the fail-safe position. Air operated trip valves (TVs) are tested from the Control Room by their remote operating (control) switch. Placing the control switch to the fail-safe position de-energizes the control power to the solenoid which vents air from the valve actuator thus positioning the valve in the fail-safe position. Air operated control valves may be tested in a similar fashion, or the valve actuating power (e.g., electrical or air supply) may be removed to position the valve in the fail-safe position.

Corrective Actions for Category A and B Valves

Corrective action shall be taken if necessary, using the following:

1. If a valve fails to exhibit the required change of valve disk position or exceeds its specified ASME OM Code limiting value of full-stroke time, then the valve shall be declared inoperable immediately. An evaluation of the valve's condition with respect to system operability and technical specifications shall be made as follows:

   a. If the inoperable valve is specifically identified in the technical specifications, then the applicable technical specification required action statements shall be followed.

   b. If the inoperable valve is in a system covered by a technical specification, an assessment of its condition shall be made to determine if it makes the system inoperable. If the condition of the valve renders the system inoperable, then the applicable system technical specification required action statements shall be followed.

   c. Nothing in the ASME OM Code shall be construed to supersede the requirements of any technical specification.

2. Valves with measured stroke times which do not meet the acceptance criteria specified in Paragraphs ISTC-5122 (MOVs), ISTC-5132 (AOVs), ISTC-5142 (HOVs), ISTC-5152 (SOVs), or ISTC-5114 (PORVs) (i.e., % change when compared to the baseline time) shall be immediately retested or declared inoperable as follows:

   a. If the valve is retested and the second set of data meets the acceptance criteria, the cause of the initial deviation shall be analyzed and the results documented in the test.

   b. If the valve is retested and the second set of data also does not meet the acceptance criteria, the data shall be analyzed within 96 hours to verify that the new stroke time represents acceptable valve operation, or the valve shall be declared inoperable. Valve operability based on analysis shall have the results of the analysis documented in the test.

3. Valves declared inoperable may be repaired, replaced, or the data may be analyzed to determine the cause of the deviation and the valve shown to be operating acceptably. Valve operability based on analysis shall have the results of the analysis documented in the test.

4. When a valve or its control system has been replaced, repaired or has undergone maintenance that could affect the valve's performance, a new reference value shall be determined or the previous value reconfirmed by an inservice test run prior to the time it is returned to service or immediately if not removed from service, to demonstrate that the performance parameters which could be affected by the replacement, repair or maintenance are within acceptable limits. Deviations between the previous and new reference values shall be identified and analyzed. Verification that the new values represent acceptable operation shall be documented in the test. Examples of maintenance that could affect valve performance parameters are adjustment of stem packing, limit switches, or control system valves, and removal of the bonnet, stem assembly, actuator, obturator, or control system components.

Manual Valves

Per ISTC-3540, manual valves within the IST program scope that perform an active safety function shall be exercised through a complete cycle at least once every 2 years. Exercise testing shall be considered acceptable if valve stem travel exhibits unrestricted movement with no abnormal resistance or binding through one complete cycle. If a valve fails to exhibit the required change of obturator position, the valve shall immediately declared inoperable.

The use of a valve persuader (cheater) for additional mechanical advantage will not invalidate the test, as it is recognized that larger valves may exhibit increased packing friction and/or increased friction associated with the disk to seat interface. In addition, a valve persuader may be used for personnel safety depending on a valve's service application (i.e. main steam).

Leak Testing

In addition, Category A valves shall be leak rate tested at least once every two years normally, but not necessarily, at refueling outages. The Category A valves that are tested in accordance with Option B of 10CFR50, Appendix J, Type C, are leak rate tested at the frequency specified in Option B of 10CFR50, Appendix J. For other than containment isolation valves with a leakage requirement based on other functions, shall be tested in accordance with ISTC-3630. Example of these other functions are RCS pressure isolation valves, certain owner defined system functions such as inventory preservation, system protection, or flooding protection. If the leak rate exceeds the allowable limit, the valves will be repaired or replaced. A retest demonstrating acceptable operation will be performed following any required corrective action before the valve is returned to service.

Category C Valves

Category C valves are valves which are self-actuating in response to some system characteristic, such as pressure (relief valves) or flow direction (check valves) for fulfillment of their function. Category C valves are divided into two groups; safety or relief valves and check valves.

Safety and Relief Valves

ASME Class 1, 2 and 3 safety and relief valves are tested in accordance with ASME OM Code Appendix I, "Inservice Testing of Pressure Relief Devices in Light-Water Reactor Nuclear Power Plants" All Main Steam Safety Valves and ASME Class 1 safety and relief valves are tested at least once every 5 years, with at least 20% of the valves in each group (i.e., same manufacturer, type (size, model, style), system application and service media) included in the BVPS-1 IST Program tested within any 24 months. All ASME Class 2 and 3 safety and relief valves are tested at least once every 10 years, with at least 20% of the valves in each group included in the BVPS-1 IST Program tested within any 48 months. A test is defined as a seat tightness test and a set pressure test. A seat tightness test shall be based on a quantitative or qualitative acceptance criteria specified by the owner for gross determination of the as-found seat tightness of a safety or relief valve. Following the as found seat tightness test, a set pressure test shall be performed. If any safety or relief valve fails its set pressure test, additional valves shall be set pressure tested on the basis of 2 additional valves to be tested for each valve failure up to the total number of valves from the same group. If any of the additional valve(s) fail, then all remaining valves in the same group shall be set pressure tested. A failure is defined as when the as found set pressure (first test actuation) exceeds the greater of either the ± tolerance limit of the Owner-established set pressure acceptance criteria or ±3% of the valve nameplate set pressure. Any safety or relief valve which exceeds its set pressure or leakage test acceptance criteria shall be evaluated for cause and effect then repaired or replaced. The cause of failure shall be determined and corrected, and the valve shall successfully pass a retest before it is returned to service. Set point adjustment is an acceptable means of corrective action in lieu of repair or replacement. Class 1 thermal relief valves shall be tested in accordance with the requirements of paragraph I-1320 of Appendix I. Class 2 and 3 thermal relief valves shall be tested or replaced every 10 years in accordance with the requirements of paragraph I-1390 of Appendix I. A thermal relief valve is a device whose only overpressure protection function is to protect isolated components (i.e. tanks, heat exchangers), systems or portions of systems from fluid expansion caused by changes in fluid temperature.

Check Valves

Category C check valves shall be exercised nominally every 3 months, except as provided by ISTC-3522 and ISTC-5221. During operation at power, each check valve shall be exercised or examined in a manner that verifies obturator travel by using the methods in ISTC-5221. Each check valve exercise test shall include an open and closed test. Open and closed tests need only be performed at an interval when it is practicable to perform both tests. Test order (e.g. whether the open test precedes the closed test) shall be determined by BVPS. Open and close tests are not required to be performed at the same time if they are both performed within the same interval.

NOTE:	Bi-directional testing in the non-safety related direction can be performed anytime during the fuel cycle (once per 18 months). If testing cannot be performed during operation at power, a Valve Cold Shutdown Justification (VCSJ) or Valve Refueling Outage Justification (VROJ) is not required to support the deferral of testing.

If exercising is not practicable during operation at power, it shall be performed during cold shutdowns. If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages. Valves exercised at shutdowns shall be exercised during each shutdown, except as specified in ISTC-3522(e). Such exercise is not required if the interval since the previous exercise is less than 3 months. During extended shutdowns, valves that are required to perform their intended function shall be exercised every 3 months, if practicable. Per ISTC-3522(e), valve exercising shall commence within 48 hours of achieving cold shutdown and continue until all testing is complete or the plant is ready to return to operation at power. For extended outages, testing need not be commenced in 48 hours if all valves required to be tested during cold shutdown will be tested before or as part of plant startup. However, it is not the intent of Subsection ISTC to keep the plant in cold shutdown to complete cold shutdown testing. All valve testing required to be performed during a refueling outage shall be completed before returning the plant to operation at power.

Valves that operate in the course of plant operation at a frequency that would satisfy the exercising requirements of ISTC need not be additionally exercised, provided that the observations otherwise required for testing are made and analyzed during such operation and recorded in the plant record at intervals no greater than specified in ISTC-3510.

For a valve in a system declared inoperable or not required to be operable, the exercising test schedule need not be followed. Within 3 months before placing the system in an operable status, the valves shall be exercised and the schedule followed in accordance with requirements of ISTC.

Per ISTC-5221, check valve obturator movement shall be verified as follows:

Check Valve Flow Exercising

During exercise testing with flow, the necessary obturator movement shall be demonstrated by performing both an open and a close test. [ISTC-5221(a)]

1. Check valves that have a safety function in both the open and close directions shall be exercised by initiating flow and observing that the obturator has traveled to either the full open position or the position required to perform its intended function(s) and verify that on cessation or reversal of flow, the obturator has traveled to its seat.

2. Check valves that have a safety function in only the open direction shall be exercised by initiating flow and observing that the obturator has traveled to either the full open position or the position required to perform its intended function(s) and verify closure.

3. Check valves that have a safety function in only the close direction shall be exercised by initiating flow and observing that the obturator has traveled at least to the partially open position (normal or expected system flow), and verify that on cessation of reversal of flow, the obturator has traveled to the seat.

Observations shall be made by observing a direct indicator (e.g. position indicating device) or other positive means (e.g. changes in system pressure, flow rate, level, temperature, seat leakage testing, or non-intrusive testing results.

Check Valve Mechanical Exercising

If a mechanical exerciser is used to exercise a valve, the force or torque required to move the obturator and fulfill its safety function(s) shall meet the acceptance criteria specified by BVPS-1 [ISTC-5221(b)]. If practicable, the force(s) or torque(s) required to move the obturator and fulfill any non-safety function should be evaluated to detect abnormality or erratic action for corrective action. The following shall be considered when determining acceptance criteria for mechanical exercising:

1. Exercise test(s) shall detect a missing obturator, sticking (closed or open), binding (throughout obturator movement), and the loss of any weight(s). Both an open and closed test may not be required.

2. Acceptance criteria shall consider the specific design, application, and historical performance. (A reference opening torque ±50% was used in a previous 10-year interval per OM-10, Paragraph 4.3.2.4(b).)

3. If impracticable to detect a missing obturator or the loss or movement of any weight(s) using a mechanical exerciser, other positive means may be used (e.g., seat leakage tests and visual observations to detect obturator loss and the loss or movement of external weight(s), respectively).

Check Valve Sample Disassembly and Inspection

Per ISTC-5221(c). "If the test methods in ISTC-5221(a) (flow exercising) and ISTC-5221(b) (mechanical exercising) are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly and inspection program shall be used to verify obturator movement. If maintenance is performed on one of these valves that could affect its performance, the post-maintenance testing shall be conducted in accordance with ISTC-5221(c)(4)."

Check valves that will be disassembled and inspected shall be grouped by similar design, application, and service condition and require a periodic examination of one valve from each group each refueling outage. The details and bases of the sampling program shall be documented and recorded in the test plan. The following shall be considered when implementing a sample disassembly and inspection program:

1. Grouping of check valves for the sample disassembly and inspection program shall be technically justified and shall consider, as a minimum, valve manufacturer, design, service, size, materials of construction, and orientation. [ISTC-5221(c)(1)]

   Maintenance and modification history should be considered in the grouping process. Valve groupings should also consider potential flow instabilities, required degree of disassembly, and the need for tolerance or critical dimension checks.

2. During the disassembly process, the full stroke motion of the obturator shall be verified. Full stroke motion of the obturator shall be verified immediately prior to completing reassembly. Check valves that have their obturator disturbed before full stroke motion is verified shall be examined to determine if a condition exists that could prevent full opening or reclosure of the obturator. Examples of valves that could have their obturators disturbed prior to verifying full stroke motion include; spring loaded check valves or check valves with the obturator supported from the bonnet. [ISTC-5221(c)(2)]

3. At least one valve from each group shall be disassembled and inspected each refueling outage; and all valves in the group be disassembled and inspected at least once every 8 years. [ISTC-5221(c)(3)]

4. Before return to service, valves that were disassembled for inspection or that received maintenance that could affect their performance, shall be exercised full- or part-stroke, if practicable, with flow in accordance with ISTC-3520. Those valves shall also be tested for other requirements (e.g., closure verification or leak rate testing) before returning them to service. [ISTC-5221(c)(4)]

Check Valve Condition Monitoring

As an alternative to the requirements of paragraphs ISTC-3510, ISTC-3520, ISTC-3530, ISTC-3550, and ISTC-5221, BVPS-1 may establish a Check Valve Condition Monitoring (CVCM) Program per ISTC-5222. The purpose of this program is to both (a) improve check valve performance and to (b) optimize testing, examination, and preventive maintenance activities in order to maintain the continued acceptable performance of a select group of check valves. BVPS-1 may implement this program on a valve or a group of similar valves basis.

Examples of candidates for (a) improved valve performance are check valves that:

- have an unusually high failure rate during inservice testing or operations
- cannot be exercised under normal operating conditions or during shutdown
- exhibit unusual, abnormal, or unexpected behavior during exercising or operation
- the Owner elects to monitor for improved valve performance

Examples of candidates for (b) optimization of testing, examination, and preventive maintenance activities are check valves with documented acceptable performance that:

- have had their performance improved under the Check Valve Condition Monitoring Program
- cannot be exercised or are not readily exercised during normal operating conditions or during shutdowns
- can only be disassembled and examined
- the Owner elects to optimize all the associated activities of the valve or valve group in a consolidated program.

The program shall be implemented in accordance with Appendix II, "Check Valve Condition Monitoring Program", a site administrative procedure (NOBP-ER-3603A, "Check Valve Condition Monitoring Program"), and site implementing procedures which perform the specified tests identified in the individual Check Valve Condition Monitoring (CVCM) Program Plans.

If the Appendix II CVCM Program for a valve or group of valves is discontinued then the requirements of ISTC-3510, ISTC-3520, ISTC-3530, ISTC-3550, and ISTC-5221 shall be implemented.

Corrective Actions for Category C Check Valves

If a check valve fails to exhibit the required change of disk position by any testing above, then the check valve shall be declared inoperable immediately. An evaluation of the check valve's condition with respect to system operability and technical specifications shall be made as follows:

1. If the inoperable check valve is specifically identified in the technical specifications, then the applicable technical specification required action statements shall be followed.

2. If the inoperable check valve is in a system covered by a technical specification, an assessment of its condition shall be made to determine if it makes the system inoperable. If the condition of the check valve renders the system inoperable, then the applicable system technical specification required action statements shall be followed.

3. Corrective action (i.e., Order) shall be initiated immediately for the check valve's repair or replacement.

4. Nothing in the ASME OM Code shall be construed to supersede the requirements of any technical specification.

5. Check valves in a sample disassembly program that are not capable of full-stroke movement (i.e., due to binding) or have failed or have unacceptably degraded valve internals, shall have the cause of the failure analyzed and the condition corrected. Other check valves in the sample group that may also be affected by this failure mechanism shall be examined or tested during the same refueling outage to determine the condition of internal components and their ability to function.

Before returning the check valve to service after corrective action, a retest showing acceptable performance shall be run.

Category D Valves

Category D valves are valves which are actuated by an energy source capable of only one operation, such as rupture disks or explosively actuated valves. There are no ASME Class 1, 2, or 3 Category D valves in the Beaver Valley Power Station, Unit 1, IST Program.

Valve Inservice Test Requirements

All the inservice testing requirements for each different category of valve in the IST Program are summarized in Table ISTC-3500-1. This table lists the paragraphs of ISTC that apply to each different type of valve.

Table ISTC-3500-1

Valve Inservice Test Requirements

Category	Valve Function	Leakage Test Proc/ Frequency	Exercise Test Proc/ Frequency	Special Test Procedure[1]	Position Indication Verification and Frequency
A	Active	ISTC-3600	ISTC-3510	None	ISTC-3700
A	Passive	ISTC-3600	None	None	ISTC-3700
B	Active	None	ISTC-3510	None	ISTC-3700
B	Passive	None	None	None	ISTC-3700
C[3] (Safety/Relief)	Active	[Notes (2),(3)]	ISTC-5230 ISTC-5240	None	ISTC-3700
C[4] (Check)	Active	[Notes (3)]	ISTC-3510	None	ISTC-3700
D	Active	[Notes (3)]	None	ISTC-5250 ISTC-5260	None

Notes:

(1) Note additional requirements for fail-safe valves, ISTC-3560.

(2) Leak test as required for Appendix I

(3) When more than one distinguishing category characteristic is applicable, all requirements for each of the individual categories are applicable, although the duplication or repetition of common testing requirements is not necessary.

(4) If a "check" valve used for a pressure relief device is capacity certified, then it shall be classified as a pressure or vacuum relief device. If a check valve used to limit pressure is not capacity certified, then it shall be classified as a check valve.

Active valves are valves which are required to change obturator position to accomplish a specific function for accident mitigation or achieving/maintaining safe shutdown. Active may also refer to a particular valve position with respect to safety function.

Passive valves are valves which maintain obturator position and are not required to change obturator position to accomplish a required function. As stated in the table, passive valves are not required to be exercised. Therefore, relief is not required from exercising any passive valve and no testing requirement is listed in the Valve Tables except where leakage testing or remote position verification is required.

If a question on valve testability exists, the IST program should be the controlling document since each component is individually assessed for testability and inclusion in the IST Program. If a valve is specifically called out in the Tech. Specs. (i.e., specific valve number or uniquely specified by valve nomenclature) to be tested at one frequency and the IST Program endorses another frequency, then the more restrictive test frequency would be applicable.

Records and Reports

Records of the results of inservice tests and corrective actions as required by ISTC-9000 are maintained in computerized or in tabular form. Stroke times of valves will be reviewed for developing trends.

NOTE:	The following four sections of this document are the "Valve Cold Shutdown Justifications", "Valve Refueling Outage Justifications", "Valve Relief Requests" and "Valve Tables" sections.

<u>Valve Cold Shutdown Justifications</u>

The "Valve Cold Shutdown Justification" section contains the detailed technical description of conditions prohibiting the required testing of safety-related valves and an alternate test method to be performed during cold shutdowns.. Since the radiation levels and air temperature inside containment are higher than normal during power operation, this would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. Therefore, surveillance testing that requires a reactor containment entry will be performed at cold shutdown and refueling. Per ISTC-3521(g) and ISTC-3522(e), valve exercising during cold shutdown shall commence within 48 hours of achieving cold shutdown, and continue until all testing is complete or the plant is ready to return to power. Attempts will be made to complete testing prior to entering Mode 4, however, completion will not be a Mode 4 requirement. The testing will resume where left off when next entering Mode 5 but need not be completed more often than once every 92 days. For planned or extended cold shutdowns, where ample time is available to complete testing on all valves identified for the cold shutdown test frequency, exceptions to the 48 hour requirement can be taken, provided all valves required to be tested during cold shutdown are tested prior to plant startup.

<u>Valve Refueling Outage Justifications</u>

The "Valve Refueling Outage Justifications" section contains the detailed technical description of conditions prohibiting the required testing of safety-related valves and an alternate test method to be performed during refueling outages.

<u>Valve Relief Requests</u>

The "Valve Relief Requests" section contains the detailed technical description of particular conditions and equipment installations prohibiting the testing of some of the characteristics of safety-related valves. An alternate test method and the frequency of revised testing is also included to meet the intent of 10CFR50.55a.

<u>Valve Tables</u>

The "Valve Tables" section is a table listing of all the valves in the IST Program, their system code class and category, whether they are active or passive, their size, valve type, actuator type, drawing number and coordinates, normal, safety and fail-safe positions, required test and frequency, specific cold shutdown justifications, refueling outage justifications and/or relief request reference numbers, test procedure numbers and remarks.

1. The valve class will be 1, 2 or 3, corresponding to the safety classifications.
2. The category of the valve will be A, B, C or D in accordance with the guidelines in ISTC-1300.
3. Whether the valve is Active or Passive will be identified in accordance with the guidelines in ISTA-2000.

4. The type of valve (i.e., globe, gate, butterfly, ball, check, safety, relief, etc.) will be specified. From the valve ID number given, the type of valve actuator can be determined from the following abbreviations:

   FCV - Flow Control Valve

   HCV - Hand Control Valve

   HYV – Hydraulic Operated Valve

   LCV - Level Control Valve

   MOV - Motor Operated Valve

   NRV - Non-Return Valve

   PCV - Pressure Control Valve

   RV - Relief Valve

   SOV - Solenoid Operated Valve

   SV - Safety Valve

   TV - (Air Operated) Trip Valve

   D - Damper

5. The drawing numbers and coordinates will be the ones used in the Operating Manuals.

6. The normal, safety and fail-safe positions will be listed using the following abbreviations:

   O - Open

   S - Shut

   A - Automatic

   T - Throttled

   LO - Locked Open

   LS - Locked Shut

   SS - Sealed Shut

   The normal position applies to operation at power and in most cases will be the normal system arrangement (NSA) position listed in the applicable Operating Manual. The safety position is the position the valve is required to be in to fulfill its safety function. The fail-safe position is the position the valve is required to be in to fulfill its intended safety function upon a loss of actuating power.

7. The required test will be listed using the following abbreviations:

ST-O	Stroke Time Open in Safety Direction
ST-S	Stroke Time Shut in Safety Direction
FS-O	Fail-Safe Test in Open Safety Direction
FS-S	Fail-Safe Test in Shut Safety Direction
ET	Exercise Test (Full Stroke Exercise (not timed) Open and Shut)) of OMN-1 (MOV) Valves

DIAG-ST-O	OMN-1 Diagnostic Test Open in Safety Direction
DIAG-ST-S	OMN-1 Diagnostic Test Shut in Safety Direction
CV-O	Stroke Check Valve Open in Safety Direction
CV-O-PR	Check Valve Verified Open using Pressure
CV-O-VAC	Check Valve Verified Open by removing Vacuum
CV-S	Stroke Check Valve Shut in Safety Direction
CV-S-LT	Stroke Check Valve Shut by Leak Test in Safety Direction
CV-S-PR	Check Valve Verified Shut using Pressure
CV-ME	Stroke Check Valve Open and Shut using a Mechanical Exerciser on the External Weight Arm
CV-BDT-O	Stroke Check Valve Open in non-Safety Direction
CV-BDT-S	Stroke Check Valve Shut in non-Safety Direction
CV-DIS	Disassemble and Inspect Check Valve in Both (Open and Shut) Directions
PMT	Post-Maintenance Test Following Disassembly and Inspection of a Check Valve
MAN	Full-Stroke Manual Valve in Both (Open and Shut) Directions
LM	Leakage Monitoring
LT	Leak Test
LJ-C or LTJ	Leak Test (10CFR50 Appendix J, Option B / Type C)
SPT	Set point Test
RPV	Remote Position Verification (Required every 2 years or at the frequency requirements of OMN-1. Some valves may require RPV every 18 months per Tech Spec 3.3.3.3(16)). Required in both the open and closed directions for active valves and in the safety direction for passive valves. Where practicable, this local observation may also be supplemented to verify disk position.

8. The specific Valve Cold Shutdown Justification (VCSJ) Valve Refueling Outage Justification (VROJ) and/or Valve Relief Request (VRR) reference number(s) will be listed.

9. The required frequency, specific test procedure number, and any remarks will be listed using the abbreviations below:

NOTE: All IST test frequencies less than 2 years may be extended by a 25% grace period, if necessary, with up to a 6 month extension for test intervals ≥2 years in accordance with ASME OM Code Case OM-20 as approved by Valve Relief Request No. 1 (VRR1). Conversely, an on-line PM activity may be scheduled sooner with grace applied for scheduling flexibility as long as its limit date is not exceeded (e.g., 9YR plus 10% grace vs. 10 YR limit date for diagnostic testing of an OMN-1 MOV). Test frequencies based on plant conditions (e.g., CSD or R) cannot be extended.

1OM	Operating Manual (Unit 1)
1BVT	Beaver Valley Test (Unit 1)
1OST	Operating Surveillance Test (Unit 1)

CMP	Corrective Maintenance Procedure
OMN-1	Diagnostic MOV testing per ASME OM Code Case OMN-1 using either 1/2CMP-E-75-021 (rising stem) or 1/2CMP-75-Quarter Turn-1E (rotating stem)
OMN-12	Diagnostic AOV testing per ASME OM Code Case OMN-12 using 1/2MI-75-Ultracheck A-1I
M	Monthly Frequency
Q	Quarterly Frequency
CSD	Cold Shutdown Frequency
R	Refueling Frequency
SP	Special Frequency
MO	Required Every __ Months
YR	Required Every __ Years
RFO	Required Every __ Refueling Outages
NSO	During "Normal System Operation" (continuously, intermittently, but at a minimum of once each cycle when the valve operates during the course of plant operation per ISTC-3550.)
CVCM	At the frequency specified in the Check Valve Condition Monitoring (CVCM) Program Plan(s).

SECTION VI: VALVE COLD SHUTDOWN JUSTIFICATIONS (VCSJ) AND INDEX

VCSJ	SYSTEM NO.	COMPONENT(S)
VCSJ1	6	SOV-1RC-102A, SOV-1RC-102B SOV-1RC-103A, SOV-1RC-103B SOV-1RC-104, SOV-1RC-105
VCSJ2	6	MOV-1RC-535, MOV-1RC-536, MOV-1RC-537
VCSJ3	7	1CH-75, 1CH-76
VCSJ4	7	1CH-84, 1CH-136, 1CH-141
VCSJ5	7	MOV-1CH-142
VCSJ6	10	1RH-3, 1RH-4
VCSJ7	10	MOV-1RH-700, MOV-1RH-701, MOV-1RH-720A, MOV-1RH-720B
VCSJ8	11	MOV-1SI-860A, MOV-1SI-860B
VCSJ9	11	MOV-1SI-865A, MOV-1SI-865B, MOV-1SI-865C
VCSJ10	11	MOV-1SI-842, TV-1SI-889
VCSJ11	11	MOV-1SI-890C
VCSJ12	15	TV-1CC-110F1
VCSJ13	15	TV-1CC-110E2, TV-1CC-110E3, TV-1CC-110D, TV-1CC-110F2
VCSJ14	15	TV-1CC-111A1, TV-1CC-111A2, TV-1CC-111D1, TV-1CC-111D2
VCSJ15	15	MOV-1CC-112A2, MOV-1CC-112A3, MOV-1CC-112B2, MOV-1CC-112B3
VCSJ16	21	MOV-1MS-101A, MOV-1MS-101B, MOV-1MS-101C
VCSJ17	21	NRV-1MS-101A, NRV-1MS-101B, NRV-1MS-101C
VCSJ18	21	PCV-1MS-101A, PCV-1MS-101B, PCV-1MS-101C
VCSJ19	21	TV-1MS-101A, TV-1MS-101B, TV-1MS-101C
VCSJ20	21	HCV-1MS-104
VCSJ21	24	HYV-1FW-100A, HYV-1FW-100B, HYV-1FW-100C
VCSJ22	24	FCV-1FW-478, FCV-1FW-488, FCV-1FW-498
VCSJ23	25	TV-1BD-100A, TV-1BD-100B, TV-1BD-100C, TV-1BD-101A1, TV-1BD-101B1, TV-1BD-101C1 TV-1BD-101A2, TV-1BD-101B2, TV-1BD-101C2
VCSJ24	26	TV-1SV-100A
VCSJ25	30	1RW-57, 1RW-58, 1RW-59
VCSJ26	30	MOV-1RW-102C1, MOV-1RW-102C2
VCSJ27	33	1FP-800, 1FP-804, 1FP-827
VCSJ28	44C	1VS-D-5-3A, 1VS-D-5-3B, 1VS-D-5-5A, 1VS-D-5-5B

VALVE COLD SHUTDOWN JUSTIFICATION 1

Valve No(s): SOV-1RC-102A
SOV-1RC-102B
SOV-1RC-103A
SOV-1RC-103B
SOV-1RC-104
SOV-1RC-105

Category: B **Class:** 1

System: 6 - Reactor Coolant System

Function: These reactor vessel head vent valves must open to vent non-condensable gasses from the reactor vessel head to Containment or the Pressurizer Relief Tank (PRT). They must close to minimize RCS pressure boundary leakage.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally closed operation during plant operation. Their safety positions are closed to minimize RCS pressure boundary leakage, and open to vent the RCS in an emergency to assure that core cooling during natural circulation will not be inhibited by a buildup of non-condensable gases. Periodic full or part-stroke exercising in the open and closed directions during normal plant operation could degrade this system by repeatedly challenging the downstream valves due to a phenomenon known as "burping." This phenomenon has been previously described in ASME report "Spurious Opening of Hydraulic-Assisted, Pilot-Operated Valves - An Investigation of the Phenomenon." The phenomenon involves a rapid pressure surge buildup at the valve inlet caused by opening the upstream valve in a series double isolation arrangement or closing a valve in a parallel redundant flow path isolation arrangement. The pressure surge is sufficient enough to lift the valve plug until a corresponding pressure increase in a control chamber above the pilot and disc can create enough downward differential pressure to close the valve. Per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed open and closed and fail-safe tested closed at cold shutdowns per 1OST-1.10A (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c) and ISTC-3560.

VALVE COLD SHUTDOWN JUSTIFICATION 2

Valve Asset No(s): MOV-1RC-535
MOV-1RC-536
MOV-1RC-537

Category: B **Class:** 1

System: 6 - Reactor Coolant

Function: These Pressurizer Power Operated Relief Valve (PORV) isolation (block) valves are required to open to unisolate their associated PORV. They are also required to close to isolate a leaking PORV if excessive leakage occurs or if a PORV would inadvertently jam or stick in the open position.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally open to support operation of their respective Power Operated Relief Valve (PORV). They are also required to close to isolate a leaking PORV if excessive leakage occurs or if a PORV would inadvertently jam or stick in the open position. Because of this they are normally exercised open and closed as required quarterly by the ASME OM Code, Paragraph ISTC-3510, and as required once every 92 days by Technical Specification Surveillance SR 3.4.11.1, in order to ensure they can be opened and closed if needed in an accident. However, if a block valve is closed in accordance with the required actions of a limiting condition of operation (LCO) for Technical Specification 3.4.11, Surveillance SR 3.4.11.1, "Note" states that cycling the block valve every 92 days is not required to be performed. This is because opening the block valve in this condition would increase the risk of an unisolable leak from the Reactor Coolant System (RCS) since the PORV is already inoperable. ISTC-3521(c) states, "If excising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Since these MOV's are ranked as high safety significant valves, they have additional exercising requirements per Paragraph 3.6.2 of OMN-1 and are required to be full-stroke exercised open and closed quarterly per 1OST-6.6 (PORV Isolation Valve Test). If they are not able to be exercised quarterly as described above, the valve(s) will be full-stroke exercised open and closed at least during cold shutdowns per 1OST-6.6 (PORV Isolation Valve Test) in accordance with OMN-1 Paragraph 3.6.1. In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since these valves do not have any plant safety analysis limits.

References: ISTC-3510 and ISTC-3521(c).

Technical Specification 3.4.11 and Bases.

OMN-1 Paragraphs 3.6.1 and 3.6.2.

VALVE COLD SHUTDOWN JUSTIFICATION 3

Valve No(s): 1CH-75

1CH-76

Category: C **Class: 3**

System: 7 - Chemical and Volume Control

Function: These discharge check valves for the Boric Acid Transfer Pumps must open to allow boric acid to be supplied to the blender for normal reactivity control and to the Charging Pumps for emergency boration.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: These check valves may be open during power operation. They must open to provide a flow path of 4% boric acid solution from the Boric Acid Tanks via the Boric Acid Transfer Pumps to the suction of the Charging Pumps for emergency boration. They can only be full-stroke exercised by initiating the maximum required accident condition flow, in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, through either the emergency boration flow path and verifying it using the installed flow instrumentation in this flow path, or through the recirculation line which does not have installed instrumentation.

Testing through the emergency boration flow path would cause an undesired reactivity transient through the direct injection of 7,000 ppm borated water to the suction of the Charging Pumps. The resultant over-boration of the RCS would cause a temperature transient as Tavg dropped to compensate and could cause a plant shutdown.

The recirculation line is not instrumented, and in order to use it, a temporary ultrasonic flow instrument must be installed. In order to install the temporary flow instrument, the insulation and heat trace must be moved away from where the transducers and tracks must be installed. Moving the heat trace elements places stresses on them which could cause them to break. Therefore, it is not practical to use the recirc line for either quarterly or cold shutdown full-stroke testing.

Per ISTC-3522(b), "If exercising is not practicable during operation at power, it shall be performed during cold shutdown."

Alternate Test: Full-stroke exercised open at cold shutdowns through the instrumented emergency boration flow path per 1OST-1.10C (Cold Shutdown Valve Exercise Test). In addition, these check valves may be full-stroke exercised open during the biennial full-flow comprehensive pump test of the Boric Acid Transfer per 1OST-7.13 & 7.14 (Boric Acid Transfer Pump Full Flow Tests) when temporary ultrasonic flow instrumentation can be installed. (See PRR6).

NOTE: Bi-directional exercising to the non-safety related closed position will be performed within the same interval at least once per cycle per 1OST-7.1 and 2 (Boric Acid Transfer Pump Test).

VALVE COLD SHUTDOWN JUSTIFICATION 3

References: ISTC-3510, ISTC-3522(b) and ISTC-5221(a).
NUREG-1482, Section 4.1.3.

VALVE COLD SHUTDOWN JUSTIFICATION 4

Valve No(s): 1CH-84
1CH-136
1CH-141

Category: C **Class:** 3

System: 7 - Chemical and Volume Control System

Function: These emergency and alternate emergency boration line check valves must open to provide a flow path for 4% boric acid solution from the Boric Acid Tanks via the Boric Acid Transfer Pumps to the suction of the Charging Pumps.

Test Requirement: ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: These check valves are normally closed during plant operation. Their safety position is open for emergency and alternate emergency boration. They can only be full-stroke exercised in the open direction by initiating the maximum required accident condition flow in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3. However, testing in this manner at power would result in concentrated boric acid solution being injected in the reactor coolant system (RCS). This would cause an undesired negative reactivity addition resulting in a reduction in plant power. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns."

Alternate Test: Full-stroke exercised open during cold shutdowns per 1OST-1.10C (Cold Shutdown Valve Exercise Test).

NOTE: Bi-directional exercising in the non-safety related closed direction will be satisfied by a leak test of [1CH-84] per 1OST-7.17 ([1CH-84 Closure Test) and by a leak test of [1CH-136 and 141] per 1BVT 1.47.11 (Safety Injection and Charging System Containment Penetration Integrity Test) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

References: ISTC-3510, ISTC-3522(b), ISTC-5221(a) and ISTC-5222.

NUREG-1482, Sections 3.1.1 and 4.1.3.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE COLD SHUTDOWN JUSTIFICATION 5

Valve No(s): MOV-1CH-142

Category: A **Class:** 2

System: 7 - Chemical and Volume Control System

Function: This Residual Heat Removal (RHR) system letdown flow control valve must close to provide containment isolate of Penetration No. 28.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for CSJ: This valve is normally closed during plant operation and must remain closed at power. Its safety position is closed for containment isolation of Penetration No. 28. Opening it during normal operation would divert normal RCS letdown back into the RHR system because there is no other isolation valve to the RHR system, and could cause a pressure shock in the RHR system. This valve would only be opened when the RHR system is in service. RHR is normally placed in service in Mode 4 when preparing to enter Mode 5 and remains in service upon exiting Mode 5 during plant start-up. Tech. Specs. require Containment Isolation capability in Mode 4; therefore, this valve would have to be able to close if containment isolation was required. Therefore, because this valve cannot be opened during power operations, it will be stroked and timed closed during cold shutdowns. Per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: This valve may be full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns per 1OST-1.10D (Cold Shutdown Valve Exercise Test). However, since it is ranked as a low safety significant valve that does not have additional exercising requirements per Paragraph 3.6.2 of OMN-1, its exercise frequency may be extended to refueling per OMN-1 Paragraph 3.6.1. In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since this valve does not have any plant safety analysis limits.

References: ISTC-3510 and ISTC-3521(c).

OMN-1 Paragraphs 3.6.1 and 3.6.2

VALVE COLD SHUTDOWN JUSTIFICATION 6

Valve No(s): 1RH-3
1RH-4

Category: C **Class:** 2

System: 10 - Residual Heat Removal

Function: These Residual Heat Removal (RHR) Pumps discharge check valves must open to support RHR system operation and must close to prevent reverse flow through the standby RHR Pump.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: During normal plant operation, the RHR system is isolated from the reactor Coolant System (RCS) and these check valves are normally closed. Their safety position is open to support RHR system operation and closed to prevent reverse flow through the standby RHR Pump. They can only be full-stroke exercised in the open direction by initiating the maximum required accident condition flow in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, when the RHR Pumps are in operation. However, during plant operation, the RHR system is isolated from the Reactor Coolant System (RCS) and the RHR Pumps are not required for operation. The RHR Pumps are only operated during cold shutdowns and refueling outages. In addition, the pumps and valves in the RHR system are also located inside the slightly subatmospheric containment and are inaccessible during normal operation. Since the radiation levels and air temperature inside containment are higher than normal during power operation, this would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. Per ISTC-3522(b), "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns."

Alternate Test: Full-stroke exercised open and closed during cold shutdowns per 1OST-10.1 (Residual Heat Removal Pump Performance Test).

References: ISTC-3510, ISTC-3522(b) and ISTC-5221(a).
NUREG-1482, Section 4.1.3.

VALVE COLD SHUTDOWN JUSTIFICATION 7

Valve No(s): MOV-1RH-700
MOV-1RH-701
MOV-1RH-720A
MOV-1RH-720B

Category: A **Class:** 1

System: 10 - Residual Heat Removal

Function: These Residual Heat Removal (RHR) System Inlet and Outlet Isolation Valves must open to place the RHR System in service to cool down the plant and must close and be leak tight during normal plant operation.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for CSJ: During normal plant operation, the RHR System is isolated from the Reactor Coolant System (RCS) and these valves are normally closed and de-energized. They cannot be cycled at power without subjecting the RHR system (a low pressure system) to RCS pressure, and cannot be opened due to pressure interlocks. Per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

The RHR system is configured such that the parallel discharge isolation valves, [MOV-1RH-720A, B], can be stroked without the loss of system function during cold shutdown. However, the two series isolation valves on the pump suction, [MOV-1RH-700, 701], cannot be stroked without shutting down both RHR pumps. A failure of one of these valves to re-open after testing would render the entire RHR system inoperable. Therefore these valves can only be stroked if both RHR pumps are shutdown.

Alternate Test: Full stroke exercised and timed open when placing the RHR System into service during station shutdown to cold shutdown per 1OM-10.4.A (Startup of the RHR System), and timed closed when removing the RHR system from service during station startup from cold shutdown per 1OM-10.4.C (RHR System Shutdown), or timed open and closed when RHR is not required to be in operation, not more often than once per 92 days, per 1OST-10.4 (Residual Heat Removal System Valve Exercise) as part of the cold shutdown valve population.

References: ISTC-3510 and ISTC-3521(c).

VALVE COLD SHUTDOWN JUSTIFICATION 8

Valve No(s): MOV-1SI-860A
MOV-1SI-860B

Category: A **Class:** 2

System: 11 - Safety Injection

Function: These Low Head Safety Injection (LHSI) Pump containment sump suction valves must open on low Refueling Water Storage Tank (RWST) level to align the suction of the LHSI Pumps to the containment sump. They are also required to close for containment isolation of Penetration No's. 68 and 69.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally closed during plant operation. They are containment isolation valves which are exposed to containment atmosphere. During an accident, this flow path would be in service and filled with water; not in contact with the atmosphere. Failure of these valves in the open position during plant operation would compromise containment integrity. NUREG-1482, Section 3.1.1, "Deferring Valve Testing to Each Cold Shutdown or Refueling Outage," Example (2), states that valves whose failure to close during a cycling test that would result in a loss of containment integrity would typically be excluded from testing during plant operations. Per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

In addition, the PRA Group has evaluated the demand failure rates for these high safety significant MOVs based on the risk associated with exercising them per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

Alternate Test: Full-stroke exercised open and closed in accordance with ASME OM Code Case OMN-1 during cold shutdowns per 1OST-1.10F (Cold Shutdown Valve Exercise Test). In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since these valves do not have any plant safety analysis limits.

References: ISTC-3510 and ISTC-3521(c).
NUREG-1482, Section 3.1.1.
OMN-1 Paragraph 3.6.1

VALVE COLD SHUTDOWN JUSTIFICATION 9

Valve No(s): MOV-1SI-865A
MOV-1SI-865B
MOV-1SI-865C

Category: B **Class:** 2

System: 11 - Safety Injection

Function: These Safety Injection (SI) Accumulator Discharge Isolation Valves must remain open to allow the SI Accumulators to discharge to the reactor coolant system (RCS) in the event of a loss of coolant accident (LOCA). They must close during a small break LOCA to prevent nitrogen from being injected into the RCS.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: During plant operation, these valves are de-energized (shorting bars are removed) in the open position which is their passive safety position. Their safety position is also closed during a small break LOCA to prevent nitrogen from being injected into the RCS. Full-stroke exercising in the open direction is not required per Table ISTC-3500-1, "Inservice Test Requirements," since the valves are passive in this direction. Full-stroke exercising in the closed direction cannot be performed during plant operation because these valves are required to be open with power removed from the Accumulator Isolation Valve operator control circuit per Technical Specification 3.5.1.5. In addition, NUREG-1482, Section 3.1.1, "Deferring Valve Testing to Each Cold Shutdown or Refueling Outage," Example (1) lists the SI Accumulator discharge valves in PWR's as one specific example of valves whose failure in a non-conservative position during the cycling test would cause a loss of system function. Therefore, these valves will not be stroked and timed during plant operation. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

In addition, the PRA Group has evaluated the demand failure rates for these high safety significant MOVs based on the risk associated with exercising them per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

VALVE COLD SHUTDOWN JUSTIFICATION 9

Alternate Test: These valves are full-stroke exercised closed when the SI Accumulators are isolated from the RCS on the way to cold shutdowns per 1OM-52.4.R.1.F (Station Shutdown from 100% Power to Mode 5) and full-stroke exercised open during station startup per 1OM-50.4.L (Plant Heatup from Mode 6 to Mode 3), and/or full stroke exercised open and closed per 1OST-1.10F (Cold Shutdown Valve Exercise Test) in accordance ASME OM Code Case OMN-1. In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since these valves do not have any plant safety analysis limits.

References: ISTC-3510, ISTC-3521(c), and Table ISTC-3500-1.

NUREG-1482, Section 3.1.1.

Technical Specification 3.5.1.5.

OMN-1 Paragraph 3.6.1.

VALVE COLD SHUTDOWN JUSTIFICATION 10

Valve No(s): MOV-1SI-842
TV-1SI-889

Category: A **Class:** 2

System: 11 - Safety Injection

Function: These inside and outside containment isolation valves in the SI Accumulator test line must close to provide containment isolation of Penetration No. 106

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are shut during normal operation and are required to close for containment isolation of Penetration No. 106. Because Containment Penetration No. 106 does not have relief protection, it is required to remain drained. When these isolation valves are opened so that they can be stroke timed shut during normal operations, the Containment Penetration fills up with water and must be drained subsequent to testing. Draining the Penetration is an Operator Work Around that requires three Operators two hours to perform due to component locations. This drain down also requires entry into the four hour Required Action of Tech. Spec. 3.6.3 for an inoperable containment isolation valve in Modes 1-4. This is because vent and drain valves within the Penetration boundary must be opened to complete the drain down. Therefore, it is not practicable to test these valves during Modes 1-4. Per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: [TV-1SI-889] is full-stroke exercised and timed closed and fail-safe tested closed at cold shutdowns per 1OST-1.10F (Cold Shutdown Valve Exercise Test).

[MOV-1SI-842] may be full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns per 1OST-1.10F (Cold Shutdown Valve Exercise Test). However, since it is ranked as a low safety significant valve that does not have additional exercising requirements per Paragraph 3.6.2 of OMN-1, its exercise frequency may be extended to refueling per OMN-1 Paragraph 3.6.1. In addition, this MOV should be stroke time tested when exercised closed at refueling since it has both ESF and Containment Isolation plant safety analysis limits.

References: ISTC-3510, ISTC-3521(c) and ISTC-3560.

Technical Specification 3.6.3.

LRM Tables 3.3.2-1 and 3.6.1-1.

OMN-1 Paragraphs 3.6.1 and 3.6.2.

VALVE COLD SHUTDOWN JUSTIFICATION 11

Valve No(s): MOV-1SI-890C

Category: A **Class:** 2

System: 11 - Safety Injection

Function: This Low Head Safety Injection (LHSI) Pump discharge valve is required to remain open in order to supply flow to the Reactor Coolant System (RCS) cold legs in an accident. It is also required to close for containment isolation of Penetration No. 61 and for transfer to hot leg recirculation should either [MOV-1SI-864A or B] fail to close.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for CSJ: This valve is open during normal plant operation and is required to remain open to supply flow to the RCS cold legs in an accident. It must also be capable of closing for containment isolation of Penetration No. 61 and for transfer to hot leg recirculation should either [MOV-1SI-864A or 864B] fail to close. Since this valve is in the single flow path from the LHSI Pumps to the RCS cold legs, failure of this valve to reopen after testing would render LHSI cold leg injection from both trains inoperable. NUREG-1482, Section 3.1.1, "Deferring Valve Testing to Each Cold Shutdown or Refueling Outage," Example (1) states that all valves whose failure in a non-conservative position during the cycling test that would result in a loss of system function would typically be excluded from testing during pant operations. Per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

In addition, the PRA Group has evaluated the demand failure rates for this high safety significant MOV based on the risk associated with exercising it per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

Alternate Test: Full-stroke exercised open and closed in accordance with ASME OM Code Case OMN-1 during cold shutdowns per 1OST-1.10F (Cold Shutdown Valve Exercise Test). In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since this valve does not have any plant safety analysis limits.

References: ISTC-3510 and ISTC-3521(c).

NUREG-1482, Section 3.1.1.

OMN-1 Paragraph 3.6.1.

VALVE COLD SHUTDOWN JUSTIFICATION 12

Valve No(s): TV-1CC-110F1

Category: A **Class:** 2

System: 15 - Reactor Plant Component Cooling Water

Function: This containment air recirculation fan cooling coil river water return isolation valve must close to provide containment isolation of Penetration No. 11.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for CSJ: This valve is normally closed to isolate the chilled water system from the river water system, and is required to close on a CIB signal for containment isolation of Penetration No. 11. The chilled water system is a closed loop system, and there is no other isolation valve downstream of [TV-1CC-110F1]. Therefore, the upstream isolation valves [TV-1CC-110D and 100F2] must be closed in order to prevent loss of chilled water inventory to the river water system when [TV-1CC-110F1] is opened for stroking. However, this would require isolating cooling water to all three containment air recirculation fan coolers. If either of these valves failed to re-open or if [TV-1CC-110F1] failed to re-close, then this would result in loss of cooling for containment. Technical Specification 3.6.5 requires plant shutdown if average containment air temperature exceeds 108F. NUREG-1482, Section 3.1.1, "Deferring Valve Testing to Each Cold Shutdown or Refueling Outage," Example (1) states that all valves whose failure in a non-conservative position during the cycling test that would result in a loss of system function would typically be excluded from testing during plant operations. Per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed closed and fail-safe tested closed at cold shutdowns per 1OST-1.10H (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c) and ISTC-3560.

NUREG-1482, Section 3.1.1.

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VALVE COLD SHUTDOWN JUSTIFICATION 13

Valve No(s): TV-1CC-110E2
TV-1CC-110E3
TV-1CC-110D
TV-1CC-110F2

Category: A **Class:** 2

System: 15 - Reactor Plant Component Cooling Water

Function: These containment air recirculation fan cooling coil water supply and return containment isolation valves must close to provide containment isolation of Penetration No's. 11 and 14.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally open during power operation to supply cooling water to the containment air recirculation fan coolers. Their safety position is closed for containment isolation of Penetration No's. 11 and 14. Since the two inlet and outlet isolation valves are in series with one another, failure of one of them to re-open during stroke time testing in the closed direction would isolate cooling water to all three containment air recirculation fan coolers and would result in loss of cooling for containment. Technical Specification 3.6.5 requires plant shutdown if average containment air temperature exceeds 108F. NUREG-1482, Section 3.1.1, "Deferring Valve Testing to Each Cold Shutdown or Refueling Outage," Example (1) states that all valves whose failure in a non-conservative position during the cycling test that would result in a loss of system function would typically be excluded from testing during pant operations. Per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed closed and fail-safe tested closed at cold shutdowns per 1OST-1.10H (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c) and ISTC-3560.
NUREG-1482, Section 3.1.1.
Technical Specification 3.6.5.

VALVE COLD SHUTDOWN JUSTIFICATION 14

Valve No(s): TV-1CC-111A1
TV-1CC-111A2
TV-1CC-111D1
TV-1CC-111D2

Category: A **Class:** 2

System: 15 - Reactor Plant Component Cooling Water

Function: These inlet and outlet containment isolation valves for the Control Rod Drive Mechanism (CRDM) Shroud coolers are required to close for containment isolation of Penetration Nos. 9 and 16.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally open during power operation to supply cooling water flow to the CRDM Shroud Coolers, and must close upon receipt of a CIB signal for containment isolation of Penetration Nos. 9 and 16. Since these valves are in series with each other, exercising them in the closed direction would isolate cooling water flow to the CRDM Shroud Coolers. Failure of any of these valves to re-open while the control rods or shutdown rods are energized and the plant is above 250F would result in a loss of cooling ventilation to the CRDMs. NUREG-1482, Section 3.1.1, "Deferring Valve Testing to Each Cold Shutdown or Refueling Outage," Example (1) states that all valves whose failure in a non-conservative position during the cycling test that would result in a loss of system function would typically be excluded from testing during pant operations. Per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed closed and fail-safe tested closed at cold shutdowns per 1OST-1.10H (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c) and ISTC-3560.
NUREG-1842, Section 3.1.1.

VALVE COLD SHUTDOWN JUSTIFICATION 15

Valve No(s): MOV-1CC-112A2
MOV-1CC-112A3
MOV-1CC-112B2
MOV-1CC-112B3

Category: A **Class:** 2

System: 15 - Reactor Plant Component Cooling Water

Function: These RHR Heat Exchanger CCR supply and return containment isolation valves must open to supply component cooling water to the RHR heat exchangers and the RHR pump seal water coolers. They must close for containment isolation of Penetration Nos. 1, 2, 4 and 5.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are stroked and timed quarterly during power operation. During cold shutdowns, however, the quarterly testing frequency may not be able to be maintained.

During cold shutdowns, these valves are opened to place the RHR System in service. Once the RHR System is in service, the safety function of these valves is to remain open to supply cooling water to the RHR heat exchangers and to the RHR pump seals. If the RHR system is inservice as the operable RCS loops per Tech Spec 3.4.6, 3.4.7, or 3.4.8 as applicable, these valves cannot be tested without entering the required action statement which requires immediate restoration of the RCS loop. Failure of these valves during testing at that time would cause loss of cooling flow for one of the required RCS Loops.

Once the RHR system is not required to be inservice as the operable RCS loops, Tech Specs would permit the exercising of these valves. However, these valves can only be stroked and timed if their associated RHR pump is not operating. Therefore, while the plant is in mode 5 or 6, the RHR pumps would have to be swapped in order to exercise all of the valves. Every effort will be made to minimize the number of pump cycles. Testing can also be performed when placing the RHR system in service and when removing the system from service or when RHR is not required to be in operation, not more often than once per 92 days.

VALVE COLD SHUTDOWN JUSTIFICATION 15

Alternate Test: Full stroke exercised and timed open and closed quarterly per 1OST-47.3F and 3K (Containment Isolation and ASME Tests), during power operation. Full stroke exercised and timed open when placing the RHR System in service per 1OM-10.4.A (Startup of the RHR System), and timed closed when removing the RHR System from service during station startup from cold shutdown per 1OM-10.4.C (RHR System Shutdown), or timed open and closed when RHR is not required to be in operation, not more often than once per 92 days, per 1OST-10.4 (Residual Heat Removal System Valve Exercise Test) as part of the cold shutdown valve population.

References: ISTC-3510.

Technical Specifications 3.4.6, 3.4.7 and 3.4.8.

VALVE COLD SHUTDOWN JUSTIFICATION **16**

Valve Asset No(s): MOV-1MS-101A
MOV-1MS-101B
MOV-1MS-101C

Category: B **Class:** 2

System: 21 - Main Steam

Function: The Main Steam Trip Valve Bypass Valves must close to provide containment isolation of Penetration No's. 73, 74 and 75.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally locked closed and de-energized during plant operation, but may be opened during Main Steam System startup prior to normal plant operation. Their safety position is closed for containment isolation of penetration no's. 73, 74 and 75. Since, each valve is a single isolation valve without redundancy, failure to reclose during a stroke test at power could result in a loss of containment integrity. NUREG-1482, Section 3.1.1., "Deferring Valve Testing to Each Cold Shutdown or Refueling Outage", lists as an example of valves to be specifically excluded from exercising (cycling) tests during plant operations: (2) All valves whose failure to close during a cycling test and could result in loss of containment integrity. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed closed during cold shutdowns per 1OST-1.10J (Cold Shutdown Valve Exercise Test).

References: ISTC-3510 and ISTC-3521(c).

NUREG-1482, Section 3.1.1.

VALVE COLD SHUTDOWN JUSTIFICATION 17

Valve No(s): NRV-1MS-101A
NRV-1MS-101B
NRV-1MS-101C

Category: B/C **Class:** 2

System: 21 - Main Steam

Function: These Steam Generator (S/G) non-return valves prevent reverse flow if their associated S/G is faulted or a line break occurs to prevent blowing down the intact S/Gs.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves and Category C check valves shall be exercised nominally every 3 months

Basis for CSJ: These valves are standard swing check valves with motor operators used to assure positive seating of the disc. The motor operator is not capable of closing the non-return valve against normal steam flow. Full or part-stroke testing of these valves at power is not possible because these valves must be open to allow steam to flow from the steam generators to the turbine. Per ISTC-3521(c) (Category B valves) and ISTC-3522(b) (Category C valves), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: The valves are exercised in the closed direction on a cold shutdown frequency. The function of the valves is to close if their associated S/Gs are faulted or if a line break occurs between the S/Gs and the main steam trip valves. The motor operators are an operating convenience only and are used as a maintenance isolation boundary point for the S/Gs. To meet the requirements of both ISTC-5221(a) and ISTC-3530, the time required to drive the valve stem onto the back of the valve disk using the control room lights is measured. This is sufficient because the maximum design stem force that can be exerted by this motor operator, is only 44,900 lbf. Calculations show that the maximum force against the disc during a MSLB accident would rapidly exceed this value, reaching a value of 500,000 lbf. Also, while the dP across the check valve in the faulted line would be expected to exceed 1000 psid, a very small dP would only be required for accident forces to exceed the maximum stem force that can be exerted by the motor operator. Therefore, the testing performed without a motor trip does prove check valve closure on reversal of flow. The valves are full-stroke exercised and timed closed at cold shutdowns per 1OST-1.10J, "Cold Shutdown Valve Exercise Test." Bi-directional exercising of the check valve function in the non-safety related open direction is satisfied by normal system operation of the Main Steam System per ISTC 3550..

References: ISTC-3510, ISTC-3521(c), ISTC-3522(b), ISTC-3530, ISTC-3550 and ISTC-5221(a).

VALVE COLD SHUTDOWN JUSTIFICATION 18

Valve No(s): PCV-1MS-101A
PCV-1MS-101B
PCV-1MS-101C

Category: B **Class:** 2

System: 21 - Main Steam

Function: These Steam Generator atmospheric steam dump valves (ASDV's) must open to regulate steamline pressure in the event of loss of Condenser steam dump availability and to control Steam Generator pressure after a reactor trip. They must close to isolate a faulted Steam Generator.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally closed during plant operation . Their safety positions are open to control Steam Generator pressure after a Reactor trip and closed to isolate a faulted Steam Generator. They are also required to fail closed on a loss of control power. Full or part-stroke exercising in the open and closed directions cannot be performed during plant operation because a reduction in power would be required in order to prevent exceeding full power limitations. If they were full or part-stroke exercised in the open direction during plant operation, steam would be released into the atmosphere, thereby causing a Reactor power transient. In order to prevent this, manual isolation valves would first have to be closed prior to exercising these valves. However, the manual isolation valves could be damaged when they are re-opened against a high differential steam pressure (approximately 800 psid ΔP). Failure of a manual isolation valve to re-open could result in loss of an ASDV to perform its safety function. In addition, they are located in a potentially hazardous area (high heat and humidity) which would place an unacceptable risk to station personnel each quarter. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed open and closed and fail-safe tested closed at cold shutdowns per 1OST-1.10J (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c) and ISTC-3560.

VALVE COLD SHUTDOWN JUSTIFICATION 19

Valve No(s): TV-1MS-101A
TV-1MS-101B
TV-1MS-101C

Category: B/C **Class:** 2

System: 21 - Main Steam

Function: These Main Steamline Isolation Valves (MSIV's) must close to prevent blowdown of the Steam Generators in the case of a high energy line break (HELB) accident, and to provide outside containment isolation of Penetration Nos. 73, 74 and 75.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves and Category C check valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally open during plant operation. Their safety position is closed for HELB isolation, and to provide outside containment isolation of Penetration Nos. 73, 74 and 75. They are also required to fail closed on a loss of control power. Full or part-stroke exercising in the closed direction cannot be performed during plant operation because this would cause a reactor trip with the possibility of a safety injection. For this reason, BVPS-1 Technical Specification Amendment No. 162 deleted the requirement to part-stroke exercise the valves. Per both ISTC-3521(c) (Category B valves) and ISTC-3522(b) (Category C valves), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed closed at cold shutdowns per 1OST-21.4, 5 and 6 (Main Steam Trip Valve Full Closure Test). This satisfies both the Category B stroke time test and Category C check valve closure test. Bi-direction exercising of the check valve function in the non-safety related open direction is satisfied by normal system operation. In addition, fail-safe testing in the closed direction in accordance with ISTC-3560, "Fail-Safe Valves," is also performed during cold shutdowns each time a valve is full-stroke exercised to the closed position.

References: ISTC-3510, ISTC-3521(c), ISTC-3522(b) and ISTC-3560.

BVPS-1 Technical Specification 4.7.1.5 (Amendment No. 162).

VALVE COLD SHUTDOWN JUSTIFICATION 20

Valve No(s): HCV-1MS-104

Category: B **Class:** 2

System: 21 - Main Steam

Function: This Residual Heat Release Valve (RHRV) must open to regulate steamline pressure in the event of loss of Condenser steam dump availability and if the Atmospheric Steam Dump Valves fail to open on demand, to control Steam Generator pressure after a reactor trip. It must close to isolate a faulted Steam Generator.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: This valve is normally closed during plant operation. Its safety position is open to control Steam Generator pressure after a Reactor trip and if the Atmospheric Steam Dump Valves fail to open on demand, and closed to isolate a faulted Steam Generator. It is also required to fail closed on a loss of control power. Full or part-stroke exercising in the open and closed directions cannot be performed during plant operation because a reduction in power would be required in order to prevent exceeding full power limitations. If it was full or part-stroke exercised in the open direction during plant operation, steam would be released into the atmosphere, thereby causing a Reactor power transient. In order to prevent this, a manual isolation valve would first have to be closed prior to exercising this valve. However, the manual isolation valve could be damaged when it is re-opened against a high differential steam pressure (approximately 800 psid ΔP). Failure of the manual isolation valve to re-open could result in loss of the RHRV to perform its safety function. In addition, it is located in a potentially hazardous area (high heat and humidity) which would place an unacceptable risk to station personnel each quarter. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed open and closed and fail-safe tested closed at cold shutdowns per 1OST-1.10J (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c) and ISTC-3560.

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VALVE COLD SHUTDOWN JUSTIFICATION 21

Valve Asset No(s): HYV-1FW-100A
HYV-1FW-100B
HYV-1FW-100C

Category: B **Class:** 2

System: 24 - Main Feedwater

Function: The Steam Generator main feedwater containment isolation valves must close in the event of a main steam line break or safety injection system actuation to prevent overfeeding the Steam Generators, for a feedwater line break down stream of the valves and to provide outside containment isolation of penetration no's. 76, 77 and 78.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally open during plant operation providing feedwater flow to the Steam Generators. Their safety position is closed for Train "A" feedwater isolation to the Steam Generators, and to provide outside containment isolation of penetration no's. 76, 77 and 78. Full or part-stroke exercising in the closed direction cannot be performed during plant operation because this would isolate or reduce feedwater flow to the Steam Generators resulting in a plant shutdown. ISTB-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed closed during cold shutdowns per 1OST-1.10K (Cold Shutdown Valve Exercise Test).

References: ISTC-3510 and ISTC-3521(c).
ECP 02-0183 (1R16).

VALVE COLD SHUTDOWN JUSTIFICATION 22

Valve No(s): FCV-1FW-478
FCV-1FW-488
FCV-1FW-498

Category: B **Class:** 2

System: 24 - Main Feedwater

Function: These Steam Generator main feedwater regulating valves must close in the event of a high energy line break (HELB) or safety injection system actuation to prevent overfeeding the Steam Generators.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally open during plant operation providing feedwater flow to the Steam Generators. Their safety position is closed for feedwater isolation to the Steam Generators and they are also required to fail closed on a loss of control power. Full or part-stroke exercising in the closed direction cannot be performed during plant operation because this would isolate feedwater flow to the Steam Generators resulting in a plant shutdown. ISTC-3521(c) states. "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed closed fail-safe tested closed during cold shutdown per 1OST-1.10K (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c), and ISTC-3560.

VALVE COLD SHUTDOWN JUSTIFICATION __23__

Valve No(s):	TV-1BD-100A	TV-1BD-101A1	TV-1BD-101A2
	TV-1BD-100B	TV-1BD-101B1	TV-1BD-101B2
	TV-1BD-100C	TV-1BD-101C1	TV-1BD-101C2

Category: __B__ **Class:** __2__

System: 25 - Steam Generator Blowdown

Function: These inside and outside containment Steam Generator blowdown isolation valves must close in the event of a high energy line break (HELB) outside of containment. [TV-1BD-100A, B and C] must also close for containment isolation of Penetration Nos. 39, 40 and 41.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally open in order to provide a flow path for the normal processing of blowdown from the secondary side of each Steam Generator. Their safety positions are closed in the event of a HELB or for containment isolation of Penetration No's 39, 40 and 41. Since the three valves from each Steam Generator blowdown flow path are in series with one another, failure of one of them to re-open during stroke time testing in the closed direction would isolate the blowdown flow path. With blowdown isolated, the affected Steam Generator secondary chemistry would begin to deteriorate to a point, where if it exceeded administrative limits, the Unit would have to shutdown. NUREG-1482, Section 3.1.1, "Deferring Valve Testing to Each Cold Shutdown or Refueling Outage," Example (1) states that all valves whose failure in a non-conservative position during the cycling test that would result in a loss of system function would typically be excluded from testing during plant operations. Per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdown."

Alternate Test: Full-stroke exercised and timed closed and fail-safe tested closed during cold shutdown per 1OST-1.10N (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c) and ISTC-3560.

NUREG-1482, Section 3.1.1.

VALVE COLD SHUTDOWN JUSTIFICATION 24

Valve No(s): TV-1SV-100A

Category: A **Class:** 2

System: 26 – Main Turbine and Condenser System

Function: The containment isolation air ejector air discharge trip valve must open to direct steam to containment if high radiation levels are present in the main condenser. It also must close for containment isolation of Penetration No. 89.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for CSJ: This valve is required to open to provide a flow path for radioactive gases from the Condenser Air Ejector effluent line into containment in the event of a S/G tube leak with subsequent contamination of the steam systems. It is also required to close for containment isolation of Penetration No. 89. If the trip valve was opened at power, the slightly subatmospheric Containment building pressure would begin to increase toward the Tech Spec 3.6.4 limit. If the trip valve could not be re-closed after stroking it open, Containment pressure would continue to rise and could result in exceeding the 1-hour Technical Specification 3.6.4 limit requiring the plant to shutdown with 6 hours. NUREG-1482, Section 3.1.1, "Deferring Valve Testing to Each Cold Shutdown or Refueling Outage" lists as an example of valves to be specifically excluded from exercising (cycling) tests during plant operations: (1) All valves whose failure in a non-conservative position during the cycling test would cause a loss of system function. Per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns.

Alternate Test: Full-stroke exercised and timed open and closed and fail-safe tested closed at cold shutdowns per 1OST-1.10L (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c) and ISTC-3560.

NUREG-1482, Section 3.1.1.

Tech Spec 3.6.4.

VALVE COLD SHUTDOWN JUSTIFICATION 25

Valve No(s): 1RW-57
1RW-58
1RW-59

Category: C **Class:** 3

System: 30 - River Water

Function: These River Water (RW) Pump discharge check valves must open to allow cooling water from the river to flow to station loads required during an accident. They must close to prevent reverse flow through an idle RW Pump.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: These check valves are normally open when a River Water pump is in service. Their safety positions are open to provide RW cooling to station loads required during an accident, and closed to prevent reverse flow through an idle RW Pump. Full-stroke exercising in the open direction is performed quarterly. In order to test these valves in the reverse direction, two of the three pumps must be cross-connected. This can only be done with pumps on the same electrical bus or during a Cold Shutdown Outage when RW is not required to be operable. Quarterly full-stroke exercising in the closed direction may not be possible if one RW Pump is out of service for maintenance. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns."

Alternate Test: Full-stroke exercised closed quarterly per 1OST-30.6A or 6B (Reactor Plant River Water Pump 1C Tests). If not able to be tested quarterly, the valve(s) will be full-stroke exercised closed when the idle RW Pump is returned to service, or at least during cold shutdowns per 1OST-30.6A and B (Reactor Plant River Water Pump 1C Tests). Check valves are also full-stroke exercised open quarterly per 1OST-30.2, 3 and 6A (Reactor Plant River Water Pump Tests).

References: ISTC-3510 and ISTC-3522(b).

VALVE COLD SHUTDOWN JUSTIFICATION 26

Valve No(s): MOV-1RW-102C1
MOV-1RW-102C2

Category: B **Class:** 3

System: 30 - River Water

Function: These discharge isolation valves for the 1C River Water (RW) Pump must open to permit the river water to be supplied to the station loads required during an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves open to align the 1C River Water pump to the appropriate RW header. Their safety positions are open to provide RW cooling to station loads required during an accident. In order to test these valves, two of the three pumps must be cross-connected. This can only be done with pumps on the same electrical bus or during a cold shutdown outage when RW is not required to be operable. Quarterly full-stroke testing may not be possible if one RW Pump is out of service for maintenance. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns".

Alternate Test: Since these MOV's are ranked as high safety significant valves they have additional exercising requirements per Paragraph 3.6.2 of OMN-1 and are required to be full-stroke exercised quarterly per 1OST-30.6A or 6B (Reactor Plant River Water Pump 1C Tests). If they are not able to be exercised quarterly as described above, the valve(s) will be full-stroke exercised when the idle RW Pump is returned to service, or at least during cold shutdowns per 1OST-30.6A and B (Reactor Plant River Water Pump 1C Test) in accordance with OMN-1 Paragraph 3.6.1. In addition, these MOV's should be stroke time tested when exercised open since they have an ESF plant safety analysis limit.

References: ISTC-3510 and ISTC-3521(c).
OMN-1 Paragraphs 3.6.1 and 3.6.2.

VALVE COLD SHUTDOWN JUSTIFICATION 27

Valve No(s): 1FP-800
1FP-804
1FP-827

Category: A/C **Class:** 2

System: 33 - Fire Protection

Function: These fire protection inside containment check valves from the deluge system to the RHR area, to the cable penetration area and to the containment hose reels must close to provide containment isolation of Penetration Nos. 13, 31 and 32.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: These check valves are normally closed and would only be opened in the event of a fire in containment. Their safety position is closed for containment isolation of Penetration Nos. 13, 31 and 32. Full-stroke exercising in the closed direction can only be verified by cycling the mechanical weight-loaded swing arms of each check valve open and then closed. Because these check valves are located inside the slightly subatmospheric containment, they are not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. Per ISTC-3522(b), "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns.

Alternate Test: Full-stroke exercised open using a manual mechanical exerciser attached to their mechanical weight loaded swing arms in accordance with ISTC-5221(b) and the guidelines provided in NUREG-1482, Section 4.1.7, and closed by observation of their mechanical weight loaded swing arms during cold shutdown per 1OST-1.10R (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3522(b) and ISTC-5221(b).
NUREG-1482, Section 4.1.7.

VALVE COLD SHUTDOWN JUSTIFICATION 28

Valve No(s): 1VS-D-5-3A
1VS-D-5-3B
1VS-D-5-5A
1VS-D-5-5B

Category: A **Class:** 2

System: 44C - Area Ventilation - Containment

Function: These containment purge and exhaust inside and outside containment isolation dampers must close to provide containment isolation of Penetration Nos. 90 and 91.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for CSJ: These motor-operated dampers (MOD's) are normally locked shut during plant operation and opened during refueling operations. Their safety position is closed for containment isolation of Penetration Nos. 90 and 91. Full or part-stroke exercising in the closed direction cannot be performed during plant operation because the LRM Containment Penetration Table 3.6.1-1 requires the MOD's to be locked shut during plant operation. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: These dampers may be full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdown per 1OST-1.10L (Cold Shutdown Valve Exercise Test). However, since they are ranked as low safety significant valves that do not have additional exercising requirements per Paragraph 3.6.2 of OMN-1, their exercise frequency may be extended to refueling per OMN-1 Paragraph 3.6.1. In addition per LRM Table 3.6.1-1, plant safety analysis limits are only applicable when required by LR 3.9.4, therefore, stroke timing when exercising closed per 1OST-1.10L is typically not required unless for PMT or when required during diagnostic testing.

References: ISTC-3510 and ISTC-3521(c).
LRM Table 3.6.1-1 and LR 3.9.4.
OMN-1 Paragraphs 3.6.1 and 3.6.2.

SECTION VII: VALVE REFUELING OUTAGE JUSTIFICATIONS (VROJ) AND INDEX

VROJ	SYSTEM NO.	COMPONENT(S)
VROJ34	13	1QS-3, 1QS-4, 1RS-100, 1RS-101
VROJ35	13	1RS-158, 1RS-160
VROJ36	15	TV-1CC-103A, TV-1CC-103A1, TV-1CC-103B, TV-1CC-103B1, TV-1CC-103C, TV-1CC-103C1, TV-1CC-105D1, TV-1CC-105D2, TV-1CC-105E1, TV-1CC-105E2, TV-1CC-107D1, TV-1CC-107D2, TV-1CC-107E1, TV-1CC-107E2
VROJ37	15	TV-1CC-107A, TV-1CC-107B, TV-1CC-107C
VROJ38	15	1CCR-289, 1CCR-290, 1CCR-291
VROJ39	21 & 24	1FW-33, 1MS-18, 1MS-19, 1MS-20
VROJ40	21	1MS-80, 1MS-81, 1MS-82
VROJ41	24	1FW-33, 1FW-34, 1FW-35, 1FW-42, 1FW-43, 1FW-44, 1FW-622, 1FW-623, 1FW-624, 1FW-625, 1FW-626, 1FW-627
VROJ42	24	1FW-50, 1FW-51, 1FW-52, 1FW-68, 1FW-69, 1FW-70
VROJ43	24	1FW-156A, 1FW-156B, 1FW-156C
VROJ44	26	1AS-278
VROJ45	30	1RW-106, 1RW-107
VROJ46	30	1WT-383, 1WT-388
VROJ47	34	1IA-91
VROJ48	34	1IA-116, 1IA-117, 1IA-378
VROJ49	36	1FO-35, 1FO-36

VALVE REFUELING OUTAGE JUSTIFICATION 1

Valve No(s): 1RC-68

Category: A/C **Class:** 2

System: 6 - Reactor Coolant

Function: This inside containment isolation check valve on the N2 makeup line to the Pressurizer Relief Tank must close for containment isolation of Penetration No. 49.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally closed and must remain closed to fulfill its safety function of containment isolation of Penetration No. 49. It is only opened during nitrogen makeup to the PRT. Because this check valve is located inside the slightly subatmospheric containment, it is not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. Due to the physical location of this valve, the relative pressures of the N2 header and the lack of instrumentation, the only means for verifying closure is during the 10CFR50, Appendix J, Option B leak rate test performed at refuelings. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage, if no other practical means are available. Per ISTC-3522(c), "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Valve closure is verified by a leak test during refueling outages per 1OST-47.135 and 1BVT 1.47.5 (Type-C Leak Tests) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

NOTE: Bi-directional exercising in the non-safety related open direction will be satisfied by demonstrating the ability to provide nitrogen makeup to the PRT during station shutdown per 1OM-19.4.M.

References: ISTC-3510, ISTC-3522(c) and ISTC-5222.

NUREG-1482, Section 4.1.6.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 2

Valve No(s): 1RC-72

Category: A/C **Class:** 2

System: 6 - Reactor Coolant

Function: This inside containment isolation check valve on the primary grade water supply line to the Pressurizer Relief Tank must close for containment isolation of Penetration No. 45.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally closed and must remain closed to fulfill its safety function of containment isolation of Penetration No. 45. It is only opened during makeup to or while depressurizing the PRT. Because this check valve is located inside the slightly subatmospheric containment, it is not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. Due to the physical location of this valve, the only means for verifying closure is during the 10CFR50, Appendix J, Option B leak rate test performed at refuelings. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage, if no other practical means are available. Per ISTC-3522(c), "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Valve closure is verified by a leak test during refueling outages per 1OST-47.132 and 1BVT 1.47.5 (Type-C Leak Tests) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

NOTE: Bi-directional exercising in the non-safety related open direction will be satisfied by demonstrating the ability to provide primary grade water makeup to the PRT during station shutdown per 1OM-19.4.M.

References: ISTC-3510, ISTC-3522(c) and ISTC-5222.

NUREG-1482, Section 4.1.6.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 3

Valve No(s): 1CH-22
1CH-23
1CH-24

Category: C **Class:** 2

System: 7 - Chemical and Volume Control

Function: These Charging Pump discharge check valves must open to provide a flow path from the Charging Pumps to the reactor coolant system (RCS) loops for a high head safety injection (HHSI). They must close to prevent reverse flow through an idle Charging Pump.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally open when their associated charging pump is in service. Their safety positions are open to allow charging/HHSI flow and closed to prevent reverse flow through an idle charging pump. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow, in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3 is not possible because the charging pumps will not develop the required flow. Full-flow exercising in the open direction during cold shutdown cannot be performed because this could result in low-temperature over-pressurization of the RCS. ISTC-3522(c) states: "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages".

Exercising the non-running Charging pump discharge check valves in the closed direction is normally done during the quarterly pump test by virtue of pump delta-P being greater than the system minimum operating point (MOP) curve for the operating pump. The quarterly pump test, however, can only be performed at lower flow rates on a flat portion of the pump curve. Therefore, a large change in flow is required to cause the delta-P to drop below the MOP curve. This quarterly test provides assurance that the check valves are closed, preventing gross leakage. The substantial flow condition test, performed during refueling outages, verifies the adjacent pumps' check valves are closed and capable of fulfilling their function in the closed direction by ensuring that the performance of the operating pump exceeds minimum system requirements. Therefore, in order to ensure acceptable check valve closure, a functional test at substantial flow conditions will be performed in conjunction with the comprehensive pump test performed during refueling outages.

Alternate Test: Full-stroke exercised open and closed at refueling outages per 1OST-11.14B (HHSI Full Flow Test). Also exercised closed quarterly per 1OST-7.4, 5 & 6 (Centrifugal Charging Pump Test).

VALVE REFUELING OUTAGE JUSTIFICATION 3

References: ISTC-3510, ISTC-3522(c) and ISTC-5221(a).
NUREG-1482, Section 4.1.3.
CR 01-0807 and CA 01-0807-02.

VALVE REFUELING OUTAGE JUSTIFICATION 4

Valve No(s): 1CH-31

Category: A/C **Class:** 2

System: 7 - Chemical and Volume Control

Function: This charging header inside containment isolation check valve must close to provide containment isolation of Penetration No. 15.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: The safety function of this check valve is to close to provide containment isolation of Penetration No. 15. During plant operation, normal charging flow is present through this check valve and a reverse direction test cannot be performed. There is no installed instrumentation to monitor upstream pressure and the only method for testing this valve is by leak test. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage, if no other practical means is available. Per ISTC-3522(c), "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Check valve closure is verified by a leak test during refueling outages per 1BVT 1.47.11 (Safety Injection and Charging System Containment Penetration Integrity Test). Check valve is also full-stroke exercised open quarterly per 1OST-47.3K (Containment Isolation and ASME Test – Work Week 7)

References: ISTC-3510 and ISTC-3522(c).

NUREG-1482, Section 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 5

Valve No(s): 1CH-97

Category: C **Class:** 2

System: 7-Chemical and Volume Control

Function: This Chemical Mixing Tank outlet check valve is required to close during an upstream non-Q class pipe break in order to prevent loss of Refueling Water Storage Tank (RWST) inventory that would otherwise be available to supply the Charging Pumps during a large break LOCA event.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally open while the Zinc Addition Skid is in service during plant operations. Its safety position is closed for isolation of upstream non-Q class piping. The Zinc Addition Skid is normally in service during plant operations and would have to be shutdown in order to test this check valve quarterly. In addition, full-stroke exercising in the closed direction can only be performed by leak testing because no other practical means is available to verify check valve closure. This involves the installation and removal of special test equipment in order to perform the leakage testing. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outages for Check Valves Verified Closed by Leak Testing", it is acceptable to verify that check valves are capable of closing by performing leak rate testing at each refueling outage, if no other practical means is available. Per ISTC-3522(c), "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages".

Alternate Test: Full-stroke exercised closed by leakage testing during refueling outages per 1OST-11.14C (Chem Tank Outlet Check Valve Reverse Flow Test).

NOTE: Bi-directional exercising in the non-safety related open direction is satisfied during normal system operation of the Zinc Addition System per ISTC-3550.

References: ISTC-3510, ISTC-3522(c) and ISTC-3550.

NUREG-1482, Section 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 6

Valve No(s): MOV-1CH-115C
MOV-1CH-115E

Category: B **Class:** 2

System: 7 - Chemical and Volume Control

Function: These Volume Control Tank (VCT) outlet isolation valves must close on a safety injection signal to ensure the suction of the charging/high head safety injection (HHSI) system is switched from the VCT to the Refueling Water Storage Tank (RWST).

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally open when the charging system is in service. Their safety position is closed to ensure the suction of the Charging Pumps is switched from the VCT to the RWST following a safety injection signal. Full or part-stoke exercising in the closed direction cannot be performed during plant operation without isolating the VCT from the Charging Pumps or potentially damaging the Charging Pumps due to inadequate suction flow. This would also result in loss of or limited pressurizer level control, normal reactor coolant system makeup, and loss of or limited seal injection flow to the Reactor Coolant Pump (RCP) seals resulting in seal damage. In addition, full or part-stroke exercising in the closed direction may not be possible during cold shutdown if the charging system is in service to support operation of a RCP. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, creating a challenge to long-term seal life. In order to stroke these valves, the charging system and RCP's would have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke during refueling outages."

In addition, the PRA Group has evaluated the demand failure rates for these high safety significant MOVs based on the risk associated with exercising them per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

VALVE REFUELING OUTAGE JUSTIFICATION 6

Alternate Test: Full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns when the charging system and the RCP's are secured, or at least during refueling outages per 1OST-1.10B (Cold Shutdown Valve Exercise Test). In addition, these MOV's should be stroke time tested when exercised closed since they have an ESF plant safety analysis limit.

References: ISTC-3510 and ISTC-3521(e).

NUREG-1482, Section 3.1.1.4.

OMN-1 Paragraph 3.6.1.

LRM Table 3.3.2-1.

VALVE REFUELING OUTAGE JUSTIFICATION 7

Valve No(s): 1CH-170

Category: A/C **Class:** 1

System: 7 - Chemical and Volume Control

Function: This RCS fill header inside containment isolation check valve must close in order to provide containment isolation of Penetration No. 46. It must also be capable of opening sufficiently to relieve any built up pressure via downstream relief valve [RV-1CH-391] caused by thermal expansion of fluid within the isolated containment penetration following an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: Upstream RCS Fill Header Flow Control Valve [FCV-1CH-160] is a passive shut valve. Filling the RCS loops using the fill header is typically only done at the end of a refueling outage if any of the RCS loops were drained for maintenance. Therefore, this flow path does not see any flow during normal plant operation and this check valve is normally closed and in its safety position. In addition, this check valve does not have any weight arms to exercise it open and closed. The only method for testing this check valve in the closed direction is via a leak test. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage, if no other practical means is available. Per ISTC-3522(c), "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages." Per ISTC-3522(a), "open and close tests need only be performed at an interval when it is practicable to perform both tests." Therefore, the open test will also be performed during a refueling outage.

Alternate Test: Check valve closure is verified by a leak test during refueling outages per 1BVT 1.47.11 (Safety Injection and Charging System Containment Penetration Integrity Test). 1BVT 1.47.11 will also verify the check valve can open sufficiently during a refueling outage by allowing pressure to transfer through the check valve to a pressure indicator located downstream while leak testing [FCV-1CH-160].

References: ISTC-3510, ISTC-3522(a) and ISTC-3522(c).

NUREG-1482, Section 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 8

Valve No(s): 1CH-181
1CH-182
1CH-183

Category: A/C **Class:** 2

System: 7 - Chemical and Volume Control

Function: These reactor coolant seal injection inside containment isolation check valves must close to provide containment isolation of Penetration Nos. 35, 36 and 37.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally open to supply the Reactor Coolant Pump (RCP) seals from the charging pumps during power operation, but are required to close to provide containment isolation of Penetration Nos. 35, 36 and 37. Closing the valves during power operation, or anytime the system is pressurized to greater than 100 psig, would secure seal injection water to the reactor coolant pump seals, resulting in seal damage. In addition, valve closure can only be checked by leak testing since they have no position indication or weighted arms. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage, if no other practical means is available. Per ISTC-3522(c), "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Valve closure is verified by a leak test during refueling outages per 1BVT 1.47.11 (Safety Injection and Charging System Containment Penetration Integrity Test).

NOTE: Bi-directional exercising to the non-safety related open position is satisfied by normal system operation of a RCP per ISTC-3550.

References: ISTC-3510, ISTC-3522(c) and ISTC-3550.
NUREG-1482, Section 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 9

Valve No(s): TV-1CH-200A
TV-1CH-200B
TV-1CH-200C

Category: A **Class:** 2

System: 7 - Chemical and Volume Control

Function: These letdown isolation inside containment isolation valves must close to secure letdown flow and limit inventory loss from the reactor coolant system (RCS) on receipt of a CIA. They must also close to provide inside containment isolation of Penetration No. 28.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally open when the charging system is in service to provide a flow path for letdown flow from the RCS. Their safety position is closed for containment isolation of Penetration No. 28, and also for letdown isolation. When these valves are stroke time tested closed and then re-opened, a crud burst occurs which collects on downstream Letdown Filter [1CH-FL-2] requiring it to be changed. In order to change [1CH-FL-2], it must first be bypassed for approximately 3 days in order to allow it to radiologically decay, but this still results in excess dose if stroke timing is done on-line each quarter. Per ISTC-3521(c), if exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns. However, while [1CH-FL-2] is bypassed, any remaining debris in the letdown line can migrate through the Volume Control Tank and Charging Pumps and ultimately collect in the Seal Injection Filters for the Reactor Coolant Pumps (RCPs). If the Seal Injection Filters become clogged, this can reduce seal injection water to the RCP seals, resulting in seal damage. In order to stroke these valves and minimize the adverse consequences of the crud burst, they should be stroked when a planned RCS crud burst is initiated during refueling outages. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke during refueling outages".

Alternate Test: Full-stroke exercised and timed closed and fail-safe tested closed during refueling outages per 1OST-1.10D (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(e) and ISTC-3560.

VALVE REFUELING OUTAGE JUSTIFICATION 10

Valve No(s): TV-1CH-204
MOV-1CH-289

Category: A **Class:** 2

System: 7 - Chemical and Volume Control

Function: This Non-Regen Heat Exchanger inlet and letdown isolation outside containment isolation valve must close to secure letdown flow and limit inventory loss from the reactor coolant system (RCS) on receipt of a CIA. This normal charging header makeup and outside containment isolation valve must close on a safety injection signal to ensure that flow from the high head safety injection (HHSI) system is switched from normal charging to the safety injection system. They must also close to provide containment isolation of Penetration Nos. 15 and 28.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally open when the charging system is in service to provide a flow path for letdown flow from the RCS and normal charging to the RCS. Their safety positions are closed for containment isolation of Penetration Nos. 15 and 28, and also for letdown and normal charging isolation. Full or part-stroke exercising in the closed direction cannot be performed during plant operation because this will result in a thermal shock to the Regenerative Heat Exchanger and associated component piping resulting in an increased probability of system and component failures. In addition, failure of this valve in the closed position could lead to a loss of pressurizer level control and require a plant shutdown. In addition, full or part-stroke exercising in the closed direction may not be possible during cold shutdown if the charging system is in service to support operation of a Reactor Coolant Pump (RCP). A failure of either valve in the closed position could require shutting down the charging system and unnecessary shutdown of a RCP. Loss of normal charging or letdown flow results in minimum Charging Pumps flow which is restricted to less than 1 hour by P&L's. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to stroke this valve, the charging system and RCP's would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke during refueling outages."

VALVE REFUELING OUTAGE JUSTIFICATION 10

Basis for ROJ: (Cont.)

In addition, the PRA Group has evaluated the demand failure rates for this high safety significant MOV based on the risk associated with exercising it per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

Alternate Test:

[TV-1CH-204] is full-stroke exercised and timed closed and fail-safe tested closed during cold shutdowns when the charging system and the RCP's are secured, or at least during refueling outages per 1OST-1.10D (Cold Shutdown Valve Exercise Test).

[MOV-1CH-289] is full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns when the charging system and the RCP's are secured, or a least during refueling outages per 1OST-1.10B (Cold Shutdown Valve Exercise Test). In addition, this MOV should be stroke time tested when exercised closed since it has both ESF and Containment Isolation plant safety analysis limits.

References:

ISTC-3510, ISTC-3521(e) and ISTC-3560.

NUREG-1482, Section 3.1.1.4.

OMN-1 Paragraph 3.6.1.

LRM Tables 3.3.2-1 and 3.6.1-1.

VALVE REFUELING OUTAGE JUSTIFICATION 11

Valve No(s): MOV-1CH-308A
MOV-1CH-308B
MOV-1CH-308C

Category: A **Class:** 2

System: 7 - Chemical and Volume Control

Function: These Reactor Coolant Pump (RCP) seal injection outside containment isolation valves must close for containment isolation of Penetration Nos. 35, 36 and 37.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency, " Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally open to provide seal water to the RCPs during power operation, but are required to close to provide containment isolation of Penetration Nos. 35, 36 and 37. Full-stroke exercising in the closed direction cannot be performed during plant operation because this would secure seal injection water to the RCP seals, resulting in seal damage. In addition, failure of these valves in the closed position will result in a plant shutdown. In addition, full-stroke exercising in the closed direction may not be possible during cold shutdown if the charging system is in service to support operation of a RCP. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to stroke these valves, the charging system and RCP's would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke during refueling outages."

Alternate Test: These valves may be full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns when the reactor coolant pumps are secured, or at least during refueling outages per 1OST-1.10E (Cold Shutdown Valve Exercise Test). However, since they are ranked as low safety significant valves that do not have additional exercising requirements per Paragraph 3.6.2 of OMN-1, their exercise frequency may be extended to refueling per OMN-1 Paragraph 3.6.1. In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since this valve does not have any plant safety analysis limits.

References: ISTC-3510 and ISTC-3521(e).
NUREG-1482, Section 3.1.1.4.
OMN-1 Paragraphs 3.6.1 and 3.6.2.

VALVE REFUELING OUTAGE JUSTIFICATION 12

Valve No(s): 1CH-369

Category: A/C **Class:** 2

System: 7 - Chemical and Volume Control

Function: This containment Penetration No. 19 pressure relief check around [MOV-1CH-378] opens to allow excess pressure trapped in the containment penetration due to thermal expansion to be equalized with the pressure inside the seal return line, inside containment. In the reverse direction, this valve must close for containment isolation of Penetration No. 19.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally closed when the charging system is in service returning seal injection flow from the Reactor Coolant Pumps (RCP's). Its safety position is closed for containment isolation of Penetration No. 19, however, it will momentarily open if required to relieve pressure trapped in the containment penetration due to thermal expansion. It is located inside the slightly subatmospheric containment building on the RCP seal water return line. During power operation and any time the RCS is pressurized to greater than 100 psig, this line is in service with the RCP seal water. Valve exercising can only be checked by leak testing since this valve does not have position indication or a weighted arm. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage, if no other practical means is available. Per ISTC-3522(c), "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages." Per ISTC-3522(a), "open and close tests need only be performed at an interval when it is practicable to perform both tests." Therefore, the open test will also be performed during a refueling outage.

Alternate Test: Check valve is verified to open by unseating the valve prior to leak testing, while check valve closure is verified by a leak test during refueling outages per 1OST-47.118 and 1BVT 1.47.5 (Type-C Leak Tests) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

References: ISTC-3510, ISTC-3522(a), ISTC-3522(c) and ISTC-5222.

NUREG-1482, Section 4.1.6.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 13

Valve No(s): MOV-1CH-378
MOV-1CH-381

Category: A **Class:** 2

System: 7 - Chemical and Volume Control

Function: These Reactor Coolant Pump (RCP) seal water return line inside and outside containment isolation valves must close for containment isolation of Penetration No. 19.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency, " Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally open when the charging system is in service to provide seal water return from the RCP's. Their safety position is closed for containment isolation of Penetration No. 19. Full-stroke exercising in the closed direction cannot be performed during plant operation because this would secure seal water return from the RCP's, resulting in seal damage. Failure of these valves in the closed position will result in a plant shutdown. In addition, full-stroke exercising in the closed direction may not be possible during cold shutdown if the charging system is in service to support operation of a RCP. Shutting down the charging system during RCP operation while in cold shutdown would secure seal water return from the RCP's, resulting in seal damage. In order to stroke these valves, the charging system and RCP's would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the reactor coolant pump (RCPs) need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCPs are secured and at refueling outages, but not more often than once every 92 days. Per ISTC-3521(e), "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke during refueling outages."

In addition, the PRA Group has evaluated the demand failure rates for these high safety significant MOVs based on the risk associated with exercising them per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

Alternate Test: Full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns when the charging system and the reactor coolant pumps are secured, or at least during refueling outages per 1OST-1.10E (Cold Shutdown Valve Exercise Test). In addition, these MOV's should be stroke time tested when exercised closed since they have both ESF and Containment Isolation plant safety analysis limits.

VALVE REFUELING OUTAGE JUSTIFICATION 13

References:

ISTC-3510 and ISTC-3521(e).

NUREG-1482, Section 3.1.1.4.

OMN-1 Paragraph 3.6.1.

LRM Tables 3.3.2-1 and 3.6.1-1.

VALVE REFUELING OUTAGE JUSTIFICATION 14

Valve No(s): MOV-1CH-310
LCV-1CH-460A
LCV-1CH-460B

Category: B **Class: 1**

System: 7 - Chemical and Volume Control

Function: This Regenerative Heat Exchanger outlet isolation and normal charging system makeup valve must close on a safety injection signal to ensure that flow from the High Head Safety Injection (HHSI) system is switched from normal charging to the safety injection system. These Regenerative Heat Exchanger inlet letdown isolation valves must close to secure letdown flow and limit inventory loss from the reactor coolant system (RCS) on receipt of a low level signal derived from the pressurizer level control system.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally open when the charging system is in service to provide a flow path for letdown flow from the RCS and normal charging to the RCS. Their safety position is closed for isolation of normal charging and for letdown isolation. Full or part-stroke exercising in the closed direction cannot be performed during plant operation because this will result in a thermal shock to the Regenerative Heat Exchanger and associated component piping resulting in an increased probability of system and component failures. In addition, failure of these valves in the closed position could lead to a loss of pressurizer level control and require a plant shutdown. In addition, full or part-stroke exercising in the closed direction may not be possible during cold shutdown if the charging system is in service to support operation of a Reactor Coolant Pump (RCP). A failure of either valve in the closed position could require shutting down the charging system and unnecessary shutdown of a RCP. Loss of normal charging or letdown flow results in minimum Charging Pump, flow which is restricted to less than 1 hour by P&L's. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to stroke these valves, the charging system and RCP's would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke during refueling outages."

VALVE REFUELING OUTAGE JUSTIFICATION 14

Basis for ROJ: (Cont.)

In addition, the PRA Group has evaluated the demand failure rates for this high safety significant MOV based on the risk associated with exercising it per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

Alternate Test:

[LCV-1CH-460A and B] are full-stroke exercised and timed closed and fail-safe tested closed during cold shutdowns when the charging system and the RCP's are secured, or at least during refueling outages per 1OST-1.10D (Cold Shutdown Valve Exercise Test).

[MOV-1CH-310] is full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns when the charging system and the RCP's are secured, or at least during refueling outages per 1OST-1.10B (Cold Shutdown Valve Exercise Test). In addition, this MOV should be stroke time tested when exercised closed since it has an ESF plant safety analysis limit.

References:

ISTC-3510, ISTC-3521(e) and ISTC-3560.

NUREG-1482, Section 3.1.1.4.

OMN-1 Paragraph 3.6.1.

LRM Table 3.3.2-1.

VALVE REFUELING OUTAGE JUSTIFICATION 15

Valve No(s): 1SI-1
1SI-2

Category: C **Class:** 2

System: 11 – Safety Injection

Function: These LHSI pump suction check valves from the containment sump must open to allow the LHSI pumps to take suction off the containment sump.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during power operation but must open to fulfill their safety function for long-term core cooling. Full stroke exercising these valves with flow would involve simulating an actual safety injection long-term cooling event by taking suction from the containment sump and delivering contaminated/dirty water to RWST or RCS. BVPS-1 considers this activity impractical. Per ISTC-5221(c), If the test methods in ISTC-5221(a) and ISTC-5221(b) are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly examination program shall be used to verify valve obturator movement. Per ISTC-5222, BVPS-1 has elected to test these check valves in accordance with Mandatory Appendix II, Check Valve Condition Monitoring (CVCM) Program. Further guidelines for disassembly and inspection are provided in NUREG-1482, Section 4.1.4.

Alternate Test: Maintenance is to disassemble and inspect each valve in the open (safety) direction and in the closed (bi-directional) direction (i.e., full-stroked) per 1/2CMP-75-ALOYCO CHECK-1M at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. If the sample valve fails its inspection, then ISTC-5224 will be applied to determine if the remaining valve in the group should be disassembled and inspected during the same outage. Since a part-stroke exercise of these check valves after valve reassembly is not practicable, it will not be performed as permitted by ISTC-5221(c)(4).

References: ISTC-3510, ISTC-5221(c), ISTC-5222 and ISTC-5224.

NUREG-1482, Section 4.1.4.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 15

Valve No(s): 1SI-5

Category: C **Class:** 2

System: 11 - Safety Injection

Function: This Low Head Safety Injection (LHSI) Pump LHSI suction check valve from the Refueling Water Storage Tank (RWST) must open to allow flow from the RWST to the LHSI pumps.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: The function of this normally closed check valve is to open to permit flow from the RWST to the LHSI pump suctions. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the LHSI Pumps will not develop enough head to overcome RCS pressure. Cold shutdown full-stroke exercising is also not practicable because testing would require full flow injection to the RCS where there is insufficient volume to receive the additional inventory. Per ISTC-3522(c), "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroked exercised open at refueling outages per 1OST-11.14A (LHSI Full Flow Test).

NOTE: Bi-directional exercising in the non-safety related closed direction will be satisfied by performing a leakage test during per 1BVT 1.47.11 (Safety Injection and Charging System Containment Penetration Integrity Test) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

References: ISTC-3510, ISTC-3522(c) and ISTC-5221(a).

NUREG-1482, Section 4.1.3.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 17

Valve No(s): 1SI-6

1SI-7

Category: C **Class:** 2

System: 11 - Safety Injection

Function: These Low Head Safety Injection (LHSI) Pump discharge check valves must open to provide a flow path from the LHSI Pumps to the reactor coolant system (RCS) loops for LHSI. They must close to prevent reverse flow through an idle LHSI Pump back to the Refueling Water Storage Tank (RWST).

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation. Their safety positions are open for LHSI and closed to prevent reverse flow through an idle LHSI Pump. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the LHSI Pumps will not develop enough head to overcome RCS pressure. During cold shutdowns, full stroke exercising in the open direction cannot be performed because flow testing would require injection to the RCS where there is not sufficient volume to receive the additional inventory. ISTC-3522(c) states, "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed quarterly per 1OST-11.1 and 2 (Safety Injection Pump Tests). Full-stroked exercised open at refueling outages per 1OST-11.14A (LHSI Full Flow Test).

References: ISTC-3510, ISTC-3522(c), and ISTC-5221(a).

NUREG-1482, Section 4.1.3.

VALVE REFUELING OUTAGE JUSTIFICATION 18

Valve No(s): 1SI-10
1SI-11
1SI-12

Category: A/C **Class:** 1

System: 11 - Safety Injection

Function: These Low Head Safety Injection (LHSI) cold leg branch line check valves must open to allow LHSI discharge to the Reactor Coolant System (RCS) cold legs and must close to prevent high pressure RCS and High Head Safety Injection (HHSI) from entering the low pressure safety injection piping.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency, " Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation and are pressure isolation valves (PIV's) that prevent reverse flow from the higher pressure RCS and High Head Safety Injection (HHSI) systems to the LHSI low pressure system. They are required to open in the event of a safety injection. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3. During cold shutdowns, full stroke exercising in the open direction cannot be performed because flow testing would require injection to the RCS where there is not sufficient volume to receive the additional inventory. In the reverse direction, these valves do not have installed instrumentation, or weighted arms. Therefore, the only way to verify closure is with a leak test. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage, if no other practical means is available. Per ISTC-3522(c), "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open per 1OST-11.14A (LHSI Full Flow Test) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. Full-stroke exercised closed by leakage testing during refueling outages per 1OST-11.16 (Leakage Testing RCS Pressure Isolation Valves).

References: ISTC-3510, ISTC-3522(c), and ISTC-5221(a).

NUREG-1482, Sections 4.1.3 and 4.1.6.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 19

Valve No(s): 1SI-13
1SI-14

Category: A/C **Class:** 1

System: 11 - Safety Injection

Function: These low head safety injection (LHSI) inside containment isolation check valves must also close to provide containment isolation of Penetration Nos. 60 and 62. They must open for LHSI hot leg recirculation.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed to provide Reactor Coolant System (RCS) pressure boundary isolation as a Pressure Isolation Valve (PIV). Their safety position is closed for containment isolation of Penetration Nos. 60 and 62 and open for LHSI hot leg recirculation. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the LHSI Pumps will not develop enough head to overcome RCS pressure. During cold shutdowns, full-stroke exercising in the open direction cannot be performed because flow testing would require injection to the RCS where there is not sufficient volume to receive the additional inventory. In the reverse direction, these valves do not have installed instrumentation, or weighted arms. Therefore, the only way to verify closure is with a leak test. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage, if no other practical means is available. ISTC-3522(c) states, "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open during refueling outages per 1OST-11.14A (LHSI Full Flow Test). Full-stroke exercised closed by leakage testing during refueling outages per 1BVT 1.47.11 (Safety Injection and Charging System Containment Penetration Integrity Test).

References: ISTC-3510, ISTC-3522(c) and ISTC-5221(a).
NUREG-1482, Sections 4.1.3 and 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 20

Valve No(s): 1SI-15
1SI-16
1SI-17

Category: A/C **Class:** 1

System: 11 - Safety Injection

Function: These low head safety injection (LHSI) branchline check valves must open to provide a flow path from the LHSI Pumps to the Reactor Coolant System (RCS) hot legs during a safety injection.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation and they are Pressure Isolation Valve (PIVs) that isolate the LHSI piping from the higher pressure RCS. Their safety position is open for LHSI. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the LHSI Pumps will not develop enough head to overcome RCS pressure. During cold shutdowns, full-stroke exercising in the open direction cannot be performed because flow testing would require injection to the RCS where there is not sufficient volume to receive the additional inventory. ISTC-3522(c) states, "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open per 1OST-11.14A (LHSI Full Flow Test) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. Full-stroke exercised closed by leakage testing during refueling outages per 1OST-11.19 (Leakage Testing Hot Leg RCS Pressure Isolation Valves).

References: ISTC-3510, ISTC-3522(c), ISTC-5221(a) and ISTC-5222.

NUREG-1482, Section 4.1.3.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 21

Valve No(s): 1SI-20

1SI-21

1SI-22

Category: A/C **Class: 1**

System: 11 - Safety Injection

Function: These low head safety injection (LHSI) branchline check valves must open to provide a flow path from the LHSI Pumps to the Reactor Coolant System (RCS) hot legs during a safety injection. High head safety injection to the RCS hot legs is no longer required in an accident per ECP 05-0280, therefore, their high head safety injection function is no longer required.

Test Requirement: ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation. Their safety position is open for LHSI. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the LHSI Pumps will not develop enough head to overcome RCS pressure. In addition, full-stroke exercising in the open direction cannot be performed using the HHSI Pumps because they will not develop the required flow. During cold shutdowns, full-stroke exercising in the open direction cannot be performed using the LHSI Pumps because this would require injection to the RCS where there is not sufficient volume to receive the additional inventory. ISTC-3522(c)) states, "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open per 1OST-11.14A (LHSI Full Flow Test) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. Full-stroke exercised closed by leakage testing during refueling outages per 1OST-11.19 (Leakage Testing Hot Leg RCS Pressure Isolation Valves).

References: ISTC-3510, ISTC-3522(c), ISTC-5221(a) and ISTC-5222.

NUREG-1482, Section 4.1.3.

ECP 05-0280.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 22

Valve No(s): 1SI-23
1SI-24
1SI-25

Category: A/C **Class:** 1

System: 11 - Safety Injection

Function: These low head / high head safety injection (LHSI / HHSI) cold leg branch line header check valves must open to provide a flow path from either the LHSI Pumps or HHSI Pumps to the reactor coolant system (RCS) cold legs during a safety injection. The valves also serve as pressure isolation valves (PIVs).

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation. Their safety position is open for LHSI and HHSI. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the LHSI Pumps will not develop enough head to overcome RCS pressure. In addition, full-stroke exercising in the open direction cannot be performed using the HHSI Pumps because they will not develop the required flow. During cold shutdowns, full stroke exercising in the open direction using the HHSI Pumps cannot be performed because this could result in low-temperature overpressurization of the RCS. Full stroke exercising in the open direction cannot be performed during cold shutdowns using the LHSI Pumps because this would require injection to the RCS where there is not sufficient volume to receive the additional inventory. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open per 1OST-11.14A (LHSI Full Flow Test) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. Full-stroke exercised closed by leakage testing during refueling outages per 1OST-11.16 (Leakage Testing RCS Pressure Isolation Valves).

References: ISTC-3510, ISTC-3522(c), ISTC-5221(a) and ISTC-5222.

NUREG-1482, Section 4.1.3.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 23

Valve No(s): 1SI-27

Category: A/C **Class:** 2

System: 11 - Safety Injection

Function: This High Head Safety Injection (HHSI) Pump suction check valve from the Refueling Water Storage Tank (RWST) must open to provide a flow path from the RWST to the suction of the HHSI Pumps during an accident. It must close when the RWST is empty to prevent reverse flow of containment sump water from entering the RWST.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally closed during plant operation. Its safety position is open for HHSI and closed during transfer to recirc to prevent reverse flow to the RWST. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the Charging Pumps will not develop the required flow. During cold shutdowns, full flow exercising in the open direction cannot be performed because this could result in low-temperature overpressurization of the RCS. Full stroke exercising in the closed direction can only be performed by leak testing because no other practical means is available to verify check valve closure. This involves the installation and removal of special test equipment in order to perform the leakage testing. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak rate testing at each refueling outage, if no other practical means is available. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open during refueling outages per 1OST-11.14B (HHSI Full Flow Test). Full-stroke exercised closed by leakage testing during refueling outages per 1BVT 1.47.11 (Safety Injection and Charging System Containment Penetration Integrity Test).

References: ISTC-3510, ISTC-3522(c) and ISTC-5221(a).

NUREG-1482, Sections 4.1.3 and 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 24

Valve No(s): 1SI-42

Category: A/C **Class:** 2

System: 11 – Safety Injection

Function: This safety injection accumulator fill line inside containment isolation check valve must close in order to provide containment isolation of Penetration No. 20. It must also be capable of opening sufficiently to relieve any built up pressure via downstream relief valve [RV-1SI-894] caused by thermal expansion of fluid within the isolated containment penetration following an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally closed and is only opened when the Hydro Test Pump is supplying makeup water from the RWST to the Safety Injection Accumulators. Its safety position is closed for containment isolation of penetration no. 20, however, it will momentarily open if required to relief pressure trapped in the containment penetration due to thermal expansion. This check valve does not have any weight arms to exercise it open and closed. The only method for testing this check valve in the closed direction is via a leak test. Per NUREG-1482, Rev.1, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage, if no other practical means is available. Per ISTC-3522(c), "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages." Per ISTC-3522(a), "open and close tests need only be performed at an interval when it is practicable to perform both tests." Therefore, the open test will also be performed during a refueling outage.

Alternate Test: Check valve is verified to open by unseating the valve prior to leak testing, while check valve closure is verified by a leak test during refueling outages per 1OST-47.119 and 1BVT 1.47.5 (Type-C Leak Tests) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

References: ISTC-3510, ISTC-3522(a), ISTC-3522(c) and ISTC-5222.

NUREG-1482, Section 4.1.6.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 25

Valve No(s):	1SI-48	1SI-51
	1SI-49	1SI-52
	1SI-50	1SI-53

Category: A/C **Class:** 1

System: 11 - Safety Injection

Function: These Safety Injection (SI) Accumulator Series Discharge Check Valves are required to open upon depressurization of the Reactor Coolant System (RCS) to allow the water from the SI Accumulator to be injected into the RCS during a loss of coolant accident (LOCA). [1SI-52 and 53] must also open to provide a flow path for the Residual Heat Removal (RHR) System when it is placed into service for cool down of the plant to cold shutdown conditions. The valves also serve as pressure isolation valves (PIVs)

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed as pressure isolation valves (PIV's) during plant operation in order to isolate lower pressure Safety Injection (SI) Accumulators from the high pressure RCS. In the reverse direction, these valves do not have installed instrumentation, or weighted arms. Therefore, the only way to verify closure is with a leak test. Per NUREG-1482, Rev.1, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage, if no other practical means is available. Their safety position in the open direction is for passive low-pressure injection of the SI Accumulators into the RCS cold legs during a LOCA. An additional safety position for [1SI-52 and 53] is open to support RHR system operation during cool down of the plant to cold shutdown conditions. Full stroke exercising in the open direction cannot be performed during plant operation because the RCS is at a higher pressure than the SI Accumulators. Full-stroke exercising for all six check valves in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed during cold shutdowns because of a lack of installed instrumentation to measure flow, and due to a possibility of developing low temperature overpressurization of the RCS. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed by leak test during refueling outages per 1OST-11.4A and 4B (Accumulator Check Valve Leak Tests). Exercised open by measuring a level change over time as the SI Accumulators are dumped per 1OST-11.15A, 15B and 15C (SI Accumulator Check Valve Tests) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

VALVE REFUELING OUTAGE JUSTIFICATION 25

References: ISTC-3510, ISTC-3522(c), ISTC-5221(a) and ISTC-5222.
NUREG-1482, Sections 4.1.3 and 4.1.6.
ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 26

Valve No(s): 1SI-83
1SI-84

Category: A/C **Class:** 1

System: 11 – Safety Injection

Function: These high head safety injection (HHSI) hot leg inside containment isolation supply check valves must close in order to provide containment isolation of Penetration No's. 7 and 33. They must also be capable of opening sufficiently to relieve any built up pressure caused by thermal expansion of fluid within the isolated containment penetrations following an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: Upstream HHSI to RCS hot leg isolation valves [MOV-1SI-869A and B] are passive shut valves because this flow path is no longer required during an accident, rather, the LHSI hot leg flow path is now required per ECP 05-0280. During plant operation when the reactor coolant system (RCS) is at normal operating pressure, exercising these check valves in the open direction cannot be performed because of the potential for thermal shock on the injection nozzles from a cold water injection. Therefore, these check valves are normally closed and in their safety position. In addition, these check valves do not have any weight arms to exercise them open and closed. The only method for testing these check valves in the closed direction is via a leak test. Per NUREG-1482, Rev.1, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage, if no other practical means is available. Per ISTC-3522(c) "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages." Per ISTC-3522(a), "open and close tests need only be performed at an interval when it is practicable to perform both tests." Therefore, the open test will also be performed during a refueling outage.

Alternate Test: Check valve closure is verified by a leak test during refueling outages per 1BVT 1.47.11 (Safety Injection and Charging System Containment Penetration Integrity Test). 1BVT 1.47.11 will also verify that each check valve can open sufficiently during a refueling outage by allowing pressure to transfer through the check valve in order to seat the adjacent check valve during leak testing.

References: ISTC-3510, ISTC-3522(a) and ISTC-3522(c).

ECP 05-0280.

NUREG-1482, Section 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 27

Valve No(s): 1SI-94

Category: A/C **Class:** 1

System: 11 - Safety Injection

Function: This Boron Injection Tank (BIT) injection line inside containment isolation check valve to the cold legs must open to permit High Head Safety Injection (HHSI) flow to the Reactor Coolant System (RCS). It must close for containment isolation Penetration No. 113.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally closed. Its safety position is closed for containment isolation of Penetration No. 113 and open for HHSI cold leg recirculation. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the Charging Pumps will not develop the required flow. In addition, they also cannot be full-stroke exercised with flow in the open direction during plant operation due to the potential for thermal shock of the injection nozzles from a cold water injection. In addition, full-stroke testing at cold shutdowns also cannot be performed since this could result in a low temperature overpressurization of the RCS. Valve exercising in the closed direction can only be verified by a leak test since this valve does not have position indication or a weighted arm. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage, if no other practical means is available. Per ISTC-3522(c), "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open during refueling outages per 1OST-11.14B (HHSI Full Flow Test). Full-stroke exercised closed by leak test during refueling outages per 1BVT 1.47.11 (Safety Injection and Charging System Containment Penetration Integrity Test).

References: ISTC-3510, ISTC-3522(c), and ISTC-5221(a).

NUREG-1482, Sections 4.1.3 and 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 28

Valve No(s): 1SI-95

Category: A/C **Class:** 1

System: 11 - Safety Injection

Function: This High Head Safety Injection (HHSI) cold leg inside containment isolation check valve must open to permit HHSI flow to the Reactor Coolant System (RCS). It must close for containment isolation of Penetration No. 96.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency, " Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally closed. Its safety position is closed for containment isolation of Penetration No 96, and open for HHSI hot leg and cold leg recirculation. During plant operation when the reactor coolant system (RCS) is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the Charging Pumps will not develop the required flow. In addition, they also cannot be full stroke exercised with flow in the open direction during plant operation due to the potential for thermal shock on the injection nozzles from a cold water injection. During cold shutdowns full-flow testing could result in a low temperature overpressurization of the RCS.

In the reverse direction, this valve does not have installed instrumentation, or weighted arms. Therefore, the only way to verify closure is with a leak test. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage, if no other practical means is available. Per ISTC-3522(c) "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open during refueling outages per 1OST-11.14B (HHSI Full Flow Test). Full-stroke exercised closed by leakage testing during refueling outages per 1BVT 1.47.11 (Safety Injection and Charging System Containment Penetration Integrity Test).

References: ISTC-3510, ISTC-3522(c), and ISTC-5221(a).

NUREG-1482, Sections 4.1.3 and 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 29

Valve No(s): 1SI-100
1SI-101
1SI-102

Category: A/C, C **Class:** 1

System: 11 - Safety Injection

Function: These high head safety injection cold leg branch line check valves must open to provide a flow path from the High Head Safety Injection (HHSI) Pumps to the reactor coolant system (RCS) cold legs during a safety injection.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation. Their safety position is open for HHSI in the event of a safety injection. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Rev.1, Section 4.1.3, cannot be performed because the HHSI Pumps will not develop the required flow against reactor pressure. During cold shutdowns, full stroke exercising in the open direction cannot be performed because this could result in low-temperature overpressurization of the RCS. ISTC-3522(c) states, "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open during refueling outages per 1OST-11.14B (HHSI Full Flow Test).

NOTE: Bi-directional exercising in the non-safety related closed direction will be satisfied in conjunction with leakage testing of [1SI-10, 11 & 12] per 1OST-11.16 (Leak Testing RCS Pressure Isolation Valves).

References: ISTC-3510, ISTC-3522(c), and ISTC-5221(a).

NUREG-1482, Section 4.1.3.

VALVE REFUELING OUTAGE JUSTIFICATION 30

Valve No(s): 1SI-115
1SI-116

Category: C **Class:** 2

System: 11 - Safety Injection

Function: These Boron Injection Recirc Pump Discharge Check Valves are required to close to isolate the BIT Recirc piping in an accident. The valves also serve as a Class 2 to non-Code boundary barrier.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency, " Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: The function of these check valves is to prevent reverse flow through the BIT recirc pumps during an accident when the HHSI is flowing through the BIT. The normal test method to prove closure of these discharge check valves for parallel pumps is to monitor flow with one pump operating in NSA, isolate the non-running pump, then record flow again. If the check valve on the non-running pump is not seated, the flow will vary after the valve is isolated. If one of the recirc pumps is Out of Service (OOS) for an extended period, there is no method to prove closure of the operating check valve. The piping configuration does not contain vents, drains or test connections. Therefore, if one of the recirc pumps is OOS, testing in the reverse direction cannot be performed for either check valve. Per ISTC-3522(c), "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Perform full-stroke exercise closed quarterly per 1OST-47.3F (Containment Isolation and ASME OM Code Test) unless one of the recirc pumps is OOS. If one of the pumps is OOS, closure testing will be performed when the pump is returned to service, or at least during refueling outages per 1OST-47.3F (Containment Isolation and ASME OM Code Test).

NOTE: Bi-directional exercising in the non-safety related open direction is satisfied by normal system operation of the Boron Injection Recirc Pumps per 1OST-47.3F (Containment Isolation and ASME OM Code Test).

References: ISTC-3510 and ISTC-3522(c).

VALVE REFUELING OUTAGE JUSTIFICATION 31

Valve No(s): MOV-1SI-836

Category: A **Class:** 1

System: 11 - Safety Injection

Function: This outside containment isolation valve from the fill and charging headers to the Reactor Coolant System (RCS) hot and cold legs must open to provide a flow path to the RCS during cold leg recirculation. It must close for containment isolation of Penetration No. 96.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: This valve is closed during normal operation. Its safety position is closed for containment isolation of Penetration No. 96, and open for cold leg recirculation. Full-stroke exercising in the open and closed directions cannot be performed during plant operation because this will inject relatively cold water into the RCS cold legs and cause thermal shock to system piping and components which will result in an increased probability of system and component failures. In addition, full-stroke exercising in the open and closed directions may not be possible during cold shutdown if the charging system is in service to support operation of a Reactor Coolant Pump (RCP). Cycling this valve open and closed with a Charging Pump operating to support RCP operation would cause significant changes in pressures and flows to the RCP seals, creating a challenge to long-term seal life. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to stroke this valve, the charging system and RCPs would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCPs need not be stopped for cold shutdown valve testing. The affected valve should be tested during outages when the RCPs are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke during refueling outages."

In addition, the PRA Group has evaluated the demand failure rates for this high safety significant MOV based on the risk associated with exercising it per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

VALVE REFUELING OUTAGE JUSTIFICATION 31

Alternate Test: This MOV is included in ASME OM Code Case OMN-1, but can only be diagnostic tested in the open direction. Therefore, it will be continue to be full-stroke exercised and timed open and closed during cold shutdowns when the reactor coolant pumps are secured, or at least during refueling outages per 1OST-1.10B (Cold Shutdown Valve Exercise Test), in addition to being diagnostic tested in the open direction per OMN-1 at some longer test frequency.

References: ISTC-3510 and ISTC-3521(e).

NUREG-1482, Section 3.1.1.4.

OMN-1 Paragraph 3.6.1.

VALVE REFUELING OUTAGE JUSTIFICATION 32

Valve No(s): MOV-1SI-867A

MOV-1SI-867B

Category: B **Class:** 2

System: 11 - Safety Injection

Function: These Boron Injection Tank (BIT) inlet isolation valves must open to provide high head safety injection (HHSI) flow to the cold legs during a safety injection.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for ROJ: During normal operations, the BIT is isolated from the charging system and reactor coolant system (RCS) by the BIT inlet and outlet isolation valves [MOV-1SI-867A, B, C and D]. They are required to open upon initiation of a safety injection to supply HHSI flow to the cold legs through the BIT. The normal operating pressure just upstream of BIT inlet isolation valves [MOV-1SI-867A and B] is approximately 2600 psig which is the discharge pressure of the Charging Pumps. The downstream pressure is approximately 150 psig. The reason for this lower pressure is that the BIT boric acid solution is constantly recirculated by the relatively low pressure Boron Injection Recirculation Pumps. In order to cycle [MOV-1SI-867A and B] open, the Boron Injection Recirculation Pumps must first be shutdown and isolated in order to prevent overpressurizing the subsystem. Once returned to the closed position, the piping downstream must be vented to less than 25 psig before the recirculation pumps can be unisolated and placed back into service. In addition, stroking these valves at power has historically caused leakage past the BIT manway flange and other valves in the system. Therefore, full or part-stroke exercising these valves at power is considered to be not practicable. In addition, stroking these valves at cold shutdown may not be possible if the charging system is in service to support operation of a Reactor Coolant Pump (RCP). With the charging system in service, the problems experienced by stroking these valves at power are also present during cold shutdowns. In order to stroke these valves, the charging system and RCPs would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCPs need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCPs and charging system are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke during refueling outages."

VALVE REFUELING OUTAGE JUSTIFICATION 32

Basis for ROJ: (Cont.)

In addition, the PRA Group has evaluated the demand failure rates for these high safety significant MOVs based on the risk associated with exercising them per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

Alternate Test:

Full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns when the charging system and the RCPs are secured, or at least during refueling outages per 1OST-1.10F (Cold Shutdown Valve Exercise Test). In addition, these MOV's should be stroke time tested when exercised open since they have an ESF plant safety analysis limit.

References:

ISTC-3510 and ISTC-3521(e).

NUREG-1482, Section 3.1.1.4.

OMN-1 Paragraph 3.6.1.

LRM Table 3.3.2-1.

VALVE REFUELING OUTAGE JUSTIFICATION 33

Valve No(s): 1NG-518
1NG-519
1NG-520

Category: A/C **Class:** 3

System: 11 - Safety Injection (Gaseous Nitrogen)

Function: These Power Operated Relief Valve (PORVs) nitrogen supply check valves must remain closed to maintain nitrogen pressure in the back-up nitrogen accumulators to supply the control air for the PORVs.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency, " Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: The safety function of these check valves is to remain closed to maintain nitrogen pressure in the back-up nitrogen accumulators to supply the control air system for the PORVs. Because these check valves are located inside the slightly subatmospheric containment, it is not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. In addition, valve closure can only be verified by a leak test because no other practical means is available to verify check valve closure. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage if no other practical means is available. Per ISTC-3522(c), "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed by leakage testing during refueling outages per 1OST-6.12 (Power Operated Relief Valve Test).

NOTE: Bi-directional exercising in the non-safety related open direction is satisfied when nitrogen makeup is provided to the accumulators subsequent to exercising the PORVs on nitrogen during refueling outages per 1OST-6.12 (Power Operated Relief Valve Test).

References: ISTC-3510 and ISTC-3522(c).

NUREG-1482, Section 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 34

Valve No(s): 1QS-3
1QS-4
1RS-100
1RS-101

Category: A/C **Class:** 2

System: 13 - Quench Spray System and Recirculation Spray

Function: These inside containment isolation discharge check valves for the quench spray and outside recirculation spray pumps must open to allow containment spray flow. They must also close for containment isolation of Penetration Nos. 63, 64, 70 and 71.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed weighted arm check valves. Their safety position is closed for containment isolation of Penetration Nos. 63, 64, 70 and 71, and open to allow containment spray flow. They cannot be exercised with flow without injecting water through the spray nozzles and spraying down containment. Therefore, full stroke exercising in the open and closed direction can only be verified by cycling the mechanical weight loaded swing arm of the check valves. Because these check valves are located inside the slightly subatmospheric containment, they are not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. In order to exercise these weighted arm check valves in the open and closed direction during cold shutdown, scaffolding must be erected in order to gain access to the check valves which is considered to be an additional hardship that is not practicable during cold shutdowns. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open using a manual mechanical exerciser attached to their mechanical weight loaded swing arms in accordance with ISTC-5221(b) and the guidelines provided in NUREG-1482, Section 4.1.7, and closed by observation of their mechanical weight loaded swing arms during refueling outages per 1OST-1.10R (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3522(c) and ISTC-5221(b).
NUREG-1482, Section 4.1.7.

VALVE REFUELING OUTAGE JUSTIFICATION 35

Valve No(s): 1RS-158
1RS-160

Category: C **Class:** 2

System: 13 - Containment Spray

Function: These Low Head Safety Injection (LHSI) pump and outside recirc spray (RS) pump cross connection check valves must open to allow the outside recirc spray pumps to provide the High Head Safety Injection (HHSI) pumps with water from the containment sump if the LHSI pumps are inoperable.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during power operation but must open to fulfill their safety function in the unlikely event that the LHSI pumps are unable to supply the HHSI pumps. No practical method of testing these valves exists. The volume of water used to test the outside RS pumps is insufficient to full-stroke exercise the check valves even if it could be directed to the suction of the HHSI pumps. Per ISTC-5221(c), If the test methods in ISTC-5221(a) and ISTC-5221(b) are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly examination program shall be used to verify valve obturator movement. Per ISTC-5222, BVPS-1 has elected to test these check valves in accordance with Mandatory Appendix II, Check Valve Condition Monitoring (CVCM) Program. Part-stroke exercising these valves with flow subsequent to reassembly is also impractical. A part-stroke test would introduce PG water with entrained air into the Charging/RCS resulting in a potential chemistry problem. Further guidelines for disassembly and inspection are provided in NUREG-1482, Section 4.1.4.

Alternate Test: Maintenance is to disassemble and inspect each valve in the open (safety) direction and in the closed (bi-directional) direction (i.e., full-stroked) per 1/2CMP-75-VELAN CHECK-1M at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. If the sample valve fails its inspection, then ISTC-5224 will be applied to determine if the remaining valve in the group should be disassembled and inspected during the same outage. Since a part-stroke exercise of these check valves after valve reassembly is not practicable it will not be performed as permitted by ISTC-5221(c)(4).

References: ISTC-3510, ISTC-5221(c), ISTC-5222 and ISTC-5224.

NUREG-1482, Section 4.1.4.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 36

Valve No(s):

TV-1CC-103A	TV-1CC-105D1	TV-1CC-107E1
TV-1CC-103A1	TV-1CC-105D2	TV-1CC-107E2
TV-1CC-103B	TV-1CC-105E1	
TV-1CC-103B1	TV-1CC-105E2	
TV-1CC-103C	TV-1CC-107D1	
TV-1CC-103C1	TV-1CC-107D2	

Category: A **Class:** 2

System: 15 - Reactor Plant Component Cooling Water

Function: These reactor plant component cooling water (CCR) supply to and return from containment inside and outside containment isolation valves must close to provide containment isolation of Penetration Nos. 8, 17, 18, 25, 26, 27 and 58.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally open to supply cooling water to the Reactor Coolant Pump (RCP) stator, bearings, and thermal barrier. Their safety positions are closed for containment isolation of Penetration Nos. 8, 17, 18, 25, 26, 27 and 58. Full-stroke exercising in the closed direction cannot be performed during plant operation because this would interrupt flow of cooling water to the RCPs. Stroking these valves with the RCPs running could cause damage to the pump bearings, stator and thermal barrier if the valves would fail to reopen. Therefore, full or part-stroke exercising is not possible during power operation or during cold shutdowns when the RCPs are running. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. Therefore, these valves should only be tested during outages when the RCPs are secured and at refueling outages, but not more often than once every 92 days. Per ISTC-3521(e), "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke during refueling outages."

Alternate Test: Full-stroke exercised and timed closed and fail-safe tested closed during cold shutdowns when the reactor coolant pumps are secured, or at least during refueling outages per 1OST-1.10G (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(e) and ISTC-3560.

NUREG-1482, Section 3.1.1.4.

VALVE REFUELING OUTAGE JUSTIFICATION 37

Valve No(s): TV-1CC-107A
TV-1CC-107B
TV-1CC-107C

Category: A **Class:** 3

System: 15 - Reactor Plant Component Cooling Water

Function: These Reactor Coolant Pump (RCP) Thermal Barrier Cooler reactor plant component cooling water (CCR) outlet isolation valves must close to isolate the lower pressure CCR system from the higher pressure reactor coolant system (RCS) in the event of a primary loop to CCR leak in the RCP Thermal Barrier Cooler.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally open to allow return of CCR cooling water from the RCP Thermal Barrier Coolers during RCP operation. Their safety position is closed in the event of a primary loop to CCR leak in the RCP Thermal Barrier Cooler. Full or part-stroke exercising in the closed direction cannot be performed during plant operation because this would interrupt or reduce flow of cooling water to the RCP thermal barrier coolers. The thermal barrier coolers limit heat transfer between the hot RCS water and the seal cooling water. Interruption of cooling water flow to the thermal barrier heat exchangers could result in damage to the RCP seals due to over heating. In addition, failure of these valves in the closed position could also result in a plant shutdown to avoid or due to RCP seal damage. In addition, full-stroke exercising in the closed direction may not be possible during cold shutdown if a RCP is operating. In order to stroke these valves without the potential risk in damage to the RCP seals, the RCP's would have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke during refueling outages."

Alternate Test: Full-stroke exercised and timed closed and fail-safe tested closed per ISTC-3560 during cold shutdowns when the RCP's are secured, or at least during refueling outages per 1OST-1.10G (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(e) and ISTC-3560.
NUREG-1482, Section 3.1.1.4.

VALVE REFUELING OUTAGE JUSTIFICATION 38

Valve No(s): 1CCR-289
1CCR-290
1CCR-291

Category: A/C **Class:** 3

System: 15 - Reactor Plant Component Cooling Water

Function: These Reactor Coolant Pump (RCP) thermal barrier supply check valves must close to isolate the lower pressure Reactor Plant Component Cooling Water (CCP) system from the higher pressure Reactor Coolant System (RCS) in the event of a primary loop to CCR leak in the RCP Thermal Barrier Cooler.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally open during RCP operations to supply CCR cooling water to the RCP Thermal Barrier Coolers. Their safety position is closed in the event of a primary loop to CCR leak in the RCP Thermal Barrier Coolers. These valves cannot be stroked closed during power operation or during cold shutdowns when the reactor coolant pumps are operating. In addition, full stroke exercising in the closed direction can only be performed by leak testing because no other practical means is available to verify check valve closure. Because these check valves are located inside the slightly subatmospheric containment, they are not accessible to perform leak test during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. In addition, installation and removal of test equipment in order to perform leakage testing, if attempted during cold shutdowns, could result in a delayed plant startup. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak rate testing at each refueling outage, if no other practical means is available. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed by leakage testing during refueling outage per 1BVT 1.60.7 (ASME OM Code Check Valve Reverse Flow Test).

NOTE: Bi-directional exercising in the non-safety related open direction is satisfied during normal system operation of the RCP's since temperature parameters associated with the RCPs are continuously monitored per ISTC-3550.

References: ISTC-3510, ISTC-3522(c) and ISTC-3550.
NUREG-1482, Section 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 39

Valve No(s): 1FW-33
1MS-18
1MS-19
1MS-20

Category: C **Class:** 2,3

System: 21 - Main Steam
24 - Auxiliary Feedwater

Function: The auxiliary feedwater (AFW) pump discharge check valve [1FW-33] must open to allow auxiliary feed flow to the steam generators. It must close to prevent pump discharge flow from the motor-driven AFW pumps from being diverted through the out of service turbine-driven AFW pump. The main steam to the auxiliary feed pump check valves [1MS-18, 19 and 20] must open to allow steam flow to the turbine-driven AFW pump and must close to prevent multiple steam generator blowdown in the event of a high energy line break.

Test Requirement: PerISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves support the Turbine-Driven Auxiliary Feedwater (TDAFW) Pump. They must open to perform their various safety functions. Per ISTC-5221(a) and NUREG-1482, Section 4.1.3, a full-stroke exercise in the open direction may be achieved by initiating the maximum required accident condition flow. A full-stroke open exercise can only be verified by a full-flow test of the TDAFW Pump.

The full-flow test of the TDAFW Pump can only be performed in Mode 3, however, it is not practicable to perform this test in Mode 3 during shutdown for or during startup after each cold shutdown for several reasons. At that time, the introduction of relatively cold AFW into the S/Gs produces a potential for thermal shock to both the Main Feed Piping (Thermal Sleeves) and the secondary side of the S/Gs. Although the thermal sleeves and S/Gs are designed for thermal shock, exposure of the Station to these events shall be minimized in order to ensure that the benefits of plant life extension can be realized.

The AFW Pumps are designed to take suction from the demineralized water storage tank, [1WT-TK-10]. The water in [1WT-TK-10], however, is not treated for pH or Oxygen. Therefore, it could have some impact on the corrosion rates in the S/G. From a Chemistry perspective, it is preferred to minimize the use of this water while in Modes 1, 2 or 3.

VALVE REFUELING OUTAGE JUSTIFICATION 39

Basis for ROJ: (Cont.)

In addition during startup, this test can only be performed once the steam pressure exceeds 600 psig. Testing at this time causes a temperature transient. The turbine draws steam from the S/Gs causing the RCS to cool down. In addition, the cold AFW is injected into the S/Gs, causing the RCS to cool even more. This cool down delays startup and is critical path time. At this point in the outage, the only heat source for the RCS is the RCPs. Therefore, any cool down is costly in the amount of time required to heat back up again.

Based on the above, performing the full-flow test of the TDAFW Pump at each cold shutdown is not practicable. Instead, testing will be performed during refueling outages only. Therefore, the full-stroke open exercise of the check valves will also be performed at a refueling outage frequency. Per ISTC-3522(c), "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages".

[1MS-18, 19 and 20] do not have installed instrumentation or weighted arms to allow testing in the reverse direction. Therefore, the only way to verify closure is by disassembly during refueling outages. Per ISTC-5221(c), "If the test methods in ISTC-5221(a) and ISTC-5221(b) are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly inspection program shall be used to verify valve obturator movement. Per ISTC-5222, BVPS-1 has elected to test these check valves in accordance with Mandatory Appendix II, Check Valve Condition Monitoring (CVCM) Program. Further guidelines for disassembly and inspection are provided in NUREG-1482, Section 4.1.4. Per ISTC-3522(c), "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test:

[1FW-33] and [1MS-18, 19, 20] will be full-stroke exercised in the open direction in Mode 3 during shutdown for or during startup after refueling outages when plant conditions permit directing flow to the S/Gs during Comprehensive Pump testing of [1FW-P-2] per 1OST-24.9 (Turbine-Driven AFW Pump Operability Test).

In addition, [1MS-18, 19, 20] will each be full-stroke exercised open and closed during refueling outages by way of a disassembly and inspection per 1/2CMP-75-ENERTECH CHECK-1M at the frequency requirements of the Check Valve Condition Monitoring (CVCM) Program. If the sample valve fails its inspection, then ISTC-5224 will be applied to determine if the remaining valves in the group should be disassembled and inspected during the same outage. As a PMT following valve re-assembly, the inspected valve will be exercised in the open direction during the Comprehensive Pump Test of [1FW-P-2] per 1OST-24.9 (Turbine-Driven AFW Pump Operability Test).

Closure testing of [1FW-33] is discussed in VROJ41.

References:

ISTC-3510, ISTC-3522(c), ISTC-5221(a), ISTC-5222 and ISTC-5224.
NUREG-1482, Sections 4.1.3 and 4.1.4.
ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 40

Valve No(s): 1MS-80
1MS-81
1MS-82

Category: C **Class:** 2

System: 21 - Main Steam

Function: These A, B and C loop Steam Generator residual heat release reverse flow check valves must close to prevent steam generator cross connection in the event of a high energy line break.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation. Their safety function is to close to prevent S/G cross connection in the event of a high energy line break. Exercising at power and cold shutdown testing in the reverse direction cannot be performed because there is no installed instrumentation to check for reverse flow and no way to isolate the normally cross-connected and pressurized headers. No way exists to isolate and systematically check operation of these valves. Per ISTC-5221(c), "If the test methods in ISTC-5221(a) and ISTC-5221(b) are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly inspection program shall be used to verify valve obturator movement. Per ISTC-5222, BVPS-1 has elected to test these check valves in accordance with Mandatory Appendix II, Check Valve Condition Monitoring (CVCM) Program. Further guidelines for disassembly and inspection are provided in NUREG-1482, Section 4.1.4.

Alternate Test: Maintenance is to disassemble and inspect each valve in the open and closed directions (full stroke) per 1/2CMP-75-ENERTECH CHECK-1M at the frequency requirements of the Check Valve Condition Monitoring (CVCM) Program. If the sample valve fails its inspection, then ISTC-5224 will be applied to determine if the remaining valves in the group should be disassembled and inspected during the same outage. As a PMT following valve re-assembly, a part-stroke exercise in the open direction will be performed per 1OM-50.4.L (Plant Heat Up From Mode 5).

References: ISTC-3510, ISTC-5221(c), ISTC-5222 and ISTC-5224.
NUREG-1482, Section 4.1.4.
ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 41

Valve No(s):				
	1FW-33	1FW-42	1FW-622	1FW-625
	1FW-34	1FW-43	1FW-623	1FW-626
	1FW-35	1FW-44	1FW-624	1FW-627

Category: C **Class:** 3

System: 24 - Auxiliary Feedwater

Function: These auxiliary feedwater pump discharge and loop check valves must open to allow auxiliary feed flow to the steam generators. These check valves also must close to fulfill a safety function: [1FW-33, 34, 35] must close to prevent pump discharge from being diverted through the non-running pump, [1FW-42, 43, 44] must close to prevent main feedwater from flowing back into the auxiliary feedwater piping, and [1FW-622, 623, 624, 625, 626, 627] must close to separate the A & B auxiliary feedwater headers.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: The safety position for these check valves is open for auxiliary feed system injection to the Steam Generators and closed to provide header separation. These valves can only be full-stroke exercised open by initiating the maximum required accident condition flow, in accordance with ISTC-5221(a) and NUREG-1482, Rev.1, Section 4.1.3, by aligning auxiliary feedwater flow to the S/Gs. This flow path would cause thermal shock at the auxiliary and main feedwater interface caused by the sudden injection of cold water into the S/Gs. Feeding the S/Gs with cold water also would result in large level transients in the S/Gs and cause a reactor trip. In addition, the reverse direction test for valves [1FW-33, 34, 35] and [1FW-622 thru 627] can only be performed with auxiliary feed flow to the S/Gs. Therefore, it is not practical to full-stroke exercise these check valves quarterly. Pump Relief Request Nos. 9 and 10 permit AFW Pump full-flow testing to be performed during a refueling outage instead of at cold shutdown. This provides the accident full-flow conditions that are necessary for check valve testing and comprehensive pump testing. Therefore, it is more practicable to perform this check valve testing during refueling outages in conjunction with comprehensive pump testing. Per ISTC-3522(c), "If exercising is not practicable during operation at power, and cold shutdowns, it shall be performed during refueling outages.

Alternate Test: Check valves [1FW-34, 35, 42, 43, 44] and [1FW-622 thru 627] are full-stroke exercised in the open direction during refueling outages per 1OST-24.8A and 8B (Motor-Driven Auxiliary Feed Pump Check Valves and Flow Tests). Forward stroke testing of [1FW-33] is discussed in VROJ39. Check valves [1FW-33, 34 and 35] and [1FW-622 thru 627] are also full-stroke exercised in the closed direction by these OSTs. Reverse direction testing of check valves [1FW-42, 43, 44] is performed by monitoring the upstream temperatures in operator rounds at least quarterly and is supplemented by a leak test per 1OST-24.11 (Auxiliary Feedwater Check Valve Exercise Verification) at refueling outages.

References: ISTC-3510, ISTC-3522(c), and ISTC-5221(a).

NUREG-1482, Section 4.1.3.

VALVE REFUELING OUTAGE JUSTIFICATION 42

Valve No(s): 1FW-50, 1FW-51, 1FW-52, 1FW-68, 1RW-69, 1FW-70

Category: C **Class:** 3

System: 24 – Auxiliary Feedwater

Function: These Turbine and Motor-Driven Auxiliary Feedwater (AFW) Pump Lube Oil Cooler Line Check Valves must open to allow cooling flow to the lube oil cooler for the Turbine and Motor-Driven AFW Pumps.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: The function of these check valves is to open to allow cooling flow to the lube oil cooler for the Turbine and Motor-Driven AFW Pumps. Full-stroke capability can only be verified by establishing design flow through the line or by using a mechanical exerciser to open the valve. However, there is no installed flow instrumentation to measure flow and these check valves do not have external weight arms to exercise them by. Therefore, per ISTC-5221(c), "If the test methods in ISTC-5221(a) and ISTC-5221(b) are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly inspection program shall be used to verify valve obturator movement." Per ISTC-5222, BVPS-1 has elected to test these check valves in accordance with Mandatory Appendix II, Check Valve Condition Monitoring (CVCM) Program. Further guidelines for disassembly and inspection are provided in NUREG-1482, Section 4.1.4.

Alternate Test: Maintenance is to disassemble and inspect each valve in the open (safety) direction and in the closed (bi-directional) direction (i.e., full stroked) per 1CMP-75- WAFER CHECK-4M at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. If the sample valve fails its inspection, then ISTC-5224 will be applied to determine if the remaining valves in the group should be disassembled and inspected during the same outage. Following re-assembly, the inspected check valve will be PMT exercised in the open direction during the Comprehensive Pump Test (CPT) of [1FW-P-2] per 1OST-24.9 (Turbine-Driven AFW Pump Operability Test) or during the CPT of [1FW-P-3A and 3B] per 1OST-24.8A and 8B (Motor-Driven AFW Pump Check Valves and Flow Tests), or during the AFW Pump tests on recirc (1OST-24.2,3 or 4).

References: ISTC-3510, ISTC-5221(c), ISTC-5222 and ISTC-5224.

NUREG-1482, Section 4.1.4.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 43

Valve No(s): 1FW-156A
1FW-156B
1FW-156C

Category: C **Class:** 2

System: 24 - Main Feedwater

Function: These A, B and C loop feedwater Containment isolation check valves must close for feedwater isolation of the Steam Generators in the event of a main steam line break, and to prevent reverse direction flow to non-safety related main feedwater system piping during operation of the Auxiliary Feedwater (AFW) Pumps in an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally open during plant operation to provide main feedwater flow to the Steam Generators. Their safety position is closed for feedwater isolation in the event of a main steam line break, and to ensure adequate AFW pump flow to the Steam Generators during an accident. Because these valves must remain open to provide feedwater flow to the Steam Generators during normal operations, full-stroke exercising these valves to the closed position at power is not possible. The only method for verifying check valve closure is by a leak test. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak rate testing at each refueling outage, if no other practical means is available. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed by a leak test at refueling outages per 1OST-24.8A or 8B (Motor-Driven AFW Pump & Check Valves Full Flow Tests).

NOTE: Bi-directional exercising in the non-safety related open direction is satisfied by normal system operation with feedwater flow to the Steam Generators per ISTC-3550.

References: ISTC-3510, ISTC-3522(c) and ISTC-3550.
NUREG-1482, Section 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 44

Valve No(s): 1AS-278

Category: A/C **Class:** 2

System: 26 - Main Turbine and Condenser System

Function: This containment isolation air ejector air discharge check valve must open to direct steam to containment if high radiation levels are present in the main condenser. It must also close for containment isolation of Penetration No. 89.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is required to open to provide a flow path for radioactive gases from the Condenser Air Ejector effluent line into containment in the event of a S/G tube leak with subsequent contamination of the steam systems. It is also required to close for containment isolation of Penetration No. 89. Full-stroke exercising in the open and closed direction can only be verified by cycling the mechanical weight loaded swing arm of the check valve. Because this check valve is located inside the slightly subatmospheric containment, it is not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. In order to exercise this weighted arm check valve in the open and closed direction during cold shutdown, scaffolding must be erected in order to gain access to the check valve which is considered to be an additional hardship that is not practicable during cold shutdowns. ISTC-3522(c) states, "If exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open using a manual mechanical exerciser attached to its mechanical weight loaded swing arms in accordance with ISTC-5221(b) and the guidelines provided in NUREG-1482, Section 4.1.7, and closed by observation of its mechanical weight loaded swing arm during refueling outages per 1OST-1.10R (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3522(c) and ISTC-5221(b).

NUREG-1482, Section 4.1.7.

VALVE REFUELING OUTAGE JUSTIFICATION 45

Valve No(s): 1RW-106
1RW-107

Category: C **Class:** 3

System: 30 - River Water

Function: These river water header supply check valves must open to supply river water to the safety-related components during an accident and must close to prevent reverse flow by the auxiliary river water pumps when they are supplying the river water headers.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally open during plant operation. Their safety function is to open to supply river water to the safety-related components during an accident and to close to prevent reverse flow from the Auxiliary River Water Pumps when they are supplying the river water headers. These check valves are full-stroke exercised in the open direction each quarter. However, full-stroke exercising in the closed direction is not practicable for the following reasons:

- Local observation of check valve closure is not possible because the check valves do not have position indicating devices that would indicate closure.
- Measuring a change in system pressure across the check valves is not possible because upstream isolation valves are not leak tight and may allow pressure to equalize across the river water headers.
- Seat leakage measurement is not possible because a substantial leakage path does not exist. In order to create a large enough leakage path with an Auxiliary River Water Pump supplying the river water header, both river water headers must be cross-connected at the River Water Pumps. Since both river water headers are needed for the test, this limits the ability to perform work on the Reactor Plant River Water System. The Turbine Plant River Water (TPRW) System may also need to be placed into service in order to cool secondary side equipment. This limits the ability to perform work on the TPRW system. During testing, cooling water would have to be isolated to one train of the Charging Pumps, Control Room Air Conditioning Units and Reactor Plant Component Cooling Water System. This would affect the availability of these components and systems along with the Residual Heat Removal System. In addition, there is no installed instrumentation to check for reverse flow. A temporary flow instrument would have to be installed to measure flow.

VALVE REFUELING OUTAGE JUSTIFICATION 45

Basis for ROJ: (Cont.)

Per ISTC-5221(c), "If the test methods in ISTC-5221(a) and ISTC-5221(b) are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly inspection program shall be used to verify valve obturator movement." Per ISTC-5222, BVPS-1 has elected to test these check valves in accordance with Mandatory Appendix II, Check Valve Condition Monitoring (CVCM) Program. Further guidelines for disassembly and inspection are provided in NUREG-1482, Section 4.1.4.

Alternate Test:

Maintenance is to disassemble and inspect each valve in the open and closed direction (full stroke) per 1/2CMP-75- WAFER CHECK-1M at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. If the sample valve fails its inspection, then ISTC-5224 will be applied to determine if the remaining valve in the group should be disassembled and inspected during the same outage. As a PMT following valve re-assembly, a part-stroke exercise in the open direction will be performed during return of the River Water header to service per 1OM-30.4.AC (Clearing River Water Headers A and B for Maintenance) or per 2OST-30.2, 3, 6A, 6B. (River Water Pump Tests).

References:

ISTC-3510, ISTC-5221(c), ISTC-5222 and ISTC-5224.

NUREG-1482, Section 4.1.4.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 46

Valve No(s): 1WT-383
1WT-388

Category: C **Class:** 3

System: 30 - River Water

Function: These check valves must close to isolate the chlorine injection line from the river water header.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed because the chlorine injection system is no longer in service. Their safety function is to remain closed to prevent river water from being diverted to the chlorine injection line during an accident. Because of the physical arrangement of these check valves off each RW header with a series check valve (not in IST Program) located adjacent just upstream and without a vent or drain in between, the valves cannot be individually verified to close by using flow or by leak test. Per ISTC-5221(c), If the test methods in ISTC-5221(a) and ISTC-5221(b) are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly examination program shall be used to verify valve obturator movement. Per ISTC-5222, BVPS-1 has elected to test these check valves in accordance with Mandatory Appendix II, Check Valve Condition Monitoring (CVCM) Program. Further guidelines for disassembly and inspection are provided in NUREG-1482, Section 4.1.4."

Alternate Test: Maintenance is to disassemble and inspect each valve in the open (bi-directional) direction and in the closed (safety) direction (i.e., full-stroked) per 1/2CMP-75-WEST CHECK-1M at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. If the sample valve fails its inspection, then ISTC-5224 will be applied to determine if the remaining valve in the group should be disassembled and inspected during the same outage. Because the Chlorine Injection System has been retired, a part-stroke exercise of these check valves after valve reassembly is not practicable and will not be performed as permitted by ISTC-5221(c)(4).

References: ISTC-3510, ISTC-5221(a), ISTC-5222 and ISTC-5224.

NUREG-1482, Section 4.1.4.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 47

Valve No(s): 1IA-91

Category: A/C **Class:** 2

System: 34 - Compressed Air (Instrument Air)

Function: This containment instrument air header inside containment isolation check valve must close to provide containment isolation of Penetration No. 47.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency, " Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally open and will remain open during operation of the containment instrument air system. Its safety position is closed for containment isolation of Penetration No. 47. The containment instrument air system is normally in service during plant operations and would have to be shutdown in order to test this check valve. In addition, full stroke exercising in the closed direction can only be performed by leak testing during the 10CFR50, Appendix J leak rate testing performed at refueling because no other practical means is available to verify check valve closure. This involves the installation and removal of special test equipment in order to perform the leakage testing. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outages for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak rate testing at each refueling outage, if no other practical means is available. Per ISTC-3522(c), "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed by leakage testing during refueling outages per 1OST-47.133 and 1BVT 1.47.5 (Type-C Leak Tests) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

NOTE: Bi-directional testing in the non-safety related open direction is satisfied during normal system operation of the instrument air supply to Containment per ISTC-3550, and during exercise testing of the PORVs during refueling outages per 1OST-6.12 (Power Operated Relief Valve Test).

References: ISTC-3510, ISTC-3522(c), ISTC-3550 and ISTC-5222.

NUREG-1482, Section 4.1.6.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 48

Valve No(s): 1IA-116
1IA-117
1IA-378

Category: A/C **Class: 3**

System: 34 - Compressed Air

Function: These air supply isolation check valves for the Power Operated Relief Valves (PORVs) must close on loss of instrument air to allow the back-up nitrogen accumulators to supply the control air for the PORVs.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency, " Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: The safety function of these check valves is to close to allow the back-up nitrogen accumulators to supply the control air system for the PORVs. These check valves are located inside the slightly subatmospheric containment, they are not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line.. In addition, valve closure can only be verified by a leak test because no other practical means is available to verify check valve closure. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage if no other practical means is available. Per ISTC-3522(c), "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed by leakage testing during refueling outages per 1OST-6.12 (Power Operated Relief Valve Test).

NOTE: Bi-directional exercising in the non-safety related open direction is satisfied during exercise testing of the PORVs during refueling outages per 1OST-6.12 (Power Operated Relief Valve Test).

References: ISTC-3510 and ISTC-3522(c).
NUREG-1482, Section 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 49

Valve No(s): 1FO-35
1FO-36

Category: A/C **Class:** 3

System: 36 – 4KV Station Service

Function: These Emergency Diesel Generator Fuel Oil Transfer Pump suction check valves must open to permit fuel oil transfer from the underground storage tank to the Day Tank. These valves must also close to prevent draining the "continuous prime" line from the Day Tank to each Fuel Oil Transfer Pump.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A/C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally shut during plant operation in order to prevent draining the "continuous prime" line from the Day Tank to each Fuel Oil Transfer Pump. Their safety function is to open in order to permit fuel oil transfer from the underground storage tank to the Day Tank. Full-stroke exercising in the open direction can be performed with flow each month during testing of the Emergency Diesel Generators. However, exercising in the closed direction cannot be performed without disassembling the check valves because these check valves do not have installed instrumentation or weighted arms to allow testing in the reverse direction. Therefore, the only way to verify closure is by disassembly and inspection. Per ISTC-5221(c), "If the test methods in ISTC-5221(a) and ISTC-5221(b) are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly inspection program shall be used to verify valve obturator movement." Per ISTC-5222, BVPS-1 has elected to test these check valves in accordance with Mandatory Appendix II, Check Valve Condition Monitoring (CVCM) Program. Further guidelines for disassembly and inspection are provided in NUREG-1482, Section 4.1.4.

Alternate Test: Maintenance is to disassemble and inspect each valve in the open and closed directions (i.e., full stroked) per 1CMP-75- CRANE CHECK-4M at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. If the sample valve fails its inspection, then ISTC-5224 will be applied to determine if the remaining valve in the group should be disassembled and inspected during the same outage. Each check valve is also full-stroke exercised in the open direction quarterly during Fuel Oil Transfer Pump testing per 1OST-36.1 or 1OST-36.2 (Diesel Generator Monthly Tests), and as a PMT following re-assembly of the inspected check valve at refueling.

References: ISTC-3510, ISTC-5221(c), ISTC-5222 and ISTC-5224.

NUREG-1482, Section 4.1.4.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

SECTION VIII: VALVE RELIEF REQUESTS

VALVE RELIEF REQUEST 1

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(2)

-- Hardship Without a Compensating Increase in Quality and Safety --

1. **ASME Code Components Affected**

   All valves within the Beaver Valley Power Station, Unit No. 1 Inservice Test (IST) Program.

2. **Applicable Code Edition and Addenda**

   ASME OM Code, 2004 Edition with Addenda through OMb-2006.

3. **Applicable Code Requirements**

   This request applies to the frequency specifications of the ASME OM Code for all valve testing contained within the IST Program scope. The applicable ASME OM Code sections include the following.

   ISTA-3120, "Inservice Test Interval," (a) states, "The frequency for inservice testing shall be in accordance with the requirements of Section IST."

   ISTC-3510, "Exercising Test Frequency," states in part that: "Active Category A, Category B, and Category C check valves shall be exercised nominally every 3 months, . . ."

   ISTC-3540, "Manual Valves," states in part that: "Manual Valves shall be full-stroke exercised at least once every 2 years, . . ."

   ISTC-3630, "Leakage Rate for Other Than Containment Isolation Valves," part (a), "Frequency," states that: "Tests shall be conducted at least once every 2 years."

   ISTC-3700, "Position Verification Testing," states in part that: "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) states that: "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, "Test Frequencies, Class 1 Pressure Relief Valves," part (a) states in part that: "Class 1 pressure relief valves shall be tested at least once every 5 years . . ."

   Appendix I, I-1350, "Test Frequency, Classes 2 and 3 Pressure Relief Valves," part (a) states in part that: "Classes 2 and 3 pressure relief valves, with the exception of PWR main steam safety valves, shall be tested every 10 years, . . ."

   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 years, . . ."

VALVE RELIEF REQUEST 1

4. Reason for Request

Test period requirements for valves set forth in specific ASME OM Code documents present a hardship without a compensating increase in quality and safety. ASME OM Code Case OMN-20, "Inservice Test Frequency," was approved and is proposed to be used as an alternative to the test periods specified in the ASME OM code.

Operational flexibility is needed when scheduling valve tests to minimize conflicts between the ASME OM Code specified test interval, plant conditions, and other maintenance and test activities. Lack of a frequency tolerance applied to ASME OM Code testing places a hardship on the plant when scheduling valve tests.

Code Case OMN-20 is not referenced in the latest revision of Regulatory Guide 1.192, "Operation and Maintenance Code Case acceptability, ASME OM Code" (August 2014), as an acceptable OM Code Case to comply with 10 CFR 50.55a(f) requirements as allowed by 10 CFR 50.55a(b)(6).

5. Proposed Alternative and Basis for Use

The proposed alternative is OMN-20, "Inservice Test Frequency," which addresses testing periods for valves specified in ASME OM Division 1, Section IST, 2009 Edition through OMa-2011 Addenda, and all earlier editions and addenda of ASME OM Code.

This request is being made in accordance with 10 CFR 50.55a(z)(2), in that the existing requirements are considered a hardship without a compensating increase in quality and safety for the following reasons:

1) For testing periods up to two years, Code Case OMN-20 provides an allowance to extend the testing periods by up to 25 percent. The period extension is to facilitate test scheduling and considers plant operating conditions that may not be suitable for performance of the required testing (for example, 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. Use of the test period extension has been a practice in the nuclear industry for many decades and not applying an extension would be a hardship when there is no evidence that the period extensions affect component reliability.

2) For testing periods of greater than or equal to two years, OMN-20 allows an extension of up to six months. The ASME OM Committee determined that such an extension is appropriate. The six-month extension will have a minimal impact on component reliability considering that the most probable result of performing any inservice test is satisfactory verification of the test acceptance criteria. As such, valves will continue to be adequately assessed for operational readiness when tested in accordance with the requirements specified in 10 CFR 50.55a(f) with the frequency extensions allowed by Code Case OMN-20.

ASME OM, Division 1, Section IST, and earlier editions and addenda of ASME OM Code specify component test frequencies 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.). 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 the table below.

Frequency	Specified Time Period Between Tests
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

Per OMN-20, the specified time period between tests may be reduced or extended as follows:

(1) For periods specified as less than two years, the period may be extended by up to 25 percent for any given test.

(2) For periods specified as greater than or equal to two 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 extensions may also be applied to other less than two year test frequencies not specified in the table above.

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 the ASME OM Code.

6. **Duration of Proposed Alternative**

The proposed alternative is requested for use during the fifth 10-year IST interval.

7. **Precedent**

The NRC approved the use of OMN-20 for Fort Calhoun on February 19, 2016 (NRC Agencywide Documents Access and Management System (ADAMS) Accession Number ML16041A308), and for Grand Gulf Nuclear Station, Unit 1, on June 16, 2016 (ADAMS Accession Number ML16160A092).

VALVE RELIEF REQUEST 2

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. ASME Code Components Affected

RV-1RC-551A, B and C Pressurizer Safety Valves (Class 1, Category C)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. Applicable Code Requirement

Mandatory Appendix I, "Inservice Testing of Pressure Relief Devices in Light-Water Reactor Nuclear Power Plants," Paragraph I-1320, "Test Frequencies, Class 1 Pressure Relief Valves," Subparagraph (a), "5-Year Test Interval," states:

> Class 1 pressure relief valves shall be tested at least once every five (5) years, starting with initial electric power generation. No maximum limit is specified for the number of valves to be tested within each interval; however, a minimum of 20% of the valves from each valve group shall be tested within any 24-month interval. This 20% shall consist of valves that have not been tested during the current 5-year interval, if they exist. The test interval for any individual valve shall not exceed 5 years.

4. Reason for Request

Beaver Valley Power Station Unit No. 1 (BVPS-1) has three pressurizer safety valves installed to protect the reactor coolant system from overpressure. Since BVPS-1 operates on an 18-month fuel cycle, one valve can be tested each refueling outage such that each valve is tested over a four and one-half year period. In order to avoid outage delays due to valve testing, a pressurizer safety valve is replaced during each refueling outage with one of three spare valves that has been pre-tested. The removed valve is refurbished and tested to become a spare valve for installation during a future refueling outage. In order to ensure a spare replacement valve does not exceed the five year test interval limit from test to test, it must be tested within six months prior to installation. Extending the maximum test interval to six years with a six-month grace period would permit the replacement of an installed pressurizer safety valve with a spare pressurizer safety valve without the need to test the spare valve within six months of installation.

ASME OM Code Case OMN-17, "Alternative Rules for Testing ASME Class 1 Pressure Relief/Safety Valves," from the 2012 Edition of the ASME OM Code allows a 72-month (six-year) test interval plus an additional six-month grace period coinciding with a refueling outage, in order to accommodate extended shutdown periods.

5. Proposed Alternative and Basis for Use

As an alternative to the ASME OM Code-2004 Edition, Mandatory Appendix I, Paragraph I-1320(a) test interval for pressurizer safety valve testing of at least once every five years, the pressurizer safety valves will be tested at least once every six years plus a six month grace period, if required, in accordance with the periodicity and other requirements of ASME OM Code Case OMN-17. Code Case OMN-17 provisions will not be applied to a valve until the valve is disassembled and inspected as described in Paragraph (e) of Code Case OMN-17.

VALVE RELIEF REQUEST 2

Paragraph (d) of Code Case OMN-17 requires disassembly and inspection of each valve after as-found set-pressure testing is performed in order to verify that parts are free of defects resulting from time related degradation or service induced wear.

Paragraph (e) of Code Case OMN-17 requires each valve to be disassembled and inspected in accordance with Paragraph (d) prior to the start of the 72-month test interval.

When the proposed alternative is applied to a valve, the valve will be disassembled and inspected, after as-found set pressure testing is performed in accordance with Code Case OMN-17 paragraphs (d) and (e). The initial inspection and ongoing inspections will verify that valve parts are free of defects resulting from time-related degradation or service-induced wear. These inspections will provide additional assurance that the pressurizer safety valves will perform their intended function.

The longer test interval will eliminate the need for a valve test within six months of installation during each refueling outage. Eliminating the test, will in turn, remove the risk of any shipping damage when the valve is returned from the offsite testing facility, and reduce wear on metal valve seats due to steam testing.

The as-found set-pressure acceptance criteria is plus or minus 3 percent of the valve nameplate set pressure in accordance with Paragraph I-1320(c)(1) of ASME OM Code, 2004 Edition, Mandatory Appendix I, for the purpose of determining the need to test additional valves. The as-found set-pressure acceptance criteria is plus or minus 3 percent of valve nameplate set pressure in accordance with BVPS-1 Technical Specification Limiting Condition for Operation 3.4.10 for the purpose of determining pressurizer safety valve operability.

Between the years 2005 and 2007, six new Target Rock model 569C-001-1 relief valves were purchased. All six new valves have been rotated into the three installed locations over the course of the past seven refueling outages with the old valves discarded. Since 2009 (when the first of the new valves was as-found tested), seven as-found set pressure tests have been performed for the six pressurizer safety valves. These tests have been performed at an offsite test facility using saturated steam. The majority of the tests were performed after the valve was installed for three operating cycles. As-found tests were within plus or minus 3 percent of the valve set pressure with the exception of valve RV-1RC-551A, which lifted low (minus 4 percent) in 2015. BVPS-1 Technical Specification Surveillance Requirement 3.4.10.1 requires that following testing, lift settings shall be within plus or minus 1 percent. For three of the seven tests, the valves were found within the as-left tolerance of plus or minus 1 percent. These test results show limited time-related degradation or set point drift and demonstrate that it is acceptable to extend the test interval from four and one-half years (three fuel cycles) to six years (four fuel cycles) with a six-month grace period.

The ability to detect degradation and to ensure the operational readiness of the pressurizer safety valves to perform their intended function is assured based on the valve test history and by performing the required inspection and testing initially and at the proposed alternative frequency. Therefore, test and inspection of the valves in accordance with the proposed alternative demonstrates an acceptable level of quality and safety.

6. Duration of Proposed Alternative

The proposed alternative is requested for use during the fifth 10-year inservice test interval.

VALVE RELIEF REQUEST 2

7. Precedent

A similar request was approved by the United States Nuclear Regulatory Commission (USNRC) staff in their safety evaluation referenced below.

USNRC Letter, Beaver Valley Power Station Unit No. 2, Docket No. 50-412, Safety Evaluation of Valve Relief Request VRR4 for the Remainder of the Third 10-Year Inservice Testing Interval, dated February 7, 2012 (ADAMS Accession No. ML120330329).

VALVE RELIEF REQUEST 3

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. **ASME Code Components Affected**

SOV-1HY-102A1 and A2	A Hydrogen Analyzer Containment Dome Inlet Flow Sample Valves (Class 2, Category A)
SOV-1HY-102B1 and B2	B Hydrogen Analyzer Containment Dome Inlet Flow Sample Valves (Class 2, Category A)
SOV-1HY-103A1 and A2	A Hydrogen Analyzer Pressurizer Cubicle Inlet Flow Sample Valves (Class 2, Category A)
SOV-1HY-103B1 and B2	B Hydrogen Analyzer Pressurizer Cubicle Inlet Flow Sample Valves (Class 2, Category A)
SOV-1HY-104A1 and A2	A Hydrogen Analyzer Flow Sample Discharge Valves (Class 2, Category A)
SOV-1HY-104B1 and B2	B Hydrogen Analyzer Flow Sample Discharge Valves (Class 2, Category A)

2. **Applicable Code Edition and Addenda**

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. **Applicable Code Requirement**

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

> Valves with remote position indicators shall be observed locally at least once every 2 years to verify that valve position is accurately indicated. . . . Where local observation is not possible, other indications shall be used for verification of valve operation.

4. **Reason for Request**

The valves listed above are Category A containment isolation valves and are required to be seat leakage tested in accordance with 10 CFR 50 Appendix J (Option B, Type C). Due to the design of the valves, position verification testing is performed in conjunction with the Type C leak test. Each of the listed valves is a solenoid operated valve (SOV) designed such that the coil position is internal to the valve body and is not observable in either the energized or de-energized state.

The subject valves are seat leakage tested using local leakage rate test equipment as part of the Appendix J Type C leak test program. As part of the leakage rate test, the position verification test is also performed. This method involves attempting to pressurize the containment penetration volume to approximately 45 pounds per square inch gauge (psig) with the valve open as indicated by its remote position lights on the control room bench board. If the attempt to pressurize the containment penetration fails, the valve position is verified to be open. The valve is then closed using the control switch in the control room and the containment penetration volume is pressurized to approximately 45 psig. Being able to maintain pressure in the penetration while the valve is indicating closed by its remote position lights on the control room bench board, verifies the valve is

VALVE RELIEF REQUEST 3

closed. This method satisfies the requirement for position verification testing and ensures that the remote indicating lights in the control room accurately reflect the local valve position in the field.

Position verification testing is required to be performed once every two years and is typically performed during a refueling outage, regardless of whether the containment penetration is due for Type C leakage testing or not. In order to perform Type C leakage testing, piping and valves associated with the individual valve being tested are drained, vented and aligned. Because the position verification test requires the Type C leakage test to be performed, the above actions are completed during each refueling outage.

5. Proposed Alternative and Basis for Use

As an alternative to the ISTC-3700 test interval of at least once every two years, it is proposed that the required position verification testing of the valves listed above be performed in conjunction with the Type C seat leakage test at the frequency specified by 10 CFR 50 Appendix J, Option B for the Type C leakage test. This test interval may be adjusted to a frequency of testing commensurate with Option B of 10 CFR 50 Appendix J for Type C seat leakage testing based on valve seat leakage performance. If a valve fails a leak test representing an unacceptable remote position verification, the valve test frequency (including position verification testing) will be adjusted in accordance with 10 CFR 50 Appendix J, Option B.

In addition to position verification testing and seat leakage testing, each of the valves listed above are stroke timed open and closed one at a time on a quarterly frequency. The opening stroke time for each valve is measured from the time the control switch is placed in the open position until the red indicating light is the only indicating light remaining illuminated. The closing stroke time for each valve is measured from the time the control switch is placed in the closed position until the green indicting light is the only indicating light remaining illuminated. The stroke times are compared to a two second limiting time established in accordance with paragraph ISTC-5152(c) of the ASME OM Code. If the stroke time is within the two second limiting time, then the valve is considered to have passed and is operating acceptably.

Option B of 10 CFR 50 Appendix J permits the extension of Type C leakage testing to a frequency based on leakage-rate limits and historical valve performance. Valves whose leakage test results indicate good performance may have their seat leakage test frequency extended up to 60 months or three refueling outages (based on an 18-month fuel cycle). In order for a valve's seat leakage test frequency to be extended, the individual containment isolation valve must first successfully pass two consecutive as-found seat leakage tests before it can be placed on an extended seat leakage test frequency.

Over the past six refueling outages, the valves listed above have passed the position verification test performed in conjunction with its Type C leakage test. Valve performance data is recorded in a database and trended by the inservice test coordinator. If the leak rate exceeds the allowable limit, the valves are repaired or replaced. Any maintenance performed on these valves that might affect position indication is followed by an applicable post-maintenance test including position verification testing regardless of the Type C test frequency.

Additionally, the SOVs that are required to be stroke-time tested with their stroke times measured and compared to the ASME OM Code acceptance criteria of less than two seconds are exercised on a quarterly test frequency. For the past 10 years, no quarterly stroke time failures have been noted.

VALVE RELIEF REQUEST 3

Valve exercise testing each quarter and position verification and seat leakage testing in accordance with the frequency specified by 10 CFR 50 Appendix J, Option B, provides an adequate assessment of valve health and therefore an acceptable level of quality and safety.

Based on past performance of the SOVs and the quarterly valve stroking for the valves subject to exercising, coupled with a 10 CFR 50, Appendix J, Option B performance based program to test for leakage and verify valve position indication, the proposed alternative to the ISTC-3700 test interval provides an acceptable level of quality and safety.

6. **Duration of Proposed Alternative**

   The proposed alternative is requested for use during the fifth 10-year inservice test interval.

7. **Precedent**

   A similar request was approved by the United States Nuclear Regulatory Commission (USNRC) staff in their safety evaluation referenced below.

   USNRC Letter, Beaver Valley Power Station Unit Nos. 1 and 2, Docket Nos. 50-334 and 50-412, Safety Evaluation of Valve Relief Request VRR3 for the Remainder of the BVPS-1 Fourth 10-Year Inservice Testing Interval and the BVPS-2 Third 10-Year Inservice Testing Interval, dated February 7, 2012 (ADAMS Accession No. ML120270298).

SECTION IX: VALVE TABLES

See the Valve Tables attached at the end of this document.

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Coolant **SYSTEM NUMBER:** 06

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1RC-277 (PT-1RC-458A) ROOT ISOL	2	A	Passive	0.125	Needle		6-2 (F-10)	S	S		LJ-C	SP		1BVT 1.47.5	Penet. #110 per 1OST-47.171
1RC-278 (PI-1RC-458A) ROOT ISOL	2	A	Passive	0.125	Globe		6-2 (E-10)	S	S		LJ-C	SP		1BVT 1.47.5	Penet. #110 per 1OST-47.171
1RC-68 PRT NITROGEN SUP CHECK	2	A/C	Active	0.75	Check		6-2 (B-3)	S	S		LJ-C	SP		1BVT 1.47.5	Penet. #49 per 1OST-47.135
											CV-BDT-O	NSO		1OM-19.4.M	During Station S/D as directed by 1OM-52.4.R.2.F
											CV-S-LT	CVCM	VROJ - 01	1BVT 1.47.5	Penet. #49 per 1OST-47.135. Frequency per Appendix J, Option B per CVCM Program Plan 1RC-CMP-1.
1RC-72 PRT SPRAY LINE CHECK	2	A/C	Active	3	Check		6-2 (C-3)	S	S		LJ-C	SP		1BVT 1.47.5	Penet. #45 per 1OST-47.132
											CV-BDT-O	NSO		1OM-19.4.M	During Station S/D as directed by 1OM-52.4.R.2.F
											CV-S-LT	CVCM	VROJ - 02	1BVT 1.47.5	Penet. #45 per 1OST-47.132. Frequency per Appendix J, Option B per CVCM Program Plan 1RC-CMP-2.
MOV-1RC-535 PRZR PORV ISOL MOV	1	B	Active	3	Gate	MOV	6-2 (B-9)	O	O/S		ET	Q or CSD	VCSJ - 02	1OST-6.6	Per OMN-1
											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
MOV-1RC-536 PRZR PORV ISOL MOV	1	B	Active	3	Gate	MOV	6-2 (C-9)	O	O/S		ET	Q or CSD	VCSJ - 02	1OST-6.6	Per OMN-1
											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1

SYSTEM NAME: Reactor Coolant **SYSTEM NUMBER:** 06

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
MOV-1RC-537 PRZR PORV ISOL MOV	1	B	Active	3	Gate	MOV	6-2 (C-9)	O	O/S		ET	Q or CSD	VCSJ - 02	1OST-6.6	Per OMN-1
											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
PCV-1RC-455C PRZR PORV RELIEF VLV	1	B	Active	3	Plug	PCV	6-2 (B-10)	S	O/S	S	FS-S	R		1OST-6.12	
											ST-O	R			
											ST-S	R			
											RPV	2YR			
PCV-1RC-455D PRZR PORV RELIEF VLV	1	B	Active	3	Plug	PCV	6-2 (C-10)	S	O/S	S	FS-S	R		1OST-6.12	
											ST-O	R			
											ST-S	R			
											RPV	2YR			
PCV-1RC-456 PRZR PORV RELIEF VLV	1	B	Active	3	Plug	PCV	6-2 (C-10)	S	O/S	S	FS-S	R		1OST-6.12	
											ST-O	R			
											ST-S	R			
											RPV	2YR			
RV-1RC-551A PZR RELIEF	1	C	Active	6 x 6	Safety	SV	6-2 (C-6)	S	O/S		DIS&INSP	6YR	VRR - 02	VENDOR	Req'd by OMN-17
											SPT	6YR	VRR - 02	1BVT 1.60.5	Per OMN-17
RV-1RC-551B PZR RELIEF	1	C	Active	6 x 6	Safety	SV	6-2 (C-7)	S	O/S		DIS&INSP	6YR	VRR - 02	VENDOR	Req'd by OMN-17
											SPT	6YR	VRR - 02	1BVT 1.60.5	Per OMN-17
RV-1RC-551C PZR RELIEF	1	C	Active	6 x 6	Safety	SV	6-2 (C-8)	S	O/S		DIS&INSP	6YR	VRR - 02	VENDOR	Req'd by OMN-17
											SPT	6YR	VRR - 02	1BVT 1.60.5	Per OMN-17
SOV-1RC-102A RCVS RX VESSEL VENT ISOL VLV	1	B	Active	1	Globe	SOV	6-2 (A-1)	LS	O/S	S	FS-S	CSD	VCSJ - 01	1OST-1.10A	
											ST-O	CSD	VCSJ - 01		
											ST-S	CSD	VCSJ - 01		
											RPV	2YR		1OST-6.9	
SOV-1RC-102B RCVS RX VESSEL VENT ISOL VLV	1	B	Active	1	Globe	SOV	6-2 (A-1)	LS	O/S	S	FS-S	CSD	VCSJ - 01	1OST-1.10A	
											ST-O	CSD	VCSJ - 01		
											ST-S	CSD	VCSJ - 01		
											RPV	2YR		1OST-6.9	

SYSTEM NAME: Reactor Coolant **SYSTEM NUMBER:** 06

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
SOV-1RC-103A	1	B	Active	1	Globe	SOV	6-2 (A-2)	LS	O/S	S	FS-S	CSD	VCSJ - 01	1OST-1.10A	
RCVS PRZR VENT ISOL VLV											ST-O	CSD	VCSJ - 01		
											ST-S	CSD	VCSJ - 01		
											RPV	2YR		1OST-6.9	
SOV-1RC-103B	1	B	Active	1	Globe	SOV	6-2 (A-2)	LS	O/S	S	FS-S	CSD	VCSJ - 01	1OST-1.10A	
RCVS PRZR VENT ISOL VLV											ST-O	CSD	VCSJ - 01		
											ST-S	CSD	VCSJ - 01		
											RPV	2YR		1OST-6.9	
SOV-1RC-104	1	B	Active	1	Globe	SOV	6-2 (A-3)	LS	O/S	S	FS-S	CSD	VCSJ - 01	1OST-1.10A	
RCVS VENT TO PRT ISOL VLV											ST-O	CSD	VCSJ - 01		
											ST-S	CSD	VCSJ - 01		
											RPV	2YR		1OST-6.9	
SOV-1RC-105	1	B	Active	1	Globe	SOV	6-2 (B-2)	LS	O/S	S	FS-S	CSD	VCSJ - 01	1OST-1.10A	
RCVS VENT TO CNMT ISOL VLV											ST-O	CSD	VCSJ - 01		
											ST-S	CSD	VCSJ - 01		
											RPV	2YR			
SOV-1RC-455C1	3	B	Active	0.75	Three-way	SOV	11-2 (G-8)	S	O/S	S	FS-S	R		1OST-6.12	
(PCV-1RC-455C) SOLENOID											ST-O	R			ST-O&S performed in conjunction with 1MSP-6.82-I
											ST-S	R			
SOV-1RC-455C2	3	B	Active	0.75	Three-way	SOV	11-2 (G-9)	S	O/S	S	FS-S	R		1OST-6.12	
(PCV-1RC-455C) SOLENOID											ST-O	R			ST-O&S performed in conjunction with 1MSP-6.82-I
											ST-S	R			
SOV-1RC-455D1	3	B	Active	0.75	Three-way	SOV	11-2 (E-8)	S	O/S	S	FS-S	R		1OST-6.12	
(PCV-1RC-455D) SOLENOID											ST-O	R			ST-O&S performed in conjunction with 1MSP-6.83-I
											ST-S	R			

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Coolant **SYSTEM NUMBER:** 06

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
SOV-1RC-455D2	3	B	Active	0.75	Three-way	SOV	11-2 (E-9)	S	O/S	S	FS-S	R		1OST-6.12	
(PCV-1RC-455D) SOLENOID											ST-O	R			ST-O&S performed in conjunction with 1MSP-6.83-I
											ST-S	R			
SOV-1RC-456-1	3	B	Active	0.375	Three-way	SOV	6-2 (B-10)	S	O/S	S	FS-S	R		1OST-6.12	
(PCV-1RC-456) SOLENOID											ST-O	R			ST-O&S performed in conjunction with 1MSP-6.84-I
											ST-S	R			
SOV-1RC-456-2	3	B	Active	0.375	Three-way	SOV	6-2 (B-10)	S	O/S	S	FS-S	R		1OST-6.12	
(PCV-1RC-456) SOLENOID											ST-O	R			ST-O&S performed in conjunction with 1MSP-6.84-I
											ST-S	R			
TV-1RC-101	2	A	Active	0.75	Globe	TV	6-2 (B-2)	S	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #49 per 1OST-47.135
PRT N2 SUP ISOL VLV											FS-S	Q		1OST-47.3J	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1RC-519	2	A	Active	3	Diaphragm	TV	6-2 (C-1)	S	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #45 per 1OST-47.132
PRT PRIMARY WATER SUP ISOL VLV											FS-S	Q		1OST-47.3J	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.

SYSTEM NAME: Chemical and Volume Control (Charging & HHSI) **SYSTEM NUMBER:** 07

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1CH-135 BORIC ACID BLENDER IN TO CHG PP SUCT ISOL	3	B	Active	1	Diaphragm		7-3 (E-8)	S	O		MAN	2YR		1OST-47.3E	
1CH-136 BORIC ACID BLENDER IN TO CHG PP SUCT CHECK	3	C	Active	1	Check		7-3 (F-8)	S	O		CV-BDT-S CV-O	CVCM CSD	 VCSJ - 04	1BVT 1.47.11 1OST-1.10C	Tested with [1CH-141] with frequency alternated with [1CH-84] per CVCM Program Plan 1CH-CMP-3.
1CH-141 EMER BORATION CHECK	2	C	Active	2	Check		7-3 (G-8)	S	O		CV-BDT-S CV-O	CVCM CSD	 VCSJ - 04	1BVT 1.47.11 1OST-1.10C	Tested with [1CH-136] with frequency alternated with [1CH-84] per CVCM Program Plan 1CH-CMP-3.
1CH-152 CHG PP 1A MIN FLOW CHECK	2	C	Active	2	Check		7-1 (C-3)	O	O		CV-BDT-S CV-BDT-S CV-O	Q Q Q		1OST-7.6 1OST-7.5 1OST-7.4	
1CH-153 CHG PP 1B MIN FLOW CHECK	2	C	Active	2	Check		7-1 (D-3)	O	O		CV-BDT-S CV-BDT-S CV-O	Q Q Q		1OST-7.4 1OST-7.6 1OST-7.5	
1CH-154 CHG PP 1C MIN FLOW CHECK	2	C	Active	2	Check		7-1 (E-3)	O	O		CV-BDT-S CV-BDT-S CV-O	Q Q Q		1OST-7.4 1OST-7.5 1OST-7.6	
1CH-158 CHG PP 1A TO FILL HDR ISOL	2	B	Active	3	Gate		7-1 (C-3)	LO	S		MAN RPV	2YR 2YR		1OST-7.15	Perform with RPV RPV of Reach Rod
1CH-159 CHG PP 1B TO FILL HDR ISOL	2	B	Active	3	Gate		7-1 (D-3)	LO	S		MAN RPV	2YR 2YR		1OST-7.15	Perform with RPV RPV of Reach Rod
1CH-161 CHG PP 1C TO FILL HDR ISOL	2	B	Active	3	Gate		7-1 (E-3)	LO	S		MAN RPV	2YR 2YR		1OST-7.15	Perform with RPV RPV of Reach Rod

BV Unit 1

VALVE TABLE

SYSTEM NAME: Chemical and Volume Control (Charging & HHSI) **SYSTEM NUMBER:** 07

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1CH-170 FILL HDR CHECK	1	A/C	Active	2	Check		7-1 (G-2)	S	O/S		CV-O-PR	R	VROJ - 07	1BVT 1.47.11	
											CV-S-LT	R	VROJ - 07		
											LT	2YR			
1CH-181 RCP 1A SEAL SUP CHECK	2	A/C	Active	2	Check		7-4 (B-4)	O	S		CV-S-LT	R	VROJ - 08	1BVT 1.47.11	
											CV-BDT-O	NSO		ISTC-3550	During Operation of "A" RCP per CRO Log
											LT	2YR		1BVT 1.47.11	
1CH-182 RCP 1B SEAL SUP CHECK	2	A/C	Active	2	Check		7-4 (D-4)	O	S		CV-S-LT	R	VROJ - 08	1BVT 1.47.11	
											CV-BDT-O	NSO		ISTC-3550	During Operation of "B" RCP per CRO Log
											LT	2YR		1BVT 1.47.11	
1CH-183 RCP 1C SEAL SUP CHECK	2	A/C	Active	2	Check		7-4 (G-4)	O	S		CV-S-LT	R	VROJ - 08	1BVT 1.47.11	
											CV-BDT-O	NSO		ISTC-3550	During Operation of "C" RCP per CRO Log
											LT	2YR		1BVT 1.47.11	
1CH-22 CHG PP 1A DISCH CHECK	2	C	Active	3	Check		7-1 (C-3)	O	O/S		CV-O	R	VROJ - 03	1OST-11.14B	
											CV-S	R	VROJ - 03		
											CV-S	Q		1OST-7.6	
											CV-S	Q		1OST-7.5	
1CH-23 CHG PP 1B DISCH CHECK	2	C	Active	3	Check		7-1 (D-3)	O	O/S		CV-O	R	VROJ - 03	1OST-11.14B	
											CV-S	R	VROJ - 03		
											CV-S	Q		1OST-7.4	
											CV-S	Q		1OST-7.6	
1CH-24 CHG PP 1C DISCH CHECK	2	C	Active	3	Check		7-1 (E-3)	O	O/S		CV-O	R	VROJ - 03	1OST-11.14B	
											CV-S	R	VROJ - 03		
											CV-S	Q		1OST-7.4	
											CV-S	Q		1OST-7.5	
1CH-25 CHG PP 1A DISCH HDR ISOL	2	B	Active	3	Gate		7-1 (C-2)	LO	S		MAN	2YR		1OST-7.15	Perform with RPV
											RPV	2YR			RPV of Reach Rod
1CH-26 CHG PP 1B DISCH HDR ISOL	2	B	Active	3	Gate		7-1 (D-2)	LO	S		MAN	2YR		1OST-7.15	Perform with RPV
											RPV	2YR			RPV of Reach Rod

SYSTEM NAME: Chemical and Volume Control (Charging & HHSI) **SYSTEM NUMBER:** 07

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1CH-27	2	B	Active	3	Gate		7-1 (E-2)	LO	S		MAN	2YR		1OST-7.15	Perform with RPV
CHG PP 1C DISCH HDR ISOL											RPV	2YR			RPV of Reach Rod
1CH-31	2	A/C	Active	3	Check		7-1 (C-1)	O	O/S		CV-S-LT	R	VROJ - 04	1BVT 1.47.11	
REGEN HX IN CHECK											CV-O	Q		1OST-47.3K	
											LT	2YR		1BVT 1.47.11	
1CH-32	1	C	Active	3	Check		7-1 (B-2)	O	O		CV-O	Q		1OST-47.3K	
REGEN HX OUTLET CHECK											CV-BDT-S	CVCM		1OST-7.16	Single valve group, frequency per CVCM Program Plan 1CH-CMP-1.
1CH-369	2	A/C	Active	0.75	Check		7-4 (D-8)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #19 per 1OST-47.118
(MOV-1CH-378) BYP CHECK CNMT ISOL PRESS EQUALIZER											CV-O-PR	CVCM	VROJ - 12		Frequency per Appendix J, Option B per CVCM Program Plan 1CH-CMP-2.
											CV-S-LT	CVCM	VROJ - 12		Frequency per Appendix J, Option B per CVCM Program Plan 1CH-CMP-2.
1CH-75	3	C	Active	2	Check		7-3 (C-4)	O/S	O		CV-O	SP	VCSJ - 03	1OST-7.13	During CPT of [1CH-P-2A]
BORIC ACID PP 2A DISCH CHECK											CV-O	CSD	VCSJ - 03	1OST-1.10C	
											CV-BDT-S	18MO		1OST-7.2	Once each Cycle
1CH-76	3	C	Active	2	Check		7-3 (G-4)	O/S	O		CV-O	SP	VCSJ - 03	1OST-7.14	During CPT of [1CH-P-2B]
BORIC ACID PP 2B DISCH CHECK											CV-O	CSD	VCSJ - 03	1OST-1.10C	
											CV-BDT-S	18MO		1OST-7.1	Once each Cycle
1CH-84	3	C	Active	2	Check		7-3 (E-7)	O/S	O		CV-BDT-S	CVCM		1OST-7.17	Frequency alternated with [1CH-136 & 141] per CVCM Program Plan 1CH-CMP-3.
BORIC ACID SUP TO BLENDER CHECK											CV-O	CSD	VCSJ - 04	1OST-1.10C	

BV Unit 1

VALVE TABLE

SYSTEM NAME: Chemical and Volume Control (Charging & HHSI) **SYSTEM NUMBER:** 07

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1CH-97	2	C	Active	1	Check		7-3 (G-9)	O	S		CV-S-LT	R	VROJ - 05	1OST-11.14C	
CHEMICAL MIXING TANK OUTLET CHECK											CV-BDT-O	NSO		ISTC-3550	During zinc addition per PM (Maint Plan 239899)
FCV-1CH-113A	3	B	Active	2	Globe	FCV	7-3 (E-7)	S	O	O	FS-O	Q		1OST-47.3E	
BORIC ACID SUP TO BLENDER FLOW CONT											ST-O	Q			
											RPV	2YR			
FCV-1CH-114A	3	B	Active	2	Globe	FCV	7-3 (E-8)	S	S	S	FS-S	Q		1OST-47.3E	
PRI WATER-SUP TO BLENDER FLOW CONT											ST-S	Q			
											RPV	2YR			
FCV-1CH-160	2	A	Passive	2	Globe	FCV	7-1 (G-3)	S	S	S	LT	2YR		1BVT 1.47.11	
FILL HDR FLOW CONT											RPV	2YR			
LCV-1CH-460A	1	B	Active	2	Globe	LCV	7-1 (A-2)	O	S	S	FS-S	CSD or R	VROJ - 14	1OST-1.10D	
LTDN TO REGEN HX IN ISOL											ST-S	CSD or R	VROJ - 14		
											RPV	2YR			
LCV-1CH-460B	1	B	Active	2	Globe	LCV	7-1 (A-3)	O	S	S	FS-S	CSD or R	VROJ - 14	1OST-1.10D	
LTDN TO REGEN HX IN ISOL											ST-S	CSD or R	VROJ - 14		
											RPV	2YR			
MOV-1CH-115B	2	A	Active	8	Gate	MOV	7-1 (E-6)	S	O/S		ET	Q		1OST-47.3E	Per OMN-1
RWST OUT TO CHG PP SUCT HDR ISOL											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
											LT	2YR		1BVT 1.47.11	
MOV-1CH-115C	2	B	Active	4	Gate	MOV	7-1 (G-5)	O	S		ET	CSD or R	VROJ - 06	1OST-1.10B	Per OMN-1
VCT OUT TO CHG PP SUCT HDR ISOL											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
MOV-1CH-115D	2	A	Active	8	Gate	MOV	7-1 (E-6)	S	O/S		ET	Q		1OST-47.3E	Per OMN-1
RWST OUT TO CHG PP SUCT HDR ISOL											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
											LT	2YR		1BVT 1.47.11	

SYSTEM NAME: Chemical and Volume Control (Charging & HHSI) **SYSTEM NUMBER:** 07

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
MOV-1CH-115E	2	B	Active	4	Gate	MOV	7-1 (F-5)	O	S		ET	CSD or R	VROJ - 06	1OST-1.10B	Per OMN-1
VCT OUT TO CHG PP SUCT HDR ISOL											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
MOV-1CH-142	2	A	Active	2	Plug	MOV	7-1 (A-9)	S	S		LJ-C	SP		1BVT 1.47.5	Penet. #28 per 1OST-47.124
RH LTDN TO NON REGEN HX IN FLOW CONT											ET	CSD or R	VCSJ - 05	1OST-1.10D	Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
MOV-1CH-289	2	A	Active	3	Gate	MOV	7-1 (D-1)	O	S		ET	CSD or R	VROJ - 10	1OST-1.10B	Per OMN-1
CHG PP DISCH HDR TO REGEN HX IN CNMT ISOL											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		1BVT 1.47.11	
MOV-1CH-308A	2	A	Active	2	Globe	MOV	7-4 (B-3)	O	S		ET	R	VROJ - 11	1OST-1.10E	Per OMN-1
RCP 1A SEAL INJ ISOL											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		1BVT 1.47.11	
MOV-1CH-308B	2	A	Active	2	Globe	MOV	7-4 (D-3)	O	S		ET	R	VROJ - 11	1OST-1.10E	Per OMN-1
RCP 1B SEAL INJ ISOL											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		1BVT 1.47.11	
MOV-1CH-308C	2	A	Active	2	Globe	MOV	7-4 (G-3)	O	S		ET	R	VROJ - 11	1OST-1.10E	Per OMN-1
RCP 1C SEAL INJ ISOL											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		1BVT 1.47.11	
MOV-1CH-310	1	B	Active	3	Gate	MOV	7-1 (B-2)	O	S		ET	CSD or R	VROJ - 14	1OST-1.10B	Per OMN-1
REGEN HX CHG HDR OUT ISOL											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1CH-350	3	B	Active	2	Gate	MOV	7-3 (G-7)	S	O		ET	Q		1OST-47.3E	Per OMN-1
EMER BORATION ISOL											DIAG-ST-O	10YR			Per OMN-1
											RPV	10YR			Per OMN-1

SYSTEM NAME: Chemical and Volume Control (Charging & HHSI) **SYSTEM NUMBER:** 07

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
MOV-1CH-378	2	A	Active	3	Gate	MOV	7-4 (D-8)	O	S		LJ-C	SP		1BVT 1.47.5	Penet. #19 per 1OST-47.118
SEAL WATER RTRN CNMT ISOL											ET	CSD or R	VROJ - 13	1OST-1.10E	Per OMN-1
											RPV	6RFO/18MO			18 months per Tech. Specs.
											DIAG-ST-S	6RFO			Per OMN-1
MOV-1CH-381	2	A	Active	3	Gate	MOV	7-4 (F-8)	O	S		LJ-C	SP		1BVT 1.47.5	Penet. #19 per 1OST-47.118
SEAL WATER RTRN CNMT ISOL											ET	CSD or R	VROJ - 13	1OST-1.10E	Per OMN-1
											RPV	6RFO/18MO			18 months per Tech. Specs.
											DIAG-ST-S	6RFO			Per OMN-1
RV-1CH-203	2	A/C	Active	2 x 3	Relief	RV	7-1 (A-5)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #28 per 1OST-47.124
LTDN RELIEF											SPT	10YR		1BVT 1.60.5	
RV-1CH-382A	2	C	Active	2 x 3	Relief	RV	7-4 (C-8)	S	O/S		SPT	10YR		1BVT 1.60.5	
SEAL RTRN HDR RELIEF															
RV-1CH-382B	2	C	Active	2 x 3	Relief	RV	7-4 (E-10)	S	O/S		SPT	10YR		1BVT 1.60.5	
SEAL WATER HX RELIEF															
RV-1CH-383	2	C	Active	3/4 x 1	Relief	RV	7-1 (C-2)	S	O/S		SPT	10YR		1BVT 1.60.5	
REGEN HX TUBE SIDE RELIEF															
RV-1CH-391	1	C	Active	3/4 x 1	Relief	RV	7-1 (G-2)	S	O/S		SPT	10YR		1BVT 1.60.5	
THERMAL RELIEF VALVE FOR CNMT PENETRATION 46															
TV-1CH-200A	2	A	Active	2	Globe	TV	7-1 (A-5)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #28 per 1OST-47.124
45 GPM LTDN ORIFICE CNMT ISOL											FS-S	R	VROJ - 09	1OST-1.10D	
											ST-S	R	VROJ - 09		
											RPV	2YR/18MO			18 months per Tech. Specs.

BV Unit 1

VALVE TABLE

SYSTEM NAME: Chemical and Volume Control (Charging & HHSI) **SYSTEM NUMBER:** 07

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1CH-200B 60 GPM LTDN ORIFICE CNMT ISOL	2	A	Active	2	Globe	TV	7-1 (A-8)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #28 per 1OST-47.124
											FS-S	R	VROJ - 09	1OST-1.10D	
											ST-S	R	VROJ - 09		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CH-200C 60 GPM LTDN ORIFICE CNMT ISOL	2	A	Active	2	Globe	TV	7-1 (A-7)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #28 per 1OST-47.124
											FS-S	R	VROJ - 09	1OST-1.10D	
											ST-S	R	VROJ - 09		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CH-204 REGEN HX LTDN OUT CNMT ISOL	2	A	Active	2	Gate	TV	7-1 (B-10)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #28 per 1OST-47.124
											FS-S	CSD or R	VROJ - 10	1OST-1.10D	
											ST-S	CSD or R	VROJ - 10		
											RPV	2YR/18MO			18 months per Tech. Specs.

SYSTEM NAME: Reactor Plant Vents & Drains **SYSTEM NUMBER:** 09

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
RV-1DA-101	2	A/C	Active	3/4 x 1	Relief	RV	9-1 (G-4)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #38 per 1OST-47.128
THERMAL RELIEF VALVE FOR CNMT PENETRATION 38											SPT	10YR		1BVT 1.60.5	
RV-1DG-102	2	A/C	Active	3/4 x 1	Relief	RV	9-1 (F-9)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #29 per 1OST-47.125
THERMAL RELIEF VALVE FOR CNMT PENETRATION 29											SPT	10YR		1BVT 1.60.5	
TV-1DA-100A	2	A	Active	2	Globe	TV	9-1 (G-4)	S	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #38 per 1OST-47.128
CNMT SUMP DISCH CNMT ISOL											FS-S	Q		1OST-47.3K	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1DA-100B	2	A	Active	2	Globe	TV	9-1 (G-4)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #38 per 1OST-47.128
CNMT SUMP DISCH CNMT ISOL											FS-S	Q		1OST-47.3L	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1DG-108A	2	A	Active	2	Globe	TV	9-1 (F-9)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #29 per 1OST-47.125
PRI DRAINS TRANSFER DISCH CNMT ISOL											FS-S	Q		1OST-47.3K	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1DG-108B	2	A	Active	2	Globe	TV	9-1 (F-10)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #29 per 1OST-47.125
PRI DRAINS TRANSFER DISCH CNMT ISOL											FS-S	Q		1OST-47.3L	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1DG-109A1	2	A	Active	1.5	Globe	TV	9-1 (E-9)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #48 per 1OST-47.134
PRT VENT A TRAIN CNMT ISOL											FS-S	Q		1OST-47.3L	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Plant Vents & Drains **SYSTEM NUMBER:** 09

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1DG-109A2	2	A	Active	1.5	Globe	TV	9-1 (E-8)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #48 per 1OST-47.134
PRT VENT B TRAIN CNMT ISOL											FS-S	Q		1OST-47.3K	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.

BV Unit 1

VALVE TABLE

SYSTEM NAME: Residual Heat Removal **SYSTEM NUMBER:** 10

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1RH-14 FUEL POOL AND RWST RTRN ISOL	2	A	Passive	6	Gate		10-1 (D-8)	S	S		LJ-C	SP		1BVT 1.47.5	Penet. #24 per 1OST-47.120
1RH-15 RWST RTRN ISOL	2	A	Passive	6	Gate		10-1 (B-8)	S	S		LJ-C	SP		1BVT 1.47.5	Penet. #24 per 1OST-47.120
											RPV	2YR		1OST-11.14A	RPV of Reach Rod
1RH-16 POOL PURIFICATION RTRN ISOL	2	A	Passive	4	Ball		10-1 (C-9)	S	S		LJ-C	SP		1BVT 1.47.5	Penet. #24 per 1OST-47.120
1RH-3 A PP DISCH CHECK	2	C	Active	10	Check		10-1 (E-3)	S	O/S		CV-O	CSD	VCSJ - 06	1OST-10.1	
											CV-S	CSD	VCSJ - 06		
1RH-4 B PP DISCH CHECK	2	C	Active	10	Check		10-1 (F-3)	S	O/S		CV-O	CSD	VCSJ - 06	1OST-10.1	
											CV-S	CSD	VCSJ - 06		
MOV-1RH-700 RESIDUAL HEAT REMOVAL IN ISOL	1	A	Active	14	Gate	MOV	10-1 (F-1)	S	O/S		ST-O	CSD	VCSJ - 07	1OST-10.4	
											ST-S	CSD	VCSJ - 07		
											LT	2YR/18MO		1OST-10.5	18 MO per Tech. Specs.
											RPV	2YR		1OST-10.4	
MOV-1RH-701 RESIDUAL HEAT REMOVAL IN ISOL	1	A	Active	14	Gate	MOV	10-1 (F-2)	S	O/S		ST-O	CSD	VCSJ - 07	1OST-10.4	
											ST-S	CSD	VCSJ - 07		
											LT	2YR/18MO		1OST-10.5	18 MO per Tech. Specs.
											RPV	2YR		1OST-10.4	
MOV-1RH-720A RESIDUAL HEAT REMOVAL RTRN ISOL	1	A	Active	10	Gate	MOV	10-1 (C-9)	S	O/S		LM	NSO		1OM-54.3	Continuous Monitoring of RHR System Pressure by 1OM-54.3, Station Log L5 per ISTC-3610.
											ST-O	CSD	VCSJ - 07	1OST-10.4	
											ST-S	CSD	VCSJ - 07		
											RPV	2YR			

SYSTEM NAME: Residual Heat Removal **SYSTEM NUMBER:** 10

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
MOV-1RH-720B RESIDUAL HEAT REMOVAL RTRN ISOL	1	A	Active	10	Gate	MOV	10-1 (D-9)	S	O/S		LM	NSO		1OM-54.3	Continuous Monitoring of RHR System Pressure by 1OM-54.3, Station Log L5 per ISTC-3610.
											ST-O	CSD	VCSJ - 07	1OST-10.4	
											ST-S	CSD	VCSJ - 07		
											RPV	2YR			
RV-1RH-721 RESIDUAL HEAT REMOVAL PP SUCT HDR RELIEF	2	C	Active	3 x 4	Relief	RV	10-1 (B-7)	S	O/S		SPT	10YR		1BVT 1.60.5	

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1NG-518 [PCV-1RC-455C] NITROGEN SUPPLY CHECK	3	A/C	Active	0.5	Check		11-2 (F-6)	S	S		CV-BDT-O	R		1OST-6.12	Satisfied by replenishing accumulator inventory after exercising the PORV
											CV-S-LT	R	VROJ - 33		
											LT	2YR			
1NG-519 [PCV-1RC-455D] NITROGEN SUPPLY CHECK	3	A/C	Active	0.5	Check		11-2 (E-6)	S	S		CV-BDT-O	R		1OST-6.12	Satisfied by replenishing accumulator inventory after exercising the PORV
											CV-S-LT	R	VROJ - 33		
											LT	2YR			
1NG-520 [PCV-1RC-456] NITROGEN SUPPLY CHECK	3	A/C	Active	0.5	Check		11-2 (G-6)	S	S		CV-BDT-O	R		1OST-6.12	Satisfied by replenishing accumulator inventory after exercising the PORV
											CV-S-LT	R	VROJ - 33		
											LT	2YR			
1SI-1 CNMT SUMP TO LHSI PP 1A CHECK	2	C	Active	12	Check		11-1 (G-3)	S	O		CV-DIS	CVCM	VROJ - 15	1/2CMP-75-ALOYCO CHECK-1M	Sample Disassembly and Inspection frequency with [SI-2] per CVCM Program Plan 1SI-CMP-1.
1SI-10 LOOP 3 COLD LEG LHSI SUP CHECK	1	A/C	Active	6	Check		11-1 (D-8)	S	O/S		CV-S-LT	R	VROJ - 18	1OST-11.16	
											CV-O	CVCM	VROJ - 18	1OST-11.14A	Tested with [1SI-11, 12, 23, 24, 25] at the frequency per CVCM Program Plan 1SI-CMP-4.
											LT	2YR/18M/CSD		1OST-11.16	CSD or 18 MO per Tech. Specs.

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1SI-100 LOOP 1 COLD LEG HHSI SUP CHECK	1	C	Active	2	Check		11-1 (A-9)	S	O		CV-BDT-S	R		1OST-11.16	During LT of [1SI-12]
											CV-O	R	VROJ - 29	1OST-11.14B	
1SI-101 LOOP 2 COLD LEG HHSI SUP CHECK	1	C	Active	2	Check		11-1 (A-9)	S	O		CV-BDT-S	R		1OST-11.16	During LT of [1SI-11]
											CV-O	R	VROJ - 29	1OST-11.14B	
1SI-102 LOOP 3 COLD LEG HHSI SUP CHECK	1	C	Active	2	Check		11-1 (B-9)	S	O		CV-BDT-S	R		1OST-11.16	During LT of [1SI-10]
											CV-O	R	VROJ - 29	1OST-11.14B	
1SI-11 LOOP 2 COLD LEG LHSI SUP CHECK	1	A/C	Active	6	Check		11-1 (D-8)	S	O/S		CV-S-LT	R	VROJ - 18	1OST-11.16	
											CV-O	CVCM	VROJ - 18	1OST-11.14A	Tested with [1SI-10, 12, 23, 24, 25] at the frequency per CVCM Program Plan 1SI-CMP-4.
											LT	2YR/18M/CSD		1OST-11.16	CSD or 18 MO per Tech. Specs.
1SI-115 BORON INJ RECIRC PP 3A DISCH CHECK	2	C	Active	1	Check		11-1 (C-3)	O/S	S		CV-S	Q,R	VROJ - 30	1OST-47.3F	
											CV-BDT-O	NSO			During Recirc of BIT Surge Tank
1SI-116 BORON INJ RECIRC PP 3B DISCH CHECK	2	C	Active	1	Check		11-1 (C-3)	O/S	S		CV-S	Q,R	VROJ - 30	1OST-47.3F	
											CV-BDT-O	NSO			During Recirc of BIT Surge Tank
1SI-12 LOOP 1 COLD LEG LHSI SUP CHECK	1	A/C	Active	6	Check		11-1 (C-8)	S	O/S		CV-S-LT	R	VROJ - 18	1OST-11.16	
											CV-O	CVCM	VROJ - 18	1OST-11.14A	Tested with [1SI-10, 11, 23, 24, 25] at the frequency per CVCM Program Plan 1SI-CMP-4.
											LT	2YR/18M/CSD		1OST-11.16	CSD or 18 MO per Tech. Specs.
1SI-13 HOT LEGS LHSI 1A SUP CHECK	2	A/C	Active	6	Check		11-1 (F-7)	S	O/S		CV-O	R	VROJ - 19	1OST-11.14A	
											CV-S-LT	R	VROJ - 19	1BVT 1.47.11	
											LT	2YR/18MO			18 MO per Tech. Specs.

SYSTEM NAME: Safety Injection SYSTEM NUMBER: 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1SI-14	2	A/C	Active	6	Check		11-1 (F-7)	S	O/S		CV-O	R	VROJ - 19	1OST-11.14A	
HOT LEGS LHSI 1B SUP CHECK											CV-S-LT	R	VROJ - 19	1BVT 1.47.11	
											LT	2YR/18MO			18 MO per Tech. Specs.
1SI-15	1	A/C	Active	6	Check		11-1 (F-9)	S	O/S		CV-S-LT	R	VROJ - 20	1OST-11.19	
LOOP 1 HOT LEG LHSI SUP CHECK											CV-O	CVCM	VROJ - 20	1OST-11.14A	Tested with [1SI-16, 17, 20, 21, 22] at the frequency per CVCM Program Plan 1SI-CMP-5.
											LT	2YR/18MO		1OST-11.19	18 MO per Tech. Specs.
1SI-16	1	A/C	Active	6	Check		11-1 (F-9)	S	O/S		CV-S-LT	R	VROJ - 20	1OST-11.19	
LOOP 2 HOT LEG LHSI SUP CHECK											CV-O	CVCM	VROJ - 20	1OST-11.14A	Tested with [1SI-15, 17, 20, 21, 22] at the frequency per CVCM Program Plan 1SI-CMP-5.
											LT	2YR/18MO		1OST-11.19	18 MO per Tech. Specs.
1SI-17	1	A/C	Active	6	Check		11-1 (F-9)	S	O/S		CV-S-LT	R	VROJ - 20	1OST-11.19	
LOOP 3 HOT LEG LHSI SUP CHECK											CV-O	CVCM	VROJ - 20	1OST-11.14A	Tested with [1SI-15, 16, 20, 21, 22] at the frequency per CVCM Program Plan 1SI-CMP-5.
											LT	2YR/18MO		1OST-11.19	18 MO per Tech. Specs.
1SI-2	2	C	Active	12	Check		11-1 (G-3)	S	O		CV-DIS	CVCM	VROJ - 15	1/2CMP-75-ALOYCO CHECK-1M	Sample Disassembly and Inspection frequency with [SI-1] per CVCM Program Plan 1SI-CMP-1.
CNMT SUMP TO LHSI PP 1B CHECK															

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1SI-20	1	A/C	Active	6	Check		11-1 (F-10)	S	O/S		CV-S-LT	R	VROJ - 21	1OST-11.19	
LOOP 1 HOT LEG SI SUP CHECK											CV-O	CVCM	VROJ - 21	1OST-11.14A	Tested with [1SI-15, 16, 17, 21, 22] at the frequency per CVCM Program Plan 1SI-CMP-5.
											LT	2YR		1OST-11.19	
1SI-21	1	A/C	Active	6	Check		11-1 (F-10)	S	O/S		CV-S-LT	R	VROJ - 21	1OST-11.19	
LOOP 2 HOT LEG SI SUP CHECK											CV-O	CVCM	VROJ - 21	1OST-11.14A	Tested with [1SI-15, 16, 17, 20, 22] at the frequency per CVCM Program Plan 1SI-CMP-5.
											LT	2YR		1OST-11.19	
1SI-22	1	A/C	Active	6	Check		11-1 (F-10)	S	O/S		CV-S-LT	R	VROJ - 21	1OST-11.19	
LOOP 3 HOT LEG SI SUP CHECK											CV-O	CVCM	VROJ - 21	1OST-11.14A	Tested with [1SI-15, 16, 17, 20, 21] at the frequency per CVCM Program Plan 1SI-CMP-5.
											LT	2YR		1OST-11.19	
1SI-23	1	A/C	Active	6	Check		11-1 (C-10)	S	O/S		CV-S-LT	R	VROJ - 22	1OST-11.16	
LOOP 1 COLD LEG SI SUP CHECK											CV-O	CVCM	VROJ - 22	1OST-11.14A	Tested with [1SI-10, 11, 12, 24, 25] at the frequency per CVCM Program Plan 1SI-CMP-4.
											LT	2YR/18M/CSD		1OST-11.16	CSD or 18 MO per Tech. Specs.
1SI-24	1	A/C	Active	6	Check		11-1 (D-10)	S	O/S		CV-S-LT	R	VROJ - 22	1OST-11.16	
LOOP 2 COLD LEG SI SUP CHECK											CV-O	CVCM	VROJ - 22	1OST-11.14A	Tested with [1SI-10, 11, 12, 23, 25] at the frequency per CVCM Program Plan 1SI-CMP-4.
											LT	2YR/18M/CSD		1OST-11.16	CSD or 18 MO per Tech. Specs.

BV Unit 1

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1SI-25 LOOP 3 COLD LEG SI SUP CHECK	1	A/C	Active	6	Check		11-1 (D-10)	S	O/S		CV-S-LT CV-O	R CVCM	VROJ - 22 VROJ - 22	1OST-11.16 1OST-11.14A	Tested with [1SI-10, 11, 12, 23, 24] at the frequency per CVCM Program Plan 1SI-CMP-4.
											LT	2YR/18M/CSD		1OST-11.16	CSD or 18 MO per Tech. Specs.
1SI-27 CHG PP RWST SUP CHECK	2	A/C	Active	8	Check		11-1 (G-1)	S	O/S		CV-O CV-S-LT LT	R R 2YR	VROJ - 23 VROJ - 23	1OST-11.14B 1BVT 1.47.11	
1SI-28 LHSI PP 1B MIN FLOW LINE CHECK	2	C	Active	2	Check		11-1 (F-4)	S	O/S		CV-O CV-S	Q Q		1OST-11.2 1OST-11.1	
1SI-29 LHSI PP 1A MIN FLOW LINE CHECK	2	C	Active	2	Check		11-1 (F-2)	S	O/S		CV-O CV-S	Q Q		1OST-11.1 1OST-11.2	
1SI-41 SI ACC FILL LINE ISOL	2	A	Passive	1	Globe		11-2 (D-6)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #20 per 1OST-47.119
1SI-42 SI ACC FILL LINE CHECK	2	A/C	Active	1	Check		11-2 (D-5)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #20 per 1OST-47.119
											CV-O-PR	CVCM	VROJ - 24		Frequency per Appendix J, Option B per CVCM Program Plan 1SI-CMP-6.
											CV-S-LT	CVCM	VROJ - 24		Frequency per Appendix J, Option B per CVCM Program Plan 1SI-CMP-6.

BV Unit 1

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1SI-48	1	A/C	Active	12	Check		11-2 (C-2)	S	O/S		CV-S-LT	R	VROJ - 25	1OST-11.4B	
SI ACC 1A DISCH CHECK											CV-O	CVCM	VROJ - 25	1OST-11.15A	Tested with [1SI-51] at alternating frequency with [1SI-49, 52] and [1SI-50, 53] per CVCM Program Plan 1SI-CMP-2.
											LT	2YR/18MO		1OST-11.4B	18 MO per Tech. Specs.
1SI-49	1	A/C	Active	12	Check		11-2 (E-2)	S	O/S		CV-S-LT	R	VROJ - 25	1OST-11.4B	
SI ACC 1B DISCH CHECK											CV-O	CVCM	VROJ - 25	1OST-11.15B	Tested with [1SI-52] at alternating frequency with [1SI-48, 51] and [1SI-50, 53] per CVCM Program Plan 1SI-CMP-2.
											LT	2YR/18MO		1OST-11.4B	18 MO per Tech. Specs.
1SI-5	2	C	Active	12	Check		11-1 (G-2)	S	O		CV-O	R	VROJ - 16	1OST-11.14A	
LHSI PP SUCT HDR RWST SUP CHECK											CV-BDT-S	CVCM		1BVT 1.47.11	Single valve group, frequency per CVCM Program Plan 1SI-CMP-3.
1SI-50	1	A/C	Active	12	Check		11-2 (G-2)	S	O/S		CV-S-LT	R	VROJ - 25	1OST-11.4B	
SI ACC 1C DISCH CHECK											CV-O	CVCM	VROJ - 25	1OST-11.15C	Tested with [1SI-53] at alternating frequency with [1SI-49, 52] and [1SI-48, 51] per CVCM Program Plan 1SI-CMP-2.
											LT	2YR/18MO		1OST-11.4B	18 MO per Tech. Specs.

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1SI-51	1	A/C	Active	12	Check		11-2 (C-2)	S	O/S		CV-S-LT	R	VROJ - 25	1OST-11.4A	
LOOP 1 COLD LEG SI ACC CHECK											CV-O	CVCM	VROJ - 25	1OST-11.15A	Tested with [1SI-48] at alternating frequency with [1SI-49, 52] and [1SI-50, 53] per CVCM Program Plan 1SI-CMP-2.
											LT	2YR/18MO		1OST-11.4A	18 MO per Tech. Specs.
1SI-52	1	A/C	Active	12	Check		11-2 (E-2)	S	O/S		CV-S-LT	R	VROJ - 25	1OST-11.4A	
LOOP 2 COLD LEG SI ACC CHECK											CV-O	CVCM	VROJ - 25	1OST-11.15B	Tested with [1SI-49] at alternating frequency with [1SI-48, 51] and [1SI-50, 53] per CVCM Program Plan 1SI-CMP-2.
											LT	2YR/18M/CSD		1OST-11.4A	CSD or 18 MO per Tech. Specs.
1SI-53	1	A/C	Active	12	Check		11-2 (G-2)	S	O/S		CV-S-LT	R	VROJ - 25	1OST-11.4A	
LOOP 3 COLD LEG SI ACC CHECK											CV-O	CVCM	VROJ - 25	1OST-11.15C	Tested with [1SI-50] at alternating frequency with [1SI-48, 51] and [1SI-49, 52] per CVCM Program Plan 1SI-CMP-2.
											LT	2YR/18M/CSD		1OST-11.4A	CSD or 18 MO per Tech. Specs.
1SI-6	2	C	Active	10	Check		11-1 (E-2)	S	O/S		CV-O	R	VROJ - 17	1OST-11.14A	
LHSI PP 1A DISCH CHECK											CV-S	Q		1OST-11.2	
1SI-7	2	C	Active	10	Check		11-1 (E-4)	S	O/S		CV-O	R	VROJ - 17	1OST-11.14A	
LHSI PP 1B DISCH CHECK											CV-S	Q		1OST-11.1	
1SI-83	1	A/C	Active	3	Check		11-1 (E-7)	S	O/S		CV-O-PR	R	VROJ - 11	1BVT 1.47.11	
HOT LEGS HHSI SUP CHECK											CV-S-LT	R	VROJ - 11		
											LT	2YR			

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1SI-84 HOT LEGS HHSI SUP CHECK	1	A/C	Active	3	Check		11-1 (F-7)	S	O/S		CV-O-PR	R	VROJ - 11	1BVT 1.47.11	
											CV-S-LT	R	VROJ - 11		
											LT	2YR			
1SI-94 COLD LEGS BIT SUP CHECK	1	A/C	Active	3	Check		11-1 (B-7)	S	O/S		CV-O	R	VROJ - 27	1OST-11.14B	
											CV-S-LT	R	VROJ - 27	1BVT 1.47.11	
											LT	2YR			
1SI-95 COLD LEGS HHSI SUP CHECK	1	A/C	Active	3	Check		11-1 (A-7)	S	O/S		CV-O	R	VROJ - 28	1OST-11.14B	
											CV-S-LT	R	VROJ - 28	1BVT 1.47.11	
											LT	2YR			
MOV-1SI-836 HHSI TO RCL COLD LEG ISOL	1	A	Active	3	Gate	MOV	11-1 (A-6)	S	O/S		ST-O	CSD or R	VROJ - 31	1OST-1.10B	Also DIAG tested open per OMN-1 every 3RFO
											ST-S	CSD or R	VROJ - 31		
											LT	2YR		1BVT 1.47.11	
											RPV	2YR		1OST-1.10B	
MOV-1SI-842 SI ACC TEST LINE CNMT ISOL	2	A	Active	2	Globe	MOV	11-2 (E-5)	S	S		LJ-C	SP		1BVT 1.47.5	Penet. #106 per 1OST-47.167
											ET	CSD or R	VCSJ - 10	1OST-1.10F	Per OMN-1
											RPV	6RFO/18MO			18 months per Tech. Specs.
											DIAG-ST-S	6RFO			Per OMN-1
MOV-1SI-850A 1A SI ACC TEST LINE ISOL	2	B	Passive	0.75	Globe	MOV	11-2 (B-3)	S	S		RPV	2YR		1OST-1.10P	
MOV-1SI-850B 1A SI ACC TEST LINE ISOL	2	B	Passive	0.75	Globe	MOV	11-2 (C-3)	S	S		RPV	2YR		1OST-1.10P	
MOV-1SI-850C 1B SI ACC TEST LINE ISOL	2	B	Passive	0.75	Globe	MOV	11-2 (E-3)	S	S		RPV	2YR		1OST-1.10P	
MOV-1SI-850D 1B SI ACC TEST LINE ISOL	2	B	Passive	0.75	Globe	MOV	11-2 (E-3)	S	S		RPV	2YR		1OST-1.10P	
MOV-1SI-850E 1C SI ACC TEST LINE ISOL	2	B	Passive	0.75	Globe	MOV	11-2 (G-3)	S	S		RPV	2YR		1OST-1.10P	

BV Unit 1

VALVE TABLE

SYSTEM NAME: Safety Injection SYSTEM NUMBER: 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
MOV-1SI-850F 1C SI ACC TEST LINE ISOL	2	B	Passive	0.75	Globe	MOV	11-2 (G-3)	S	S		RPV	2YR		1OST-1.10P	
MOV-1SI-851A 1A SI ACC FILL LINE ISOL	2	B	Passive	1	Globe	MOV	11-2 (B-4)	S	S		RPV	2YR		1OST-1.10P	
MOV-1SI-851B 1B SI ACC FILL LINE ISOL	2	B	Passive	1	Globe	MOV	11-2 (D-4)	S	S		RPV	2YR		1OST-1.10P	
MOV-1SI-851C 1C SI ACC FILL LINE ISOL	2	B	Passive	1	Globe	MOV	11-2 (F-4)	S	S		RPV	2YR		1OST-1.10P	
MOV-1SI-852A 1A SI ACC DRAIN ISOL	2	B	Passive	2	Globe	MOV	11-2 (B-2)	S	S		RPV	2YR		1OST-1.10P	
MOV-1SI-852B 1B SI ACC DRAIN ISOL	2	B	Passive	2	Globe	MOV	11-2 (D-2)	S	S		RPV	2YR		1OST-1.10P	
MOV-1SI-852C 1C SI ACC DRAIN ISOL	2	B	Passive	2	Globe	MOV	11-2 (F-2)	S	S		RPV	2YR		1OST-1.10P	
MOV-1SI-853A 1A SI ACC N2 SUP ISOL	2	B	Passive	1	Globe	MOV	11-2 (A-4)	S	S		RPV	2YR		1OST-47.3Q	
MOV-1SI-853B 1B SI ACC N2 SUP ISOL	2	B	Passive	1	Globe	MOV	11-2 (C-4)	S	S		RPV	2YR		1OST-47.3Q	
MOV-1SI-853C 1C SI ACC N2 SUP ISOL	2	B	Passive	1	Globe	MOV	11-2 (E-4)	S	S		RPV	2YR		1OST-47.3Q	
MOV-1SI-860A 1A LHSI PP RX CNMT SUMP SUCT ISOL	2	A	Active	12	Gate	MOV	11-1 (F-3)	S	O/S		ET DIAG-ST-O DIAG-ST-S RPV LT	CSD 6RFO 6RFO 6RFO 2YR	VCSJ - 08	1OST-1.10F 1BVT 1.47.11	Per OMN-1 Per OMN-1 Per OMN-1 Per OMN-1

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
MOV-1SI-860B	2	A	Active	12	Gate	MOV	11-1 (F-4)	S	O/S		ET	CSD	VCSJ - 08	1OST-1.10F	Per OMN-1
1B LHSI PP RX CNMT SUMP SUCT ISOL											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		1BVT 1.47.11	
MOV-1SI-862A	2	B	Active	12	Gate	MOV	11-1 (G-3)	O	O/S		ET	Q		1OST-47.3L	Per OMN-1
1A LHSI PP RWST SUCT ISOL											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1SI-862B	2	B	Active	12	Gate	MOV	11-1 (G-3)	O	O/S		ET	Q		1OST-47.3F	Per OMN-1
1B LHSI PP RWST SUCT ISOL											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1SI-863A	2	B	Active	6	Gate	MOV	11-1 (E-1)	S	O		ET	Q		1OST-47.3L	Per OMN-1
1A LHSI PP TO CHG PP SUP ISOL											DIAG-ST-O	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1SI-863B	2	B	Active	6	Gate	MOV	11-1 (E-5)	S	O		ET	Q		1OST-47.3F	Per OMN-1
1B LHSI PP TO CHG PP SUP ISOL											DIAG-ST-O	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1SI-864A	2	B	Active	10	Gate	MOV	11-1 (D-2)	O	O/S		ET	Q		1OST-47.3L	Per OMN-1
1A LHSI PP TO RCL COLD LEGS ISOL											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1SI-864B	2	B	Active	10	Gate	MOV	11-1 (D-4)	O	O/S		ET	Q		1OST-47.3F	Per OMN-1
1B LHSI PP TO RCL COLD LEGS ISOL											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1

BV Unit 1

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
MOV-1SI-865A 1A SI ACC DISCH ISOL (PWR LOCK OUT)	2	B	Active	12	Gate	MOV	11-2 (B-2)	O	O/S		ET	CSD	VCSJ - 09	1OST-1.10F	Per OMN-1. May also be ET in 1OM-52.4.R.1.F during station S/D and 1OM-50.4.L during station S/U.
											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1SI-865B 1B SI ACC DISCH ISOL (PWR LOCK OUT)	2	B	Active	12	Gate	MOV	11-2 (E-2)	O	O/S		ET	CSD	VCSJ - 09	1OST-1.10F	Per OMN-1. May also be ET in 1OM-52.4.R.1.F during station S/D and 1OM-50.4.L during station S/U.
											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1SI-865C 1C SI ACC DISCH ISOL (PWR LOCK OUT)	2	B	Active	12	Gate	MOV	11-2 (G-2)	O	O/S		ET	CSD	VCSJ - 09	1OST-1.10F	Per OMN-1. May also be ET in 1OM-52.4.R.1.F during station S/D and 1OM-50.4.L during station S/U.
											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1SI-867A BIT IN ISOL	2	B	Active	3	Gate	MOV	11-1 (A-2)	S	O		ET	CSD or R	VROJ - 32	1OST-1.10F	Per OMN-1
											DIAG-ST-O	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
MOV-1SI-867B BIT IN ISOL	2	B	Active	3	Gate	MOV	11-1 (A-2)	S	O		ET	CSD or R	VROJ - 32	1OST-1.10F	Per OMN-1
											DIAG-ST-O	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
MOV-1SI-867C	1	A	Active	3	Gate	MOV	11-1 (B-6)	S	O/S		ET	R		1OST-11.14B	Per OMN-1
BIT OUT ISOL											ET	Q		1OST-47.3L	Per OMN-1
											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-O	3RFO		1OST-11.14B	Per OMN-1
											DIAG-ST-S	3RFO		1OST-47.3L	Per OMN-1
											DIAG-ST-S	3RFO		1OST-11.14B	Per OMN-1
											RPV	3RFO			Per OMN-1
											RPV	3RFO		1OST-47.3L	Per OMN-1
											LT	2YR		1BVT 1.47.11	
MOV-1SI-867D	1	A	Active	3	Gate	MOV	11-1 (B-6)	S	O/S		ET	R		1OST-11.14B	Per OMN-1
BIT OUT ISOL											ET	Q		1OST-47.3F	Per OMN-1
											DIAG-ST-O	3RFO		1OST-11.14B	Per OMN-1
											DIAG-ST-O	3RFO		1OST-47.3F	Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											DIAG-ST-S	3RFO		1OST-11.14B	Per OMN-1
											RPV	3RFO			Per OMN-1
											RPV	3RFO		1OST-47.3F	Per OMN-1
											LT	2YR		1BVT 1.47.11	
MOV-1SI-869A	1	A	Passive	3	Gate	MOV	11-1 (E-7)	S	S		LT	2YR		1BVT 1.47.11	
HHSI TO RCS HOT LEGS ISOL (PWR LOCK OUT)											RPV	2YR			
MOV-1SI-869B	1	A	Passive	3	Gate	MOV	11-1 (F-7)	S	S		LT	2YR		1BVT 1.47.11	
HHSI TO RCS HOT LEGS ISOL (PWR LOCK OUT)											RPV	2YR			
MOV-1SI-885A	2	A	Active	2	Globe	MOV	11-1 (F-4)	O	O/S		ET	Q		1OST-47.3L	Per OMN-1
LHSI PP 1A MIN FLOW LINE TRAIN A ISOL											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		1BVT 1.47.11	
MOV-1SI-885B	2	A	Active	2	Globe	MOV	11-1 (F-4)	O	O/S		ET	Q		1OST-47.3F	Per OMN-1
LHSI PP 1B MIN FLOW LINE TRAIN A ISOL											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		1BVT 1.47.11	

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
MOV-1SI-885C	2	A	Active	2	Globe	MOV	11-1 (F-5)	O	O/S		ET	Q		1OST-47.3F	Per OMN-1
LHSI PP 1B MIN FLOW LINE TRAIN B ISOL											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		1BVT 1.47.11	
MOV-1SI-885D	2	A	Active	2	Globe	MOV	11-1 (F-5)	O	O/S		ET	Q		1OST-47.3L	Per OMN-1
LHSI PP 1A MIN FLOW LINE TRAIN B ISOL											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		1BVT 1.47.11	
MOV-1SI-890A	1	A	Active	10	Gate	MOV	11-1 (D-3)	S	O/S		ET	R		1OST-11.14A	Per OMN-1
1A LHSI TO RCS HOT LEGS ISOL (PWR LOCK OUT)											LT	2YR		1BVT 1.47.11	
											DIAG-ST-O	1RFO		1OST-47.3L	Per OMN-1
											DIAG-ST-S	1RFO			Per OMN-1
											RPV	1RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
MOV-1SI-890B	1	A	Active	10	Gate	MOV	11-1 (D-5)	S	O/S		ET	R		1OST-11.14A	Per OMN-1
1B LHSI TO RCS HOT LEGS ISOL (PWR LOCK OUT)											LT	2YR		1BVT 1.47.11	
											DIAG-ST-O	1RFO		1OST-47.3F	Per OMN-1
											DIAG-ST-S	1RFO			Per OMN-1
											RPV	1RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
MOV-1SI-890C	1	A	Active	10	Gate	MOV	11-1 (D-6)	O	O/S		ET	CSD	VCSJ - 11	1OST-1.10F	Per OMN-1
LHSI TO RCS COLD LEGS ISOL (PWR LOCK OUT)											LT	2YR		1BVT 1.47.11	
											DIAG-ST-O	1RFO		1OST-1.10F	Per OMN-1
											DIAG-ST-S	1RFO			Per OMN-1
											RPV	1RFO			Per OMN-1
RV-1GN-108	3	C	Active	1 x 1.5	Relief	RV	11-2 (E-7)	S	O/S		SPT	10YR		1BVT 1.60.5	
[PCV-1RC-455D] NITROGEN RELIEF															
RV-1GN-109	3	C	Active	1 x 1.5	Relief	RV	11-2 (F-7)	S	O/S		SPT	10YR		1BVT 1.60.5	
[PCV-1RC-455C] NITROGEN RELIEF															

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
RV-1GN-117 [PCV-1RC-456] NITROGEN HEADER RELIEF	3	C	Active	1 x 1.5	Relief	RV	11-2 (G-7)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1GN-118 [GN-TK-1C] TANK RELIEF	3	C	Active	3/4 x 1	Relief	RV	11-2 (G-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1GN-119 [GN-TK-1A] TANK RELIEF	3	C	Active	3/4 x 1	Relief	RV	11-2 (E-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1GN-120 [GN-TK-1B] TANK RELIEF	3	C	Active	3/4 x 1	Relief	RV	11-2 (F-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1SI-845A LHSI PP 1A DISCH RELIEF	2	C	Active	3/4 x 1	Relief	RV	11-1 (D-2)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1SI-845B LHSI PP DISCH HDR TO COLD LEGS RELIEF	2	C	Active	3/4 x 1	Relief	RV	11-1 (D-2)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1SI-845C LHSI PP 1B DISCH RELIEF	2	C	Active	3/4 x 1	Relief	RV	11-1 (D-4)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1SI-857 BIT RELIEF	2	C	Active	3/4 x 1	Relief	RV	11-1 (B-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1SI-858A SI ACC 1A RELIEF	2	C	Active	1 x 2	Relief	RV	11-2 (A-2)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1SI-858B SI ACC 1B RELIEF	2	C	Active	1 x 2	Relief	RV	11-2 (C-2)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1SI-858C SI ACC 1C RELIEF	2	C	Active	1 x 2	Relief	RV	11-2 (E-2)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1SI-894 THERMAL RELIEF VALVE FOR CNMT PENETRATION 20	2	C	Active	3/4 x 1	Relief	RV	11-2 (D-5)	S	O/S		SPT	10YR		1BVT 1.60.5	

BV Unit 1

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1SI-101-1 SI ACC NITROGEN SUP ISOL	2	A	Active	1	Globe	TV	11-2 (B-6)	S	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #53 per 1OST-47.136
											FS-S	Q		1OST-47.3L	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1SI-101-2 SI ACC NITROGEN SUP ISOL	2	A	Active	1	Globe	TV	11-2 (B-5)	S	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #53 per 1OST-47.136
											FS-S	Q		1OST-47.3K	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1SI-884A BIT RECIRC TO BORON INJ SURGE TK ISOL	2	B	Active	1	Globe	TV	11-1 (C-5)	O	S	S	FS-S	Q		1OST-47.3F	
											ST-S	Q			
											RPV	2YR			
TV-1SI-884B BIT RECIRC TO BORON INJ SURGE TK ISOL	2	B	Active	1	Globe	TV	11-1 (C-5)	O	S	S	FS-S	Q		1OST-47.3F	
											ST-S	Q			
											RPV	2YR			
TV-1SI-884C BORON RECIRC TO BIT ISOL	2	B	Active	1	Globe	TV	11-1 (C-4)	O	S	S	FS-S	Q		1OST-47.3F	
											ST-S	Q			
											RPV	2YR			
TV-1SI-889 SI ACC TEST LINE CNMT TRIP	2	A	Active	0.75	Gate	TV	11-1 (G-8)	S	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #106 per 1OST-47.167
											FS-S	CSD	VCSJ - 10	1OST-1.10F	
											ST-S	CSD	VCSJ - 10		
											RPV	2YR/18MO			18 months per Tech. Specs.

BV Unit 1

VALVE TABLE

SYSTEM NAME: Containment Vacuum **SYSTEM NUMBER:** 12

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1CV-57 OPEN PRESS LINE DISCH ISOL	2	A	Passive	0.375	Globe		12-1 (C-4)	SS	S		LJ-C	SP		1BVT 1.47.5	Penet. #57-1 per 1OST-47.143
1CV-58 OPEN PRESS LINE DISCH ISOL	2	A	Passive	0.375	Globe		12-1 (B-4)	SS	S		LJ-C	SP		1BVT 1.47.5	Penet. #57-2 per 1OST-47.144
1CV-59 OPEN PRESS LINE DISCH ISOL	2	A	Passive	0.375	Globe		12-1 (B-4)	SS	S		LJ-C	SP		1BVT 1.47.5	Penet. #97-3 per 1OST-47.163
1CV-60 OPEN PRESS LINE DISCH ISOL	2	A	Passive	0.375	Globe		12-1 (B-4)	SS	S		LJ-C	SP		1BVT 1.47.5	Penet. #55-2 per 1OST-47.138
HCV-1CV-151 CNMT EJ SUCT CNMT ISOL	2	A	Passive	8	Butterfly	HCV	12-1 (F-8)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #94 per 1OST-47.157
HCV-1CV-151-1 CNMT EJ SUCT CNMT ISOL	2	A	Passive	8	Butterfly	HCV	12-1 (F-7)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #94 per 1OST-47.157
TV-1CV-101A CNMT ACTIV MONITOR SUCT CNMT ISOL	2	A	Active	1	Globe	TV	12-1 (D-6)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #44 per 1OST-47.131
											FS-S	Q		1OST-47.3L	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CV-101B CNMT ACTIV MONITOR SUCT CNMT ISOL	2	A	Active	1	Globe	TV	12-1 (D-7)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #44 per 1OST-47.131
											FS-S	Q		1OST-47.3L	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CV-102 CNMT ACTIV MONITOR DISCH CNMT ISOL	2	A	Active	1	Globe	TV	12-1 (E-7)	O	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #43 per 1OST-47.130
											FS-S	Q		1OST-47.3L	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		1OST-47.130	18 months per Tech. Specs.

SYSTEM NAME: Containment Vacuum **SYSTEM NUMBER:** 12

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1CV-102-1 CNMT ACTIV MONITOR DISCH CNMT ISOL	2	A	Active	1	Globe	TV	12-1 (E-8)	O	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #43 per 1OST-47.130
											FS-S	Q		1OST-47.3L	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		1OST-47.130	18 months per Tech. Specs.
TV-1CV-150A CNMT VAC PP 1A CNMT ISOL	2	A	Active	2	Globe	TV	12-1 (F-6)	O	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #93 per 1OST-47.156
											FS-S	Q		1OST-47.3L	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		1OST-47.156	18 months per Tech. Specs.
TV-1CV-150B CNMT VAC PP 1A CNMT ISOL	2	A	Active	2	Globe	TV	12-1 (F-7)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #93 per 1OST-47.156
											FS-S	Q		1OST-47.3L	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		1OST-47.156	18 months per Tech. Specs.
TV-1CV-150C CNMT VAC PP 1B CNMT ISOL	2	A	Active	2	Globe	TV	12-1 (E-7)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #92 per 1OST-47.155
											FS-S	Q		1OST-47.3L	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CV-150D CNMT VAC PP 1B CNMT ISOL	2	A	Active	2	Globe	TV	12-1 (E-6)	S	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #92 per 1OST-47.155
											FS-S	Q		1OST-47.3L	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.

SYSTEM NAME: Containment Depressurization (Quench Spray & Recirc Spray) **SYSTEM NUMBER:** 13

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1QS-3 1A QS PP DISCH CHECK	2	A/C	Active	10	Check		13-1 (E-9)	S	O/S		LJ-C CV-ME	SP R	 VROJ - 34	1BVT 1.47.5 1OST-1.10R	Penet. #64 per 1OST-47.147
1QS-4 1B QS PP DISCH CHECK	2	A/C	Active	10	Check		13-1 (E-9)	S	O/S		LJ-C CV-ME	SP R	 VROJ - 34	1BVT 1.47.5 1OST-1.10R	Penet. #63 per 1OST-47.146
1RS-100 2A OUTSIDE RECIRC SPRAY PP DISCH CHECK	2	A/C	Active	10	Check		13-2 (C-6)	S	O/S		LJ-C CV-ME	SP R	 VROJ - 34	1BVT 1.47.5 1OST-1.10R	Penet. #71 per 1OST-47.149
1RS-101 2B OUTSIDE RECIRC SPRAY PP DISCH CHECK	2	A/C	Active	10	Check		13-2 (B-8)	S	O/S		LJ-C CV-ME	SP R	 VROJ - 34	1BVT 1.47.5 1OST-1.10R	Penet. #70 per 1OST-47.148
1RS-157 2A OUTSIDE RECIRC SPRAY PP TO HHSI PP ISOL	2	B	Active	6	Gate		13-2 (D-7)	LS	O		MAN RPV	2YR 2YR		1OST-47.3G	Perform with RPV RPV of Reach Rod
1RS-158 2A OUTSIDE RECIRC SPRAY PP TO HHSI PP CHECK	2	C	Active	6	Check		13-2 (D-7)	S	O		CV-DIS	CVCM	VROJ - 35	1/2CMP-75-VELAN CHECK-1M	Sample Disassembly and Inspection frequency with [1RS-160] per CVCM Program Plan 1RS-CMP-1.
1RS-159 2B OUTSIDE RECIRC SPRAY PP TO HHSI PP ISOL	2	B	Active	6	Gate		13-2 (D-9)	LS	O		MAN RPV	2YR 2YR		1OST-47.3M	Perform with RPV RPV of Reach Rod
1RS-160 2B OUTSIDE RECIRC SPRAY PP TO HHSI PP CHECK	2	C	Active	6	Check		13-2 (D-9)	S	O		CV-DIS	CVCM	VROJ - 35	1/2CMP-75-VELAN CHECK-1M	Sample Disassembly and Inspection frequency with [1RS-158] per CVCM Program Plan 1RS-CMP-1.
MOV-1QS-100A 1A QUENCH SPRAY PP SUCT ISOL	2	B	Passive	12	Gate	MOV	13-1 (C-4)	O	O		RPV	2YR		1OST-47.3G	

SYSTEM NAME: Containment Depressurization (Quench Spray & Recirc Spray) SYSTEM NUMBER: 13

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
MOV-1QS-100B 1B QUENCH SPRAY PP SUCT ISOL	2	B	Passive	12	Gate	MOV	13-1 (D-4)	O	O		RPV	2YR		1OST-47.3M	
MOV-1QS-101A 1A QUENCH SPRAY PP DISCH ISOL	2	A	Active	10	Gate	MOV	13-1 (E-9)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #64 per 1OST-47.147
											ET	Q		1OST-47.3G	Per OMN-1
											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1QS-101B 1B QUENCH SPRAY PP DISCH ISOL	2	A	Active	10	Gate	MOV	13-1 (F-9)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #63 per 1OST-47.146
											ET	Q		1OST-47.3M	Per OMN-1
											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1RS-155A 2A OUTSIDE RECIRC SPRAY PP SUCT ISOL	2	B	Active	12	Gate	MOV	13-2 (F-6)	O	O/S		ST-O	Q		1OST-47.3G	
											ST-S	Q			
											RPV	2YR			
MOV-1RS-155B 2B OUTSIDE RECIRC SPRAY PP SUCT ISOL	2	B	Active	12	Gate	MOV	13-2 (F-8)	O	O/S		ST-O	Q		1OST-47.3M	
											ST-S	Q			
											RPV	2YR			
MOV-1RS-156A 2A OUTSIDE RECIRC SPRAY PP DISCH ISOL	2	B	Active	10	Gate	MOV	13-2 (D-6)	O	O/S		ET	Q		1OST-47.3G	Per OMN-1
											DIAG-ST-O	10YR			Per OMN-1
											DIAG-ST-S	10YR			Per OMN-1
											RPV	10YR			Per OMN-1
MOV-1RS-156B 2B OUTSIDE RECIRC SPRAY PP DISCH ISOL	2	B	Active	10	Gate	MOV	13-2 (D-8)	O	O/S		ET	Q		1OST-47.3M	Per OMN-1
											DIAG-ST-O	10YR			Per OMN-1
											DIAG-ST-S	10YR			Per OMN-1
											RPV	10YR			Per OMN-1

SYSTEM NAME: Reactor Plant Sample **SYSTEM NUMBER:** 14A

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
RV-1SS-605	2	A/C	Active	3/4 x 1	Relief	RV	14A-1 (E-3)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #55-1 per 1OST-47.137
Thermal Relief Valve For Cnmt Penetration 55-1											SPT	10YR		1BVT 1.60.5	
RV-1SS-606	2	A/C	Active	3/4 x 1	Relief	RV	14A-1 (A-3)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #56-2 per 1OST-47.141
Thermal Relief Valve For Cnmt Penetration 56-2											SPT	10YR		1BVT 1.60.5	
RV-1SS-607	2	A/C	Active	3/4 x 1	Relief	RV	14A-1 (D-3)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #97-2 per 1OST-47.162
Thermal Relief Valve For Cnmt Penetration 97-2											SPT	10YR		1BVT 1.60.5	
RV-1SS-608	2	A/C	Active	3/4 x 1	Relief	RV	14A-1 (D-3)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #56-1 per 1OST-47.140
Thermal Relief Valve For Cnmt Penetration 56-1											SPT	10YR		1BVT 1.60.5	
RV-1SS-609	2	A/C	Active	3/4 x 1	Relief	RV	14A-1 (B-3)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #56-3 per 1OST-47.142
Thermal Relief Valve For Cnmt Penetration 56-3											SPT	10YR		1BVT 1.60.5	
RV-1SS-610	2	A/C	Active	3/4 x 1	Relief	RV	14A-1 (C-3)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #97-1 per 1OST-47.161
Thermal Relief Valve For Cnmt Penetration 97-1											SPT	10YR		1BVT 1.60.5	
RV-1SS-611	2	A/C	Active	3/4 x 1	Relief	RV	14A-1 (E-3)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #105-2 per 1OST-47.166
Thermal Relief Valve For Cnmt Penetration 105-2											SPT	10YR		1BVT 1.60.5	
TV-1SS-100A1	2	A	Active	0.75	Globe	TV	14A-1 (D-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #56-1 per 1OST-47.140
PZR LIQUID SPACE SAMPLE LINE INSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3K	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1SS-100A2	2	A	Active	0.75	Globe	TV	14A-1 (D-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #56-1 per 1OST-47.140
PZR LIQUID SPACE SAMPLE LINE OUTSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3J	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Plant Sample **SYSTEM NUMBER:** 14A

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1SS-102A1	2	A	Active	0.75	Globe	TV	14A-1 (A-3)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #56-2 per 1OST-47.141
RCS COLD LEG SAMPLE HDR INSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3O	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		1CHM-SAM-3.25	18 months per Tech. Specs.
TV-1SS-102A2	2	A	Active	0.75	Globe	TV	14A-1 (A-3)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #56-2 per 1OST-47.141
RCS COLD LEG SAMPLE HDR OUTSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3J	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		1CHM-SAM-3.25	18 months per Tech. Specs.
TV-1SS-103A1	2	A	Active	0.75	Globe	TV	14A-1 (D-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #97-2 per 1OST-47.162
RHR OUT SAMPLE LINE INSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3K	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1SS-103A2	2	A	Active	0.75	Globe	TV	14A-1 (D-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #97-2 per 1OST-47.162
RHR OUT SAMPLE LINE OUTSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3J	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1SS-104A1	2	A	Active	0.75	Globe	TV	14A-1 (C-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #97-1 per 1OST-47.161
RHR IN SAMPLE LINE INSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3K	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1SS-104A2	2	A	Active	0.75	Globe	TV	14A-1 (C-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #97-1 per 1OST-47.161
RHR IN SAMPLE LINE OUTSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3J	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.

SYSTEM NAME: Reactor Plant Sample **SYSTEM NUMBER:** 14A

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1SS-105A1	2	A	Active	0.75	Globe	TV	14A-1 (B-3)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #56-3 per 1OST-47.142
RCS HOT LEG SAMPLE HDR INSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3O	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		1CHM-SAM-3.25	18 months per Tech. Specs.
TV-1SS-105A2	2	A	Active	0.75	Globe	TV	14A-1 (B-3)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #56-3 per 1OST-47.142
RCS HOT LEG SAMPLE HDR OUTSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3J	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		1CHM-SAM-3.25	18 months per Tech. Specs.
TV-1SS-109A1	2	A	Active	0.75	Globe	TV	14A-1 (E-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #55-1 per 1OST-47.137
SI ACCS SAMPLE HDR INSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3F	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1SS-109A2	2	A	Active	0.75	Globe	TV	14A-1 (E-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #55-1 per 1OST-47.137
SI ACCS SAMPLE HDR OUTSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3O	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1SS-111A1	2	A	Active	0.75	Globe	TV	14A-1 (D-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #55-4 per 1OST-47.139
PRT GAS SAMPLE LINE INSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3F	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1SS-111A2	2	A	Active	0.75	Globe	TV	14A-1 (D-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #55-4 per 1OST-47.139
PRT GAS SAMPLE LINE OUTSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3O	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.

SYSTEM NAME: Reactor Plant Sample **SYSTEM NUMBER:** 14A

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1SS-112A1	2	A	Active	0.75	Globe	TV	14A-1 (E-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #105-2 per 1OST-47.166
PZR VAPOR SPACE SAMPLE LINE INSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3F	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1SS-112A2	2	A	Active	0.75	Globe	TV	14A-1 (E-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #105-2 per 1OST-47.166
PZR VAPOR SPACE SAMPLE LINE OUTSIDE CNMT ISOL TRIP											FS-S	Q		1OST-47.3O	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1SS-117A	2	B	Active	0.75	Globe	TV	14A-1 (G-2)	O	S	S	FS-S	Q		1OST-47.3M	
1A SG BLDN SAMPLE LINE OUTSIDE CNMT ISOL TRIP											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1SS-117B	2	B	Active	0.75	Globe	TV	14A-1 (F-2)	O	S	S	FS-S	Q		1OST-47.3M	
1B SG BLDN SAMPLE LINE OUTSIDE CNMT ISOL TRIP											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1SS-117C	2	B	Active	0.75	Globe	TV	14A-1 (F-2)	O	S	S	FS-S	Q		1OST-47.3M	
1C SG BLDN SAMPLE LINE OUTSIDE CNMT ISOL TRIP											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.

SYSTEM NAME: Reactor Plant Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1CCR-247 (RH-E-1A) AND (RH-P-1A) SEAL CLR CCR SUP ISOL	2	A	Active	18	Butterfly		15-5 (G-1)	LS	O		LJ-C	SP		1BVT 1.47.5	Penet. #1&4 per 1OST-47.108
											MAN	2YR		1OST-10.4	
											MAN	2YR		1OM-10.4.A	
1CCR-248 (RH-E-1B) AND (RH-P-1B) SEAL CLR CCR SUP ISOL	2	A	Active	18	Butterfly		15-5 (G-1)	LS	O		LJ-C	SP		1BVT 1.47.5	Penet. #2&5 per 1OST-47.109
											MAN	2YR		1OST-10.4	
											MAN	2YR		1OM-10.4.A	
1CCR-251 (RH-E-1A) AND (RH-P-1A) SEAL CLR CCR RTRN ISOL	2	A	Active	18	Butterfly		15-5 (G-8)	LS	O		LJ-C	SP		1BVT 1.47.5	Penet. #1&4 per 1OST-47.108
											MAN	2YR		1OST-10.4	
											MAN	2YR		1OM-10.4.A	
1CCR-252 (RH-E-1B) AND (RH-P-1B) SEAL CLR CCR RTRN ISOL	2	A	Active	18	Butterfly		15-5 (G-8)	LS	O		LJ-C	SP		1BVT 1.47.5	Penet. #2&5 per 1OST-47.109
											MAN	2YR		1OM-10.4.A	
											MAN	2YR		1OST-10.4	
1CCR-289 RCP 1A THERM BARR CCR IN CHECK	3	A/C	Active	2	Check		15-5 (C-3)	O	S		CV-S-LT	R	VROJ - 38	1BVT 1.60.7	
											CV-BDT-O	NSO		ISTC-3550	During operation of "A" RCP per PM (Maint Plan 239899)
											LT	2YR		1BVT 1.60.7	
1CCR-290 RCP 1B THERM BARR CCR IN CHECK	3	A/C	Active	2	Check		15-5 (D-3)	O	S		CV-S-LT	R	VROJ - 38	1BVT 1.60.7	
											CV-BDT-O	NSO		ISTC-3550	During operation of "B" RCP per PM (Maint Plan 239899)
											LT	2YR		1BVT 1.60.7	
1CCR-291 RCP 1C THERM BARR CCR IN CHECK	3	A/C	Active	2	Check		15-5 (F-3)	O	S		CV-S-LT	R	VROJ - 38	1BVT 1.60.7	
											CV-BDT-O	NSO		ISTC-3550	During operation of "C" RCP per PM (Maint Plan 239899)
											LT	2YR		1BVT 1.60.7	
1CCR-4 CCR PP 1A DISCH CHECK	3	C	Active	18	Check		15-1 (E-6)	O/S	O/S		CV-O	Q		1OST-15.1	
											CV-S-PR	Q		1OST-15.2	
											CV-S-PR	Q		1OST-15.3	

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Plant Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1CCR-5	3	C	Active	18	Check		15-1 (E-7)	O/S	O/S		CV-O	Q		1OST-15.2	
CCR PP 1B DISCH CHECK											CV-S-PR	Q		1OST-15.3	
											CV-S-PR	Q		1OST-15.1	
1CCR-6	3	C	Active	18	Check		15-1 (E-8)	O/S	O/S		CV-O	Q		1OST-15.3	
CCR PP 1C DISCH CHECK											CV-S-PR	Q		1OST-15.2	
											CV-S-PR	Q		1OST-15.1	
MOV-1CC-112A2	2	A	Active	18	Butterfly	MOV	15-5 (A-7)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #1&4 per 1OST-47.108
(RH-E-1A) CCR IN CNMT ISOL											ST-O	Q		1OST-47.3K	
											ST-S	Q			
											ST-O	CSD	VCSJ - 15	1OM-10.4.C	
											ST-O	CSD	VCSJ - 15	1OST-10.4	
											ST-O	CSD	VCSJ - 15	1OM-10.4.A	
											ST-S	CSD	VCSJ - 15	1OM-10.4.C	
											ST-S	CSD	VCSJ - 15	1OM-10.4.A	
											ST-S	CSD	VCSJ - 15	1OST-10.4	
											RPV	2YR		1OST-47.3K	
											RPV	2YR		1OST-10.4	
MOV-1CC-112A3	2	A	Active	18	Butterfly	MOV	15-5 (F-7)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #1&4 per 1OST-47.108
(RH-E-1A) CCR OUT CNMT ISOL											ST-O	Q		1OST-47.3K	
											ST-S	Q			
											ST-O	CSD	VCSJ - 15	1OM-10.4.C	
											ST-O	CSD	VCSJ - 15	1OST-10.4	
											ST-O	CSD	VCSJ - 15	1OM-10.4.A	
											ST-S	CSD	VCSJ - 15	1OM-10.4.C	
											ST-S	CSD	VCSJ - 15	1OM-10.4.A	
											ST-S	CSD	VCSJ - 15	1OST-10.4	
											RPV	2YR			
											RPV	2YR		1OST-47.3K	

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Plant Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
MOV-1CC-112B2	2	A	Active	18	Butterfly	MOV	15-5 (A-8)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #2&5 per 1OST-47.109
(RH-E-1B) CCR IN CNMT ISOL											ST-O	Q		1OST-47.3F	
											ST-S	Q	VCSJ - 15		
											ST-O	CSD	VCSJ - 15	1OM-10.4.C	
											ST-O	CSD	VCSJ - 15	1OST-10.4	
											ST-O	CSD	VCSJ - 15	1OM-10.4.A	
											ST-S	CSD		1OM-10.4.C	
											ST-S	CSD	VCSJ - 15	1OM-10.4.A	
											ST-S	CSD	VCSJ - 15	1OST-10.4	
											RPV	2YR		1OST-47.3F	
											RPV	2YR		1OST-10.4	
MOV-1CC-112B3	2	A	Active	18	Butterfly	MOV	15-5 (F-8)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #2&5 per 1OST-47.109
(RH-E-1B) CCR OUT CNMT ISOL											ST-O	Q		1OST-47.3F	
											ST-S	Q			
											ST-O	CSD	VCSJ - 15	1OM-10.4.A	
											ST-O	CSD	VCSJ - 15	1OM-10.4.C	
											ST-O	CSD	VCSJ - 15	1OST-10.4	
											ST-S	CSD	VCSJ - 15	1OM-10.4.C	
											ST-S	CSD	VCSJ - 15	1OM-10.4.A	
											ST-S	CSD	VCSJ - 15	1OST-10.4	
											RPV	2YR		1OST-47.3F	
											RPV	2YR		1OST-10.4	
RV-1CC-109	3	C	Active	3/4 x 1	Relief	RV	15-2 (E-7)	S	O/S		SPT	10YR		1BVT 1.60.5	
SEAL WATER HX (CH-E-1) CCR RELIEF															
RV-1CC-116A	3	C	Active	3/4 x 1	Relief	RV	15-5 (C-3)	S	O/S		SPT	10YR		1BVT 1.60.5	
RCP 1A THERM BARR CCR RELIEF															
RV-1CC-116B	3	C	Active	3/4 x 1	Relief	RV	15-5 (D-3)	S	O/S		SPT	10YR		1BVT 1.60.5	
RCP 1B THERM BARR CCR RELIEF															
RV-1CC-116C	3	C	Active	3/4 x 1	Relief	RV	15-5 (E-3)	S	O/S		SPT	10YR		1BVT 1.60.5	
RCP 1C THERM BARR CCR RELIEF															

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Plant Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
RV-1CC-119A (RH-E-1A) CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-5 (F-5)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-119B (RH-E-1B) CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-5 (G-5)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-136A SEAL CLR (RH-P-1A) CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-5 (G-3)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-136B SEAL CLR (RH-P-1B) CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-5 (G-3)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-139A CNMT PEN 52 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (B-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-139B CNMT PEN 39 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (B-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-139C CNMT PEN 51 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (B-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-139D CNMT PEN 41 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (C-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-139E CNMT PEN 40 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (D-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-139F CNMT PEN 28 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (E-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-139G CNMT PEN 76 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (E-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-139H CNMT PEN 73 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (E-6)	S	O/S		SPT	10YR		1BVT 1.60.5	

SYSTEM NAME: Reactor Plant Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
RV-1CC-139I CNMT PEN 77 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (F-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-139J CNMT PEN 74 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (F-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-139K CNMT PEN 78 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (F-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-139L CNMT PEN 75 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (G-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-139M CNMT PEN 56 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (D-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-139N CNMT PEN 97 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (D-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-139P CNMT PEN 105 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (C-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-139R CNMT PEN 110 OUTER CLG COIL CCR RELIEF	3	C	Active	3/4 x 1	Relief	RV	15-4 (C-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1CC-261 THERMAL RELIEF FOR CNMT PENETRATION 1	2	A/C	Active	3/4 x 1	Relief	RV	15-5 (F-2)	S	O/S		LJ-C SPT	SP 10YR		1BVT 1.47.5 1BVT 1.60.5	Penet. #1&4 per 1OST-47.108
RV-1CC-262 THERMAL RELIEF FOR CNMT PENETRATION 2	2	A/C	Active	3/4 x 1	Relief	RV	15-5 (G-7)	S	O/S		LJ-C SPT	SP 10YR		1BVT 1.47.5 1BVT 1.60.5	Penet. #2&5 per 1OST-47.109
RV-1CC-263 THERMAL RELIEF FOR CNMT PENETRATION 5	2	A/C	Active	3/4 x 1	Relief	RV	15-5 (G-2)	S	O/S		LJ-C SPT	SP 10YR		1BVT 1.47.5 1BVT 1.60.5	Penet. #2&5 per 1OST-47.109
RV-1CC-264 THERMAL RELIEF FOR CNMT PENETRATION 4	2	A/C	Active	3/4 x 1	Relief	RV	15-5 (F-7)	S	O/S		LJ-C SPT	SP 10YR		1BVT 1.47.5 1BVT 1.60.5	Penet. #1&4 per 1OST-47.108

SYSTEM NAME: Reactor Plant Component Cooling Water — SYSTEM NUMBER: 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
RV-1CC-265 THERMAL RELIEF FOR CNMT PENETRATION 8	2	A/C	Active	3/4 x 1	Relief	RV	15-5 (E-9)	S	O/S		LJ-C SPT	SP 10YR		1BVT 1.47.5 1BVT 1.60.5	Penet. #8 per 1OST-47.110
RV-1CC-266 THERMAL RELIEF FOR CNMT PENETRATION 9	2	A/C	Active	3/4 x 1	Relief	RV	15-3 (F-4)	S	O/S		LJ-C SPT	SP 10YR		1BVT 1.47.5 1BVT 1.60.5	Penet. #9 per 1OST-47.111
RV-1CC-267 THERMAL RELIEF FOR CNMT PENETRATION 11	2	A/C	Active	3/4 x 1	Relief	RV	29-2 (E-9)	S	O/S		LJ-C SPT	SP 10YR		1BVT 1.47.5 1BVT 1.60.5	Penet. #11 per 1OST-47.112
RV-1CC-268 THERMAL RELIEF FOR CNMT PENETRATION 14	2	A/C	Active	3/4 x 1	Relief	RV	29-2 (A-3)	S	O/S		LJ-C SPT	SP 10YR		1BVT 1.47.5 1BVT 1.60.5	Penet. #14 per 1OST-47.114
RV-1CC-269 THERMAL RELIEF FOR CNMT PENETRATION 16	2	A/C	Active	3/4 x 1	Relief	RV	15-3 (B-8)	S	O/S		LJ-C SPT	SP 10YR		1BVT 1.47.5 1BVT 1.60.5	Penet. #16 per 1OST-47.115
RV-1CC-270 THERMAL RELIEF FOR CNMT PENETRATION 17	2	A/C	Active	3/4 x 1	Relief	RV	15-5 (C-2)	S	O/S		LJ-C SPT	SP 10YR		1BVT 1.47.5 1BVT 1.60.5	Penet. #17 per 1OST-47.116
RV-1CC-271 THERMAL RELIEF FOR CNMT PENETRATION 18	2	A/C	Active	3/4 x 1	Relief	RV	15-5 (E-2)	S	O/S		LJ-C SPT	SP 10YR		1BVT 1.47.5 1BVT 1.60.5	Penet. #18 per 1OST-47.117
RV-1CC-272 THERMAL RELIEF FOR CNMT PENETRATION 25	2	A/C	Active	3/4 x 1	Relief	RV	15-5 (D-9)	S	O/S		LJ-C SPT	SP 10YR		1BVT 1.47.5 1BVT 1.60.5	Penet. #25 per 1OST-47.121
RV-1CC-273 THERMAL RELIEF FOR CNMT PENETRATION 26	2	A/C	Active	3/4 x 1	Relief	RV	15-5 (B-9)	S	O/S		LJ-C SPT	SP 10YR		1BVT 1.47.5 1BVT 1.60.5	Penet. #26 per 1OST-47.122
RV-1CC-274 THERMAL RELIEF FOR CNMT PENETRATION 27	2	A/C	Active	3/4 x 1	Relief	RV	15-5 (A-9)	S	O/S		LJ-C SPT	SP 10YR		1BVT 1.47.5 1BVT 1.60.5	Penet. #27 per 1OST-47.123
RV-1CC-275 THERMAL RELIEF FOR CNMT PENETRATION 58	2	A/C	Active	3/4 x 1	Relief	RV	15-5 (B-2)	S	O/S		LJ-C SPT	SP 10YR		1BVT 1.47.5 1BVT 1.60.5	Penet. #58 per 1OST-47.145

SYSTEM NAME: Reactor Plant Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1CC-103A	2	A	Active	6	Globe	TV	15-5 (B-1)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #58 per 1OST-47.145
RCP 1A CCR IN CNMT ISOL											FS-S	CSD or R	VROJ - 36	1OST-1.10G	
											ST-S	CSD or R	VROJ - 36		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-103A1	2	A	Active	6	Globe	TV	15-5 (B-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #58 per 1OST-47.145
RCP 1A CCR IN CNMT ISOL											FS-S	CSD or R	VROJ - 36	1OST-1.10G	
											ST-S	CSD or R	VROJ - 36		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-103B	2	A	Active	6	Globe	TV	15-5 (C-1)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #17 per 1OST-47.116
RCP 1B CCR IN CNMT ISOL											FS-S	CSD or R	VROJ - 36	1OST-1.10G	
											ST-S	CSD or R	VROJ - 36		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-103B1	2	A	Active	6	Globe	TV	15-5 (C-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #17 per 1OST-47.116
RCP 1B CCR IN CNMT ISOL											FS-S	CSD or R	VROJ - 36	1OST-1.10G	
											ST-S	CSD or R	VROJ - 36		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-103C	2	A	Active	6	Globe	TV	15-5 (E-1)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #18 per 1OST-47.117
RCP 1C CCR IN CNMT ISOL											FS-S	CSD or R	VROJ - 36	1OST-1.10G	
											ST-S	CSD or R	VROJ - 36		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-103C1	2	A	Active	6	Globe	TV	15-5 (E-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #18 per 1OST-47.117
RCP 1C CCR IN CNMT ISOL											FS-S	CSD or R	VROJ - 36	1OST-1.10G	
											ST-S	CSD or R	VROJ - 36		
											RPV	2YR/18MO			18 months per Tech. Specs.

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Plant Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1CC-105D1	2	A	Active	6	Globe	TV	15-5 (E-8)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #25 per 1OST-47.121
RCP MOTORS 1B AND 1C CCR OUT HDR CNMT ISOL											FS-S	CSD or R	VROJ - 36	1OST-1.10G	
											ST-S	CSD or R	VROJ - 36		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-105D2	2	A	Active	6	Globe	TV	15-5 (E-9)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #25 per 1OST-47.121
RCP MOTORS 1B AND 1C CCR OUT HDR CNMT ISOL											FS-S	CSD or R	VROJ - 36	1OST-1.10G	
											ST-S	CSD or R	VROJ - 36		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-105E1	2	A	Active	4	Globe	TV	15-5 (A-8)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #27 per 1OST-47.123
RCP MOTOR 1A CCR OUT HDR CNMT ISOL											FS-S	CSD or R	VROJ - 36	1OST-1.10G	
											ST-S	CSD or R	VROJ - 36		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-105E2	2	A	Active	4	Globe	TV	15-5 (A-10)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #27 per 1OST-47.123
RCP MOTOR 1A CCR OUT HDR CNMT ISOL											FS-S	CSD or R	VROJ - 36	1OST-1.10G	
											ST-S	CSD or R	VROJ - 36		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-107A	3	A	Active	2	Globe	TV	15-5 (C-6)	O	S	S	FS-S	CSD or R	VROJ - 37	1OST-1.10G	
RCP 1A THERM BARR CCR OUT ISOL											ST-S	CSD or R	VROJ - 37		
											LT	2YR		1BVT 1.60.7	
											RPV	2YR		1OST-1.10G	
TV-1CC-107B	3	A	Active	2	Globe	TV	15-5 (D-6)	O	S	S	FS-S	CSD or R	VROJ - 37	1OST-1.10G	
RCP 1B THERM BARR CCR OUT ISOL											ST-S	CSD or R	VROJ - 37		
											LT	2YR		1BVT 1.60.7	
											RPV	2YR		1OST-1.10G	
TV-1CC-107C	3	A	Active	2	Globe	TV	15-5 (F-6)	O	S	S	FS-S	CSD or R	VROJ - 37	1OST-1.10G	
RCP 1C THERM BARR CCR OUT ISOL											ST-S	CSD or R	VROJ - 37		
											LT	2YR		1BVT 1.60.7	
											RPV	2YR		1OST-1.10G	

SYSTEM NAME: Reactor Plant Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1CC-107D1	2	A	Active	3	Globe	TV	15-5 (E-8)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #8 per 1OST-47.110
RCP 1B AND 1C THERM BARR CCR OUT CNMT ISOL											FS-S	CSD or R	VROJ - 36	1OST-1.10G	
											ST-S	CSD or R	VROJ - 36		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-107D2	2	A	Active	3	Globe	TV	15-5 (E-9)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #8 per 1OST-47.110
RCP 1B AND 1C THERM BARR CCR OUT CNMT ISOL											FS-S	CSD or R	VROJ - 36	1OST-1.10G	
											ST-S	CSD or R	VROJ - 36		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-107E1	2	A	Active	2	Globe	TV	15-5 (B-8)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #26 per 1OST-47.122
RCP 1A THERM BARR CCR OUT CNMT ISOL											FS-S	CSD or R	VROJ - 36	1OST-1.10G	
											ST-S	CSD or R	VROJ - 36		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-107E2	2	A	Active	2	Globe	TV	15-5 (B-9)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #26 per 1OST-47.122
RCP 1A THERM BARR CCR OUT CNMT ISOL											FS-S	CSD or R	VROJ - 36	1OST-1.10G	
											ST-S	CSD or R	VROJ - 36		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-110D	2	A	Active	8	Globe	TV	29-2 (E-9)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #11 per 1OST-47.112
CNMT RECIRC CLG COILS CHILLED WATER OUT CNMT ISOL											FS-S	CSD	VCSJ - 13	1OST-1.10H	
											ST-S	CSD	VCSJ - 13		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-110E2	2	A	Active	8	Globe	TV	29-2 (A-2)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #14 per 1OST-47.114
CNMT RECIRC COOLING COILS AC CHILLED WATER SUP CNMT ISOL											FS-S	CSD	VCSJ - 13	1OST-1.10H	
											ST-S	CSD	VCSJ - 13		
											RPV	2YR/18MO			18 months per Tech. Specs.

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Plant Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1CC-110E3	2	A	Active	8	Globe	TV	29-2 (A-3)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #14 per 1OST-47.114
CNMT RECIRC COOLING COILS AC CHILLED WATER SUP CNMT ISOL											FS-S	CSD	VCSJ - 13	1OST-1.10H	
											ST-S	CSD	VCSJ - 13		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-110F1	2	A	Active	8	Globe	TV	29-2 (E-10)	S	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #11 per 1OST-47.112
CNMT RECIRC COOLING COILS OUTLET TO RW CNMT ISOL											FS-S	CSD	VCSJ - 12	1OST-1.10H	
											ST-S	CSD	VCSJ - 12		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-110F2	2	A	Active	8	Globe	TV	29-2 (F-10)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #11 per 1OST-47.112
CNMT RECIRC COOLING COILS AC CHILLED WTR RTRN CNMT ISOL											FS-S	CSD	VCSJ - 13	1OST-1.10H	
											ST-S	CSD	VCSJ - 13		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-111A1	2	A	Active	6	Globe	TV	15-3 (B-8)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #16 per 1OST-47.115
CRDM SHROUD CLG COILS CCR IN CNMT ISOL											FS-S	CSD	VCSJ - 14	1OST-1.10H	
											ST-S	CSD	VCSJ - 14		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-111A2	2	A	Active	6	Globe	TV	15-3 (B-8)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #16 per 1OST-47.115
CRDM SHROUD CLG COILS CCR IN CNMT ISOL											FS-S	CSD	VCSJ - 14	1OST-1.10H	
											ST-S	CSD	VCSJ - 14		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1CC-111D1	2	A	Active	6	Globe	TV	15-3 (F-4)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #9 per 1OST-47.111
CRDM SHROUD CLG COILS CCR OUT CNMT ISOL											FS-S	CSD	VCSJ - 14	1OST-1.10H	
											ST-S	CSD	VCSJ - 14		
											RPV	2YR/18MO			18 months per Tech. Specs.

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Plant Component Cooling Water | SYSTEM NUMBER: 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1CC-111D2 CRDM SHROUD CLG COILS CCR OUT CNMT ISOL	2	A	Active	6	Globe	TV	15-3 (G-4)	O	S	S	LJ-C FS-S ST-S RPV	SP CSD CSD 2YR/18MO	 VCSJ - 14 VCSJ - 14	1BVT 1.47.5 1OST-1.10H	Penet. #9 per 1OST-47.111 18 months per Tech. Specs.
TV-1CC-121-1 REFUEL WATER REFRIG UNITS CCR IN ISOL	3	B	Active	2	Globe	TV	15-5 (B-1)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3H	
TV-1CC-121-2 REFUEL WATER REFRIG UNITS CCR OUT ISOL	3	B	Active	2	Globe	TV	15-5 (F-2)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3H	
TV-1CC-125 DEGAS EQUIP CCR IN ISOL	3	B	Active	6	Globe	TV	15-2 (A-3)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3J	
TV-1CC-125-1 DEGAS EQUIP CCR OUT ISOL	3	B	Active	6	Globe	TV	15-1 (F-5)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3J	
TV-1CC-125-2 DEGAS EQUIP CCR OUT ISOL	3	B	Active	6	Globe	TV	15-1 (F-5)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3J	
TV-1CC-126 BORON EVAP 1A EQUIP CCR IN ISOL	3	B	Active	8	Globe	TV	15-2 (A-4)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3J	
TV-1CC-126-1 BORON EVAP 1A EQUIP CCR OUT ISOL	3	B	Active	8	Globe	TV	15-1 (G-7)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3J	
TV-1CC-126-2 BORON EVAP 1A EQUIP CCR OUT ISOL	3	B	Active	8	Globe	TV	15-1 (G-8)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3J	
TV-1CC-127 BORON EVAP 1B EQUIP CCR IN ISOL	3	B	Active	8	Globe	TV	15-2 (B-5)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3J	

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Plant Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1CC-127-1 BORON EVAP 1B EQUIP CCR OUT ISOL	3	B	Active	8	Globe	TV	15-1 (F-9)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3J	
TV-1CC-127-2 BORON EVAP 1B EQUIP CCR OUT ISOL	3	B	Active	8	Globe	TV	15-1 (E-9)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3J	
TV-1CC-129 LIQUID WASTE EQUIP CCR IN ISOL	3	B	Active	6	Globe	TV	15-2 (A-10)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3H	
TV-1CC-129-1 LIQUID WASTE EQUIP CCR IN ISOL	3	B	Active	6	Globe	TV	15-2 (B-10)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3H	
TV-1CC-129-2 LIQUID WASTE EQUIP CCR OUT ISOL	3	B	Active	6	Globe	TV	15-2 (E-10)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3H	
TV-1CC-133-2 SAMPLE CLR CCR OUT ISOL	3	B	Active	1.5	Globe	TV	15-2 (G-9)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3H	
TV-1CC-133-3 LIQUID WASTE HX CCR OUT COMB RTRN ISOL	3	B	Active	6	Globe	TV	15-2 (F-10)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3H	
TV-1CC-134-1 SAMPLE CLR CCR IN ISOL	3	B	Active	3	Globe	TV	15-2 (A-7)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3H	
TV-1CC-134-2 SAMPLE CLR CCR IN ISOL	3	B	Active	3	Globe	TV	15-2 (B-7)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3H	
TV-1CC-134-3 SAMPLE CLR CCR OUT ISOL	3	B	Active	1.5	Globe	TV	15-2 (G-8)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3H	
TV-1CC-136 BORON RCVY EQUIP CCR IN ISOL	3	B	Active	12	Globe	TV	15-2 (A-5)	O	S	S	FS-S ST-S RPV	Q Q 2YR		1OST-47.3J	

SYSTEM NAME: Reactor Plant Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1CC-137	3	B	Active	2	Globe	TV	15-5 (B-1)	O	S	S	FS-S	Q		1OST-47.3H	
REFUEL WATER REFRIG UNITS COMMON CCR IN ISOL											ST-S	Q			
											RPV	2YR			
TV-1CC-137A	3	B	Active	1.5	Globe	TV	15-5 (D-2)	O	S	S	FS-S	Q		1OST-47.3H	
REFUEL WATER REFRIG UNIT (QS-MR-1A) CCR OUT ISOL											ST-S	Q			
											RPV	2YR			
TV-1CC-137B	3	B	Active	1.5	Globe	TV	15-5 (E-1)	S	S	S	FS-S	Q		1OST-47.3H	
REFUEL WATER REFRIG UNIT (QS-MR-1B) CCR OUT ISOL											ST-S	Q			
											RPV	2YR			

BV Unit 1

VALVE TABLE

SYSTEM NAME: Fuel Pool Cooling and Purification **SYSTEM NUMBER:** 20

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1PC-10 REFUEL CAV SUCT CNMT PEN ISOL	2	A	Passive	6	Ball		20-1 (D-7)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #104 per 1OST-47.165
1PC-37 REFUEL CAV SUP CNMT ISOL	2	A	Passive	6	Ball		20-1 (D-8)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #103 per 1OST-47.164
1PC-38 REFUEL CAV SUP CNMT ISOL	2	A	Passive	6	Ball		20-1 (D-7)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #103 per 1OST-47.164
1PC-9 REFUEL CAV SUCT CNMT PEN ISOL	2	A	Passive	6	Ball		20-1 (D-8)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #104 per 1OST-47.165

BV Unit 1

VALVE TABLE

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1MS-15	2	B	Active	3	Gate		21-1 (D-3)	LO	O/S		MAN	2YR		1OST-24.9	
1A S/G STEAM SUPPLY TO (1FW-P-2) ISOLATION															
1MS-16	2	B	Active	3	Gate		21-1 (F-3)	LO	O/S		MAN	2YR		1OST-24.9	
1B S/G STEAM SUPPLY TO (1FW-P-2) ISOLATION															
1MS-17	2	B	Active	3	Gate		21-1 (F-3)	LS	O/S		MAN	2YR		1OST-24.9	
1C S/G STEAM SUPPLY TO (1FW-P-2) ISOLATION															
1MS-18	2	C	Active	3	Check		21-1 (G-4)	S	O/S		CV-O	R	VROJ - 39	1OST-24.9	
1C S/G STEAM SUPPLY TO (1FW-P-2) CHK VLV											CV-DIS	CVCM	VROJ - 39	1/2CMP-75-ENER TECH CHECK-1M	Sample Disassembly and Inspection frequency with [1MS-19, 20] per CVCM Program Plan 1MS-CMP-1 as tied to TDAFWP Overspeed Trip Test (1OST-24.13).
											PMT	CVCM	VROJ - 39	1OST-24.9	Stroke open during CPT after Disassembly and Inspection.
1MS-19	2	C	Active	3	Check		21-1 (G-4)	S	O/S		CV-O	R	VROJ - 39	1OST-24.9	
1B S/G STEAM SUPPLY TO (1FW-P-2) CHK VLV											CV-DIS	CVCM	VROJ - 39	1/2CMP-75-ENER TECH CHECK-1M	Sample Disassembly and Inspection frequency with [1MS-18, 20] per CVCM Program Plan 1MS-CMP-1 as tied to TDAFWP Overspeed Trip Test (1OST-24.13).
											PMT	CVCM	VROJ - 39	1OST-24.9	Stroke open during CPT after Disassembly and Inspection.

BV Unit 1

VALVE TABLE

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1MS-20 1A S/G STEAM SUPPLY TO (1FW-P-2) CHK VLV	2	C	Active	3	Check		21-1 (G-4)	S	O/S		CV-O	R	VROJ - 39	1OST-24.9	
											CV-DIS	CVCM	VROJ - 39	1/2CMP-75-ENER TECH CHECK-1M	Sample Disassembly and Inspection frequency with [1MS-18, 19] per CVCM Program Plan 1MS-CMP-1 as tied to TDAFWP Overspeed Trip Test (1OST-24.13).
											PMT	CVCM	VROJ - 39	1OST-24.9	Stroke open during CPT after Disassembly and Inspection.
1MS-23 1A S/G ATMOS DUMP ISOLATION VLV	2	B	Active	4	Gate		21-1 (B-5)	O	O/S		MAN	2YR		1OST-1.10J	
1MS-24 1B S/G ATMOS DUMP ISOLATION VLV	2	B	Active	4	Gate		21-1 (C-5)	O	O/S		MAN	2YR		1OST-1.10J	
1MS-25 1C S/G ATMOS DUMP ISOLATION VLV	2	B	Active	4	Gate		21-1 (E-5)	O	O/S		MAN	2YR		1OST-1.10J	
1MS-26 RESIDUAL HEAT RELEASE ISOL VLV	2	B	Active	4	Gate		21-1 (C-7)	O	O/S		MAN	2YR		1OST-1.10J	
1MS-523 1A SG RESIDUAL HEAT RELEASE ISOL VLV	2	B	Active	3	Gate		21-1 (C-7)	O	O/S		MAN	2YR		1OST-1.10J	
1MS-524 1B SG RESIDUAL HEAT RELEASE ISOL VLV	2	B	Active	3	Gate		21-1 (D-7)	O	O/S		MAN	2YR		1OST-1.10J	
1MS-525 1C SG RESIDUAL HEAT RELEASE ISOL VLV	2	B	Active	3	Gate		21-1 (E-7)	O	O/S		MAN	2YR		1OST-1.10J	

BV Unit 1

VALVE TABLE

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1MS-80 1A S/G RESIDUAL HEAT RELEASE CHECK	2	C	Active	3	Check		21-1 (C-7)	S	O/S		CV-DIS	CVCM	VROJ - 40	1/2CMP-75-ENER TECH CHECK-1M	Sample Disassembly and Inspection frequency with [1MS-81, 82] per CVCM Program Plan 1MS-CMP-2.
											PMT	CVCM	VROJ - 40	1OM-50.4.L	Partial Stroke Open during S/U after disassembly and inspection
1MS-81 1B S/G RESIDUAL HEAT RELEASE CHECK	2	C	Active	3	Check		21-1 (C-7)	S	O/S		CV-DIS	CVCM	VROJ - 40	1/2CMP-75-ENER TECH CHECK-1M	Sample Disassembly and Inspection frequency with [1MS-80, 82] per CVCM Program Plan 1MS-CMP-2.
											PMT	CVCM	VROJ - 40	1OM-50.4.L	Partial Stroke Open during S/U after disassembly and inspection
1MS-82 1C S/G RESIDUAL HEAT RELEASE CHECK	2	C	Active	3	Check		21-1 (E-7)	S	O/S		CV-DIS	CVCM	VROJ - 40	1/2CMP-75-ENER TECH CHECK-1M	Sample Disassembly and Inspection frequency with [1MS-80, 81] per CVCM Program Plan 1MS-CMP-2.
											PMT	CVCM	VROJ - 40	1OM-50.4.L	Partial Stroke Open during S/U after disassembly and inspection

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
HCV-1MS-104	2	B	Active	4	Globe	HCV	21-1 (D-7)	S	O/S	S	FS-S	N/A		1OST-21.7	PMT (if on-line)
RESIDUAL HEAT RELEASE VALVE											RPV	N/A			PMT (if on-line)
											ST-O	N/A			PMT (if on-line)
											ST-S	N/A			PMT (if on-line)
											FS-S	CSD	VCSJ - 20	1OST-1.10J	
											ST-O	CSD	VCSJ - 20		
											ST-S	CSD	VCSJ - 20		
											RPV	2YR			
MOV-1MS-101A	2	B	Active	2	Globe	MOV	21-1 (C-8)	LS	S		ST-S	CSD	VCSJ - 16	1OST-1.10J	
(TV-1MS-101A) BYPASS											RPV	2YR			
MOV-1MS-101B	2	B	Active	2	Globe	MOV	21-1 (E-8)	LS	S		ST-S	CSD	VCSJ - 16	1OST-1.10J	
(TV-1MS-101B) BYPASS											RPV	2YR			
MOV-1MS-101C	2	B	Active	2	Globe	MOV	21-1 (G-8)	LS	S		ST-S	CSD	VCSJ - 16	1OST-1.10J	
(TV-1MS-101C) BYPASS											RPV	2YR			
MOV-1MS-105	3	B	Active	3	Gate	MOV	21-1 (G-4)	O	O/S		ST-O	R		1OST-24.9	
AFW TURB STEAM ISOL VLV											ST-S	R			
											ST-O	Q		1OST-24.4	
											ST-S	Q			
											RPV	2YR		1OST-24.9	
											RPV	2YR		1OST-24.4	
NRV-1MS-101A	2	B/C	Active	32	Check	NRV	21-1 (B-8)	O	S		CV-BDT-O	NSO		ISTC-3550	Via steam line pressure from "A" S/G per L5 Log
1A SG NRTRN VLV											CV-S	CSD	VCSJ - 17	1OST-1.10J	
											ST-S	CSD	VCSJ - 17		Stroking & timing NRV shut verifies closure (CV-S) of non-return check valve.
											RPV	2YR			

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
NRV-1MS-101B 1B SG NRTRN VLV	2	B/C	Active	32	Check	NRV	21-1 (D-8)	O	S		CV-BDT-O	NSO		ISTC-3550	Via steam line pressure from "B" S/G per L5 Log
											CV-S	CSD	VCSJ - 17	1OST-1.10J	
											ST-S	CSD	VCSJ - 17		Stroking & timing NRV shut verifies closure (CV-S) of non-return check valve.
											RPV	2YR			
NRV-1MS-101C 1C SG NRTRN VLV	2	B/C	Active	32	Check	NRV	21-1 (F-8)	O	S		CV-BDT-O	NSO		ISTC-3550	Via steam line pressure from "C" S/G per L5 Log
											CV-S	CSD	VCSJ - 17	1OST-1.10J	
											ST-S	CSD	VCSJ - 17		Stroking & timing NRV shut verifies closure (CV-S) of non-return check valve.
											RPV	2YR			
PCV-1MS-101A 1A S/G ATM DUMP VLV	2	B	Active	6	Globe	PCV	21-1 (A-5)	S	O/S	S	FS-S	CSD	VCSJ - 18	1OST-1.10J	
											ST-O	CSD	VCSJ - 18		
											ST-S	CSD	VCSJ - 18		
											RPV	2YR			
PCV-1MS-101B 1B S/G ATM DUMP VLV	2	B	Active	6	Globe	PCV	21-1 (C-5)	S	O/S	S	FS-S	CSD	VCSJ - 18	1OST-1.10J	
											ST-O	CSD	VCSJ - 18		
											ST-S	CSD	VCSJ - 18		
											RPV	2YR			
PCV-1MS-101C 1C S/G ATM DUMP VLV	2	B	Active	6	Globe	PCV	21-1 (E-5)	S	O/S	S	FS-S	CSD	VCSJ - 18	1OST-1.10J	
											ST-O	CSD	VCSJ - 18		
											ST-S	CSD	VCSJ - 18		
											RPV	2YR			
SV-1MS-101A 1A S/G SAFETY VALVE	2	C	Active	6 x 10	Safety	SV	21-1 (B-4)	S	O/S		SPT	5YR		1BVT 1.60.5	
											SPT	5YR		1BVT 1.21.2	
SV-1MS-101B 1B S/G SAFETY VALVE	2	C	Active	6 x 10	Safety	SV	21-1 (D-4)	S	O/S		SPT	5YR		1BVT 1.21.2	
											SPT	5YR		1BVT 1.60.5	

BV Unit 1

VALVE TABLE

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
SV-1MS-101C 1C S/G SAFETY VALVE	2	C	Active	6 x 10	Safety	SV	21-1 (E-4)	S	O/S		SPT SPT	5YR 5YR		1BVT 1.60.5 1BVT 1.21.2	
SV-1MS-102A 1A S/G SAFETY VALVE	2	C	Active	6 x 10	Safety	SV	21-1 (B-4)	S	O/S		SPT SPT	5YR 5YR		1BVT 1.60.5 1BVT 1.21.2	
SV-1MS-102B 1B S/G SAFETY VALVE	2	C	Active	6 x 10	Safety	SV	21-1 (D-4)	S	O/S		SPT SPT	5YR 5YR		1BVT 1.60.5 1BVT 1.21.2	
SV-1MS-102C 1C S/G SAFETY VALVE	2	C	Active	6 x 10	Safety	SV	21-1 (E-4)	S	O/S		SPT SPT	5YR 5YR		1BVT 1.60.5 1BVT 1.21.2	
SV-1MS-103A 1A S/G SAFETY VALVE	2	C	Active	6 x 10	Safety	SV	21-1 (B-4)	S	O/S		SPT SPT	5YR 5YR		1BVT 1.60.5 1BVT 1.21.2	
SV-1MS-103B 1B S/G SAFETY VALVE	2	C	Active	6 x 10	Safety	SV	21-1 (D-4)	S	O/S		SPT SPT	5YR 5YR		1BVT 1.60.5 1BVT 1.21.2	
SV-1MS-103C 1C S/G SAFETY VALVE	2	C	Active	6 x 10	Safety	SV	21-1 (E-4)	S	O/S		SPT SPT	5YR 5YR		1BVT 1.60.5 1BVT 1.21.2	
SV-1MS-104A 1A S/G SAFETY VALVE	2	C	Active	6 x 10	Safety	SV	21-1 (B-3)	S	O/S		SPT SPT	5YR 5YR		1BVT 1.60.5 1BVT 1.21.2	
SV-1MS-104B 1B S/G SAFETY VALVE	2	C	Active	6 x 10	Safety	SV	21-1 (D-3)	S	O/S		SPT SPT	5YR 5YR		1BVT 1.60.5 1BVT 1.21.2	
SV-1MS-104C 1C S/G SAFETY VALVE	2	C	Active	6 x 10	Safety	SV	21-1 (E-3)	S	O/S		SPT SPT	5YR 5YR		1BVT 1.60.5 1BVT 1.21.2	
SV-1MS-105A 1A S/G SAFETY VALVE	2	C	Active	6 x 10	Safety	SV	21-1 (B-3)	S	O/S		SPT SPT	5YR 5YR		1BVT 1.60.5 1BVT 1.21.2	
SV-1MS-105B 1B S/G SAFETY VALVE	2	C	Active	6 x 10	Safety	SV	21-1 (D-3)	S	O/S		SPT SPT	5YR 5YR		1BVT 1.60.5 1BVT 1.21.2	

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
SV-1MS-105C	2	C	Active	6 x 10	Safety	SV	21-1 (E-3)	S	O/S		SPT	5YR		1BVT 1.21.2	
1C S/G SAFETY VALVE											SPT	5YR		1BVT 1.60.5	
TV-1MS-101A	2	B/C	Active	32	Inverse Check	TV	21-1 (B-8)	O	S	S	CV-BDT-O	NSO		ISTC-3550	Via steam line pressure from "A" S/G per L5 Log
LOOP 1A MAIN STEAM TRIP VALVE											CV-S	CSD	VCSJ - 19	1OST-21.4	
											FS-S	CSD	VCSJ - 19		
											ST-S-A	CSD	VCSJ - 19		Stroking and timing trip valve shut verifies closure (CV-S) of inverse check valve.
											ST-S-B	CSD	VCSJ - 19		
											RPV	2YR			
TV-1MS-101B	2	B/C	Active	32	Inverse Check	TV	21-1 (D-8)	O	S	S	CV-BDT-O	NSO		ISTC-3550	Via steam line pressure from "B" S/G per L5 Log
LOOP 1B MAIN STEAM TRIP VALVE											CV-S	CSD	VCSJ - 19	1OST-21.5	
											FS-S	CSD	VCSJ - 19		
											ST-S-A	CSD	VCSJ - 19		Stroking and timing trip valve shut verifies closure (CV-S) of inverse check valve.
											ST-S-B	CSD	VCSJ - 19		
											RPV	2YR			
TV-1MS-101C	2	B/C	Active	32	Inverse Check	TV	21-1 (F-8)	O	S	S	CV-BDT-O	NSO		ISTC-3550	Via steam line pressure from "C" S/G per L5 Log
LOOP 1C MAIN STEAM TRIP VALVE											CV-S	CSD	VCSJ - 19	1OST-21.6	
											FS-S	CSD	VCSJ - 19		
											ST-S-A	CSD	VCSJ - 19		Stroking and timing trip valve shut verifies closure (CV-S) of inverse check valve.
											ST-S-B	CSD	VCSJ - 19		
											RPV	2YR			

BV Unit 1

VALVE TABLE

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1MS-105A	3	B	Active	3	Gate	TV	21-1 (G-4)	S	O	O	FS-O	R		1OST-24.9	
AFW TURB STEAM SUP A TRN TRIP VLV											ST-O	R			
											FS-O	Q		1OST-24.4	
											ST-O	Q			
											RPV	2YR		1OST-24.9	
											RPV	2YR		1OST-24.4	
											FS-O	18MO		1OST-24.15A	
TV-1MS-105B	3	B	Active	3	Gate	TV	21-1 (G-5)	S	O	O	FS-O	R		1OST-24.9	
AFW TURB STEAM SUP B TRN TRIP VLV											ST-O	R			
											FS-O	Q		1OST-24.4	
											ST-O	Q			
											RPV	2YR		1OST-24.9	
											RPV	2YR		1OST-24.4	
											FS-O	18MO		1OST-24.15B	
TV-1MS-111A	2	B	Active	1.5	Gate	TV	26-4 (E-1)	O	S	S	FS-S	Q		1OST-47.3L	
1A MAIN STEAM LINE PRE-NRTRN DRAIN ISOL VLV											ST-S	Q			
											RPV	2YR			
TV-1MS-111B	2	B	Active	1.5	Gate	TV	26-4 (C-1)	O	S	S	FS-S	Q		1OST-47.3L	
1B MAIN STEAM LINE PRE-NRTRN DRAIN ISOL VLV											ST-S	Q			
											RPV	2YR			
TV-1MS-111C	2	B	Active	1.5	Gate	TV	26-4 (A-1)	O	S	S	FS-S	Q		1OST-47.3L	
1C MAIN STEAM LINE PRE-NRTRN DRAIN ISOL VLV											ST-S	Q			
											RPV	2YR			

SYSTEM NAME: Feedwater & Auxiliary Feedwater **SYSTEM NUMBER:** 24

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1FW-156A 1A SG MAIN FW ISOL CHK VLV	2	C	Active	16	Check		24-1 (B-7)	O	S		CV-S-LT CV-S-LT CV-BDT-O	R R NSO	VROJ - 43 VROJ - 43	1OST-24.8A 1OST-24.8B ISTC-3550	While maintaining "A" S/G level with main feedwater flow per L5 Log
1FW-156B 1B SG MAIN FW ISOL CHK VLV	2	C	Active	16	Check		24-1 (D-7)	O	S		CV-S-LT CV-S-LT CV-BDT-O	R R NSO	VROJ - 43 VROJ - 43	1OST-24.8A 1OST-24.8B ISTC-3550	While maintaining "B" S/G level with main feedwater flow per L5 Log
1FW-156C 1C SG MAIN FW ISOL CHK VLV	2	C	Active	16	Check		24-1 (F-7)	O	S		CV-S-LT CV-S-LT CV-BDT-O	R R NSO	VROJ - 43 VROJ - 43	1OST-24.8A 1OST-24.8B ISTC-3550	While maintaining "C" S/G level with main feedwater flow per L5 Log
1FW-33 (1FW-P-2) DISCH CHECK	3	C	Active	6	Check		24-2 (E-7)	S	O/S		CV-O CV-S CV-S	R R R	VROJ - 39 VROJ - 41 VROJ - 41	1OST-24.9 1OST-24.8B 1OST-24.8A	
1FW-34 (1FW-P-3A) DISCH CHECK	3	C	Active	4	Check		24-2 (E-2)	S	O/S		CV-O CV-S	R R	VROJ - 41 VROJ - 41	1OST-24.8A 1OST-24.8B	
1FW-35 (1FW-P-3B) DISCH CHECK	3	C	Active	4	Check		24-2 (E-4)	S	O/S		CV-O CV-S	R R	VROJ - 41 VROJ - 41	1OST-24.8B 1OST-24.8A	
1FW-36 (1FW-P-2) "A" HEADER DISCH ISOLATION	3	B	Active	6	Gate		24-2 (D-7)	LO	O/S		MAN	2YR		1OST-24.4	
1FW-37 (1FW-P-3A) "A" HEADER DISCH ISOLATION	3	B	Active	4	Gate		24-2 (D-2)	LO	O/S		MAN	2YR		1OST-24.2	
1FW-38 (1FW-P-3B) "A" HEADER DISCH ISOLATION	3	B	Active	4	Gate		24-2 (D-4)	S	O/S		MAN	2YR		1OST-24.3	

SYSTEM NAME: Feedwater & Auxiliary Feedwater **SYSTEM NUMBER:** 24

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1FW-39 (1FW-P-2) "B" Header Discharge Isolation	3	B	Active	6	Gate		24-2 (D-7)	S	O/S		MAN	2YR		1OST-24.4	
1FW-40 (1FW-P-3A) "B" HEADER DISCH ISOLATION	3	B	Active	4	Gate		24-2 (D-2)	S	O/S		MAN	2YR		1OST-24.2	
1FW-41 (1FW-P-3B) "B" HEADER DISCH ISOLATION	3	B	Active	4	Gate		24-2 (D-5)	LO	O/S		MAN	2YR		1OST-24.3	
1FW-42 1A SG AUX FEED CHECK	2	A/C	Active	3	Check		24-1 (B-7)	S	O/S		CV-O	R	VROJ - 41	1OST-24.8A	
											CV-O	R	VROJ - 41	1OST-24.8B	
											CV-S-LT	R	VROJ - 41	1OST-24.11	
											CV-S	NSO/Q		1OM-54.3	Monitored shiftly by 1OM-54.3, Station Log PAB1 per ISTC-3550
											LM	NSO			Monitored shiftly by 1OM-54.3, Station Log PAB1 per ISTC-3610
1FW-43 1B SG AUX FEED CHECK	2	A/C	Active	3	Check		24-1 (E-7)	S	O/S		CV-O	R	VROJ - 41	1OST-24.8A	
											CV-O	R	VROJ - 41	1OST-24.8B	
											CV-S-LT	R	VROJ - 41	1OST-24.11	
											CV-S	NSO/Q		1OM-54.3	Monitored shiftly by 1OM-54.3, Station Log PAB1 per ISTC-3550
											LM	NSO			Monitored shiftly by 1OM-54.3, Station Log PAB1 per ISTC-3610

SYSTEM NAME: Feedwater & Auxiliary Feedwater **SYSTEM NUMBER:** 24

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1FW-44	2	A/C	Active	3	Check		24-1 (G-7)	S	O/S		CV-O	R	VROJ - 41	1OST-24.8B	
1C SG AUX FEED CHECK											CV-O	R	VROJ - 41	1OST-24.8A	
											CV-S-LT	R	VROJ - 41	1OST-24.11	
											CV-S	NSO/Q		1OM-54.3	Monitored shiftly by 1OM-54.3, Station Log PAB1 per ISTC-3550
											LM	NSO			Monitored shiftly by 1OM-54.3, Station Log PAB1 per ISTC-3610
1FW-50	3	C	Active	1	Check		24-2 (E-7)	S	O		CV-DIS	CVCM	VROJ - 42	1CMP-75-CRANE CHECK-4M	Sample Disassembly and Inspection frequency with [1FW-51, 52, 68, 69, 70] per CVCM Program Plan 1FW-CMP-1.
(1FW-P-2) COOLER CHECK											PMT	CVCM	VROJ - 42	1OST-24.9	Partial Stroke Open during CPT after Disassembly and Inspection
											PMT	CVCM	VROJ - 42	1OST-24.4	Partial Stroke Open after Disassembly and Inspection
1FW-51	3	C	Active	1	Check		24-2 (E-2)	S	O		CV-DIS	CVCM	VROJ - 42	1CMP-75-CRANE CHECK-4M	Sample Disassembly and Inspection frequency with [1FW-50, 52, 68, 69, 70] per CVCM Program Plan 1FW-CMP-1.
(1FW-P-3A) COOLER CHECK											PMT	CVCM	VROJ - 42	1OST-24.2	Partial Stroke Open after Disassembly and Inspection
											PMT	CVCM	VROJ - 42	1OST-24.8A	Partial Stroke Open during CPT after Disassembly and Inspection

BV Unit 1

VALVE TABLE

SYSTEM NAME: Feedwater & Auxiliary Feedwater **SYSTEM NUMBER:** 24

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1FW-52 (1FW-P-3B) COOLER CHECK	3	C	Active	1	Check		24-2 (E-5)	S	O		CV-DIS	CVCM	VROJ - 42	1CMP-75-CRANE CHECK-4M	Sample Disassembly and Inspection frequency with [1FW-50, 51, 68, 69, 70] per CVCM Program Plan 1FW-CMP-1.
											PMT	CVCM	VROJ - 42	1OST-24.8B	Partial Stroke Open during CPT after Disassembly and Inspection
											PMT	CVCM	VROJ - 42	1OST-24.3	Partial Stroke Open after Disassembly and Inspection
1FW-622 1C SG AUX FEED CHECK FROM "A" HEADER	2	C	Active	3	Check		24-2 (C-4)	S	O/S		CV-O	R	VROJ - 41	1OST-24.8A	
											CV-S	R	VROJ - 41	1OST-24.8B	
1FW-623 1C SG AUX FEED CHECK FROM "B" HEADER	2	C	Active	3	Check		24-2 (C-4)	S	O/S		CV-O	R	VROJ - 41	1OST-24.8B	
											CV-S	R	VROJ - 41	1OST-24.8A	
1FW-624 1B SG AUX FEED CHECK FROM "A" HEADER	2	C	Active	3	Check		24-2 (B-4)	S	O/S		CV-O	R	VROJ - 41	1OST-24.8A	
											CV-S	R	VROJ - 41	1OST-24.8B	
1FW-625 1B SG AUX FEED CHECK FROM "B" HEADER	2	C	Active	3	Check		24-2 (B-4)	S	O/S		CV-O	R	VROJ - 41	1OST-24.8B	
											CV-S	R	VROJ - 41	1OST-24.8A	
1FW-626 1A SG AUX FEED CHECK FROM "A" HEADER	2	C	Active	3	Check		24-2 (A-4)	S	O/S		CV-O	R	VROJ - 41	1OST-24.8A	
											CV-S	R	VROJ - 41	1OST-24.8B	
1FW-627 1A SG AUX FEED CHECK FROM "B" HEADER	2	C	Active	3	Check		24-2 (A-4)	S	O/S		CV-O	R	VROJ - 41	1OST-24.8B	
											CV-S	R	VROJ - 41	1OST-24.8A	

SYSTEM NAME: Feedwater & Auxiliary Feedwater **SYSTEM NUMBER:** 24

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1FW-68 (1FW-P-2) COOLER INLET CHECK	3	C	Active	1	Check		24-2 (E-8)	S	O		CV-DIS	CVCM	VROJ - 42	1CMP-75-CRANE CHECK-4M	Sample Disassembly and Inspection frequency with [1FW-50, 51, 52, 69, 70] per CVCM Program Plan 1FW-CMP-1.
											PMT	CVCM	VROJ - 42	1OST-24.4	Partial Stroke Open after Disassembly and Inspection
											PMT	CVCM	VROJ - 42	1OST-24.9	Partial Stroke Open during CPT after Disassembly and Inspection
1FW-69 (1FW-P-3A) COOLER INLET CHECK	3	C	Active	1	Check		24-2 (E-2)	S	O		CV-DIS	CVCM	VROJ - 42	1CMP-75-CRANE CHECK-4M	Sample Disassembly and Inspection frequency with [1FW-50, 51, 52, 68, 70] per CVCM Program Plan 1FW-CMP-1.
											PMT	CVCM	VROJ - 42	1OST-24.8A	Partial Stroke Open during CPT after Disassembly and Inspection
											PMT	CVCM	VROJ - 42	1OST-24.2	Partial Stroke Open after Disassembly and Inspection

BV Unit 1

VALVE TABLE

SYSTEM NAME: Feedwater & Auxiliary Feedwater **SYSTEM NUMBER:** 24

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1FW-70 (1FW-P-3B) COOLER INLET CHECK	3	C	Active	1	Check		24-2 (E-5)	S	O		CV-DIS	CVCM	VROJ - 42	1CMP-75-CRANE CHECK-4M	Sample Disassembly and Inspection frequency with [1FW-50, 51, 52, 68, 69] per CVCM Program Plan 1FW-CMP-1.
											PMT	CVCM	VROJ - 42	1OST-24.3	Partial Stroke Open after Disassembly and Inspection
											PMT	CVCM	VROJ - 42	1OST-24.8B	Partial Stroke Open during CPT after Disassembly and Inspection
FCV-1FW-102 TURB DRIVEN AFW PUMP RECIRC VLV	3	B	Passive	3	Globe	FCV	24-2 (E-7)	S	S	S	RPV	2YR		1OST-24.4	
FCV-1FW-103A 3A AFW PUMP RECIRC VLV	3	B	Passive	2	Globe	FCV	24-2 (F-1)	S	S	S	RPV	2YR		1OST-24.2	
FCV-1FW-103B 3B AFW PUMP RECIRC VLV	3	B	Passive	2	Globe	FCV	24-2 (F-4)	S	S	S	RPV	2YR		1OST-24.3	
FCV-1FW-478 1A SG MAIN FW FEED REG VLV	2	B	Active	16	Globe	FCV	24-1 (B-4)	O	S	S	FS-S	CSD	VCSJ - 22	1OST-1.10K	
											ST-S-A	CSD	VCSJ - 22		
											ST-S-B	CSD	VCSJ - 22		
											RPV	2YR			
FCV-1FW-479 1A SG FW BYPASS FCV	2	B	Active	4	Globe	FCV	24-1 (A-4)	S	S	S	FS-S	Q		1OST-47.3P	
											FS-S	Q		1OST-47.3N	
											ST-S-A	Q		1OST-47.3P	
											ST-S-B	Q		1OST-47.3N	
											RPV	2YR			
											RPV	2YR		1OST-47.3P	
FCV-1FW-488 1B SG MAIN FW FEED REG VLV	2	B	Active	16	Globe	FCV	24-1 (D-4)	O	S	S	FS-S	CSD	VCSJ - 22	1OST-1.10K	
											ST-S-A	CSD	VCSJ - 22		
											ST-S-B	CSD	VCSJ - 22		
											RPV	2YR			

SYSTEM NAME: Feedwater & Auxiliary Feedwater **SYSTEM NUMBER:** 24

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
FCV-1FW-489	2	B	Active	4	Globe	FCV	24-1 (D-4)	S	S	S	FS-S	Q		1OST-47.3P	
1B SG FW BYPASS FCV											FS-S	Q		1OST-47.3N	
											ST-S-A	Q		1OST-47.3P	
											ST-S-B	Q		1OST-47.3N	
											RPV	2YR		1OST-47.3P	
											RPV	2YR		1OST-47.3N	
FCV-1FW-498	2	B	Active	16	Globe	FCV	24-1 (F-4)	O	S	S	FS-S	CSD	VCSJ - 22	1OST-1.10K	
1C SG MAIN FW FEED REG VLV											ST-S-A	CSD	VCSJ - 22		
											ST-S-B	CSD	VCSJ - 22		
											RPV	2YR			
FCV-1FW-499	2	B	Active	4	Globe	FCV	24-1 (F-4)	S	S	S	FS-S	Q		1OST-47.3P	
1C SG FW BYPASS FCV											FS-S	Q		1OST-47.3N	
											ST-S-A	Q		1OST-47.3P	
											ST-S-B	Q		1OST-47.3N	
											RPV	2YR		1OST-47.3P	
											RPV	2YR		1OST-47.3N	
HYV-1FW-100A	2	B	Active	16	Gate	HYV	24-1 (B-7)	O	S		ST-S	CSD	VCSJ - 21	1OST-1.10K	
1A STEAM GENERATOR MAIN FEEDWATER CNMT ISOL VALVE											RPV	2YR			
HYV-1FW-100B	2	B	Active	16	Gate	HYV	24-1 (D-7)	O	S		ST-S	CSD	VCSJ - 21	1OST-1.10K	
1B STEAM GENERATOR MAIN FEEDWATER CNMT ISOL VALVE											RPV	2YR			
HYV-1FW-100C	2	B	Active	16	Gate	HYV	24-1 (F-7)	O	S		ST-S	CSD	VCSJ - 21	1OST-1.10K	
1C STEAM GENERATOR MAIN FEEDWATER CNMT ISOL VALVE											RPV	2YR			
MOV-1FW-151A	2	B	Active	3	Globe	MOV	24-2 (C-3)	O	O/S		DIAG-ST-O	6RFO		1OST-24.1	Per OMN-1
1C SG AFW THROTTLE VLV (B HDR)											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
MOV-1FW-151B	2	B	Active	3	Globe	MOV	24-2 (C-3)	O	O/S		DIAG-ST-O	6RFO		1OST-24.1	Per OMN-1
1C SG AFW THROTTLE VLV (A HDR)											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1

BV Unit 1

VALVE TABLE

SYSTEM NAME: Feedwater & Auxiliary Feedwater **SYSTEM NUMBER:** 24

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
MOV-1FW-151C	2	B	Active	3	Globe	MOV	24-2 (B-3)	O	O/S		DIAG-ST-O	6RFO		1OST-24.1	Per OMN-1
1B SG AFW THROTTLE VLV (B HDR)											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
MOV-1FW-151D	2	B	Active	3	Globe	MOV	24-2 (B-3)	O	O/S		DIAG-ST-O	6RFO		1OST-24.1	Per OMN-1
1B SG AFW THROTTLE VLV (A HDR)											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
MOV-1FW-151E	2	B	Active	3	Globe	MOV	24-2 (A-3)	O	O/S		DIAG-ST-O	6RFO		1OST-24.1	Per OMN-1
1A SG AFW THROTTLE VLV (B HDR)											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
MOV-1FW-151F	2	B	Active	3	Globe	MOV	24-2 (A-3)	O	O/S		DIAG-ST-O	6RFO		1OST-24.1	Per OMN-1
1A SG AFW THROTTLE VLV (A HDR)											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
RV-1FW-155	2	C	Active	3 x 4	Relief	RV	24-2 (F-7)	S	O/S		SPT	10YR		1BVT 1.60.5	
(1FW-P-2) RELIEF															

BV Unit 1

VALVE TABLE

SYSTEM NAME: Steam Generator Blowdown **SYSTEM NUMBER:** 25

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
TV-1BD-100A	2	B	Active	3	Globe	TV	25-1 (B-4)	O	S	S	FS-S	CSD	VCSJ - 23	1OST-1.10N	
STM GEN 1A BLOWDOWN TRIP											ST-S	CSD	VCSJ - 23		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1BD-100B	2	B	Active	3	Globe	TV	25-1 (D-4)	O	S	S	FS-S	CSD	VCSJ - 23	1OST-1.10N	
STM GEN 1B BLOWDOWN TRIP											ST-S	CSD	VCSJ - 23		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1BD-100C	2	B	Active	3	Globe	TV	25-1 (F-4)	O	S	S	FS-S	CSD	VCSJ - 23	1OST-1.10N	
STM GEN 1C BLOWDOWN TRIP											ST-S	CSD	VCSJ - 23		
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1BD-101A1	2	B	Active	3	Gate	TV	25-1 (B-2)	O	S	S	FS-S	CSD	VCSJ - 23	1OST-1.10N	
BLOWDOWN TEMPERATURE ISOLATION, A S/G											ST-S	CSD	VCSJ - 23		
											RPV	2YR			
TV-1BD-101A2	2	B	Active	3	Gate	TV	25-1 (B-2)	O	S	S	FS-S	CSD	VCSJ - 23	1OST-1.10N	
BLOWDOWN TEMPERATURE ISOLATION, A S/G											ST-S	CSD	VCSJ - 23		
											RPV	2YR			
TV-1BD-101B1	2	B	Active	3	Gate	TV	25-1 (D-2)	O	S	S	FS-S	CSD	VCSJ - 23	1OST-1.10N	
BLOWDOWN TEMPERATURE ISOLATION, B S/G											ST-S	CSD	VCSJ - 23		
											RPV	2YR			
TV-1BD-101B2	2	B	Active	3	Gate	TV	25-1 (D-2)	O	S	S	FS-S	CSD	VCSJ - 23	1OST-1.10N	
BLOWDOWN TEMPERATURE ISOLATION, B S/G											ST-S	CSD	VCSJ - 23		
											RPV	2YR			
TV-1BD-101C1	2	B	Active	3	Gate	TV	25-1 (F-2)	O	S	S	FS-S	CSD	VCSJ - 23	1OST-1.10N	
BLOWDOWN TEMPERATURE ISOLATION, C S/G											ST-S	CSD	VCSJ - 23		
											RPV	2YR			
TV-1BD-101C2	2	B	Active	3	Gate	TV	25-1 (F-2)	O	S	S	FS-S	CSD	VCSJ - 23	1OST-1.10N	
BLOWDOWN TEMPERATURE ISOLATION, C S/G											ST-S	CSD	VCSJ - 23		
											RPV	2YR			

BV Unit 1

VALVE TABLE

SYSTEM NAME: Main Turbine and Condenser **SYSTEM NUMBER:** 26

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1AS-278	2	A/C	Active	6	Check		26-6 (D-10)	S	O/S		LJ-C	SP		1BVT 1.47.5	Penet. #89 per 1OST-47.152
AIR EJECTOR AIR DISCH TO CNMT											CV-ME	R	VROJ - 44	1OST-1.10R	
TV-1SV-100A	2	A	Active	6	Globe	TV	26-6 (D-9)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #89 per 1OST-47.152
AIR EJECTOR AIR DISCH TO CONT											FS-S	CSD	VCSJ - 24	1OST-1.10L	
											ST-O	CSD	VCSJ - 24		
											ST-S	CSD	VCSJ - 24		
											RPV	2YR/18MO			18 months per Tech. Specs.

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Plant River Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1RW-106	3	C	Active	24	Check		30-1 (A-9)	O	O/S		CV-O	Q		1OST-30.2	
RW SUPPLY A HDR CHECK											CV-O	Q		1OST-30.6A	
											CV-DIS	CVCM	VROJ - 45	1/2CMP-75-WAFER CHECK-1M	Sample Disassembly and Inspection frequency with [1RW-107] per CVCM Program Plan 1RW-CMP-1.
											PMT	CVCM	VROJ - 45	1OM-30.4.AC	Partial stroke open during return of River Water header to service OR during 1OST-30.2(6A) after Disassembly and Inspection.
1RW-107	3	C	Active	24	Check		30-1 (D-9)	O	O/S		CV-O	Q		1OST-30.6B	
RW SUPPLY B HDR CHECK											CV-O	Q		1OST-30.3	
											CV-DIS	CVCM	VROJ - 45	1/2CMP-75-WAFER CHECK-1M	Sample Disassembly and Inspection frequency with [1RW-106] per CVCM Program Plan 1RW-CMP-1.
											PMT	CVCM	VROJ - 45	1OM-30.4.AC	Partial stroke open during return of River Water header to service OR during 1OST-30.3(6B) after Disassembly and Inspection.
1RW-133	3	C	Active	3	Check		30-2 (C-4)	O/S	S		CV-BDT-O	Q		1OST-30.14B	
CONT ROOM AC COND BOOSTER PMP (1VS-P-3A) INLET CHECK											CV-S	Q		1OST-30.14A	
1RW-134	3	C	Active	3	Check		30-2 (D-4)	O/S	S		CV-BDT-O	Q		1OST-30.14A	
CONT ROOM AC COND BOOSTER PMP (1VS-P-3B) INLET CHECK											CV-S	Q		1OST-30.14B	

SYSTEM NAME: Reactor Plant River Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1RW-142 CONT ROOM CLG COIL (1VS-E-14A) INLET ISOL	3	B	Active	3	Ball		30-2 (C-4)	S	O		MAN	2YR		1OST-30.14A	
1RW-143 CONT ROOM CLG COIL (1VS-E-14B) INLET ISOL	3	B	Active	3	Ball		30-2 (D-4)	S	O		MAN	2YR		1OST-30.14B	
1RW-150 CONT ROOM CLG COIL (1VS-E-14A) OUTLET ISOL	3	B	Active	3	Ball		30-2 (C-5)	S	O		MAN	2YR		1OST-30.14A	
1RW-151 CONT ROOM CLG COIL (1VS-E-14B) OUTLET ISOL	3	B	Active	3	Ball		30-2 (D-5)	S	O		MAN	2YR		1OST-30.14B	
1RW-152 CONT ROOM AC COND (1VS-E-4A) OUTLET HDR ISOL	3	B	Active	3	Ball		30-2 (C-3)	O	S		MAN	2YR		1OST-30.14A	
1RW-153 CONT ROOM AC COND (1VS-E-4B) OUTLET HDR ISOL	3	B	Active	3	Ball		30-2 (D-3)	O	S		MAN	2YR		1OST-30.14B	
1RW-158 CHARGING PUMP COOLER B SUPPLY HEADER CHECK	3	C	Active	3	Check		30-2 (E-5)	O/S	O/S		CV-O CV-S CV-O	Q Q 18MO		1OST-30.14A 1OST-30.14B 1OST-30.12B	
1RW-159 CHARGING PUMP COOLER A SUPPLY HEADER CHECK	3	C	Active	3	Check		30-2 (C-5)	O/S	O/S		CV-O CV-S CV-O	Q Q 18MO		1OST-30.14B 1OST-30.14A 1OST-30.12A	
1RW-206 STEAM GEN AUX FW PP EMER SUPPLY HDR ISOL	3	B	Active	6	Butterfly		24-2 (F-10)	LS	O		MAN	2YR		1OST-24.10	
1RW-207 STEAM GEN AUX FW PP EMER SUPPLY HDR ISOL	3	B	Active	6	Butterfly		24-2 (G-9)	S	O		MAN	2YR		1OST-24.10	Position Verification 31 Days per Tech. Specs.
1RW-208 STEAM GEN AUX FW PP (1FW-P-2) EMER SUP HDR ISOL	3	B	Active	6	Butterfly		24-2 (F-8)	S	O		MAN	2YR		1OST-24.10	Position Verification 31 Days per Tech. Specs.
1RW-209 STEAM GEN AUX FW PP (1FW-P-3A) EMER SUP HDR ISOL	3	B	Active	4	Butterfly		24-2 (G-2)	S	O		MAN	2YR		1OST-24.10	Position Verification 31 Days per Tech. Specs.

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Plant River Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1RW-210 STEAM GEN AUX FW PP (1FW-P-3B) EMER SUP HDR ISOL	3	B	Active	4	Butterfly		24-2 (F-5)	S	O		MAN	2YR		1OST-24.10	Position Verification 31 Days per Tech. Specs.
1RW-306 STEAM GEN AUX FW EMER SUPPLY HDR TELLTALE DRN	3	B	Active	0.75	Globe		24-2 (F-10)	O	S		MAN	2YR		1OST-24.10	Position Verification 31 Days per Tech. Specs.
1RW-486 RP RW PP 1A VACUUM BKR	3	C	Active	3	Check		30-1 (A-2)	S	O/S		CV-O-VAC	Q		1OST-30.2	
											CV-S-LT	Q			
1RW-487 RP RW PP 1B VACUUM BKR	3	C	Active	3	Check		30-1 (C-2)	S	O/S		CV-O-VAC	Q		1OST-30.3	
											CV-S-LT	Q			
1RW-488 RP RW PP 1C VACUUM BKR	3	C	Active	3	Check		30-1 (D-2)	S	O/S		CV-O-VAC	Q		1OST-30.6A	
											CV-O-VAC	Q		1OST-30.6B	
											CV-S-LT	Q			
											CV-S-LT	Q		1OST-30.6A	
1RW-57 RP RW PP (1WR-P-1A) DISCH CHECK	3	C	Active	20	Check		30-1 (A-3)	O	O/S		CV-S-PR	Q or CSD	VCSJ - 25	1OST-30.6A	
											CV-O	Q		1OST-30.2	
1RW-58 RP RW PP (1WR-P-1B) DISCH CHECK	3	C	Active	20	Check		30-1 (C-3)	O	O/S		CV-S-PR	Q or CSD	VCSJ - 25	1OST-30.6B	
											CV-O	Q		1OST-30.3	
1RW-59 RP RW PP (1WR-P-1C) DISCH CHECK	3	C	Active	20	Check		30-1 (D-3)	O	O/S		CV-S-PR	Q or CSD	VCSJ - 25	1OST-30.6A	
											CV-S-PR	Q or CSD	VCSJ - 25	1OST-30.6B	
											CV-O	Q			
											CV-O	Q		1OST-30.6A	
1RW-615 RAD MONITOR (RM-1RW-100A) INLET ISOL	2	B	Active	1	Ball		43-2 (D-2)	O	O/S		MAN	2YR		1OST-47.3N	
1RW-621 RAD MONITOR (RM-1RW-100B) INLET ISOL	2	B	Active	1	Ball		43-2 (D-7)	O	O/S		MAN	2YR		1OST-47.3N	
1RW-627 RAD MONITOR (RM-1RW-100C) INLET ISOL	2	B	Active	1	Ball		43-2 (F-2)	O	O/S		MAN	2YR		1OST-47.3N	

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Plant River Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1RW-633 RAD MONITOR (RM-1RW-100D) INLET ISOL	2	B	Active	1	Ball		43-2 (F-7)	O	O/S		MAN	2YR		1OST-47.3N	
1RW-901 STRAINER [1RW-YS-47] BLOWDOWN ISOLATION VALVE	3	B	Active	0.75	Ball		24-2 (G-9)	S	O		MAN	2YR		1OST-24.10	
1WT-383 [CV-562] OUTLET CHECK	3	C	Active	3	Check		30-2 (B-2)	S	S		CV-DIS	CVCM	VROJ - 46	1/2CMP-75-WEST CHECK-1M	Sample Disassembly and Inspection frequency with [1WT-388] per CVCM Program Plan 1WT-CMP-1.
1WT-388 [CV-563] OUTLET CHECK	3	C	Active	3	Check		30-2 (G-2)	S	S		CV-DIS	CVCM	VROJ - 46	1/2CMP-75-WEST CHECK-1M	Sample Disassembly and Inspection with [1WT-383] per CVCM Program Plan 1WT-CMP-1.
MOV-1RW-102A1 1A RP RW PUMP DISCH VLV TO B-HDR	3	B	Passive	20	Butterfly	MOV	30-1 (B-4)	S	S		RPV	2YR		1OST-1.10M	
MOV-1RW-102A2 1A RP RW PUMP DISCH VLV TO A-HDR	3	B	Active	20	Butterfly	MOV	30-1 (A-4)	O	O		ET DIAG-ST-O RPV	Q 6YR 6YR		1OST-30.2	Per OMN-1 Per OMN-1 Per OMN-1
MOV-1RW-102B1 1B RP RW PUMP DISCH VLV TO B-HDR	3	B	Active	20	Butterfly	MOV	30-1 (C-4)	S	O		ET DIAG-ST-O RPV	Q 6YR 6YR		1OST-30.3	Per OMN-1 Per OMN-1 Per OMN-1
MOV-1RW-102B2 1B RP RW PUMP DISCH VLV TO A-HDR	3	B	Passive	20	Butterfly	MOV	30-1 (C-4)	S	S		RPV	2YR		1OST-1.10M	
MOV-1RW-102C1 1C RP RW PUMP DISCH VLV TO B-HDR	3	B	Active	20	Butterfly	MOV	30-1 (D-4)	S	O		ET DIAG-ST-O RPV	Q or CSD 10YR 10YR	VCSJ - 26	1OST-30.6B	Per OMN-1 Per OMN-1 Per OMN-1
MOV-1RW-102C2 1C RP RW PUMP DISCH VLV TO A-HDR	3	B	Active	20	Butterfly	MOV	30-1 (D-4)	S	O		ET DIAG-ST-O RPV	Q or CSD 3YR 3YR	VCSJ - 26	1OST-30.6A	Per OMN-1 Per OMN-1 Per OMN-1

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Plant River Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
MOV-1RW-103A	3	B	Active	24	Butterfly	MOV	30-3 (B-2)	S	O/S		ET	Q		1OST-30.4	Per OMN-1
1A HDR RP RW TO RECIRC SPRAY HXS ISOL VLV											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
MOV-1RW-103B	3	B	Active	24	Butterfly	MOV	30-3 (B-2)	S	O/S		ET	Q		1OST-30.4	Per OMN-1
1A HDR PP RW TO RECIRC SPRAY HXS ISOL VLV											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
MOV-1RW-103C	3	B	Active	24	Butterfly	MOV	30-3 (G-2)	S	O/S		ET	Q		1OST-30.5	Per OMN-1
1B HDR RP RW TO RECIRC SPRAY HXS ISOL VLV											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
MOV-1RW-103D	3	B	Active	24	Butterfly	MOV	30-3 (G-2)	S	O/S		ET	Q		1OST-30.5	Per OMN-1
1B HDR PP RW TO RECIRC SPRAY HXS ISOL VLV											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
MOV-1RW-104	3	B	Passive	24	Butterfly	MOV	30-3 (E-6)	S	S		RPV	2YR		1OST-1.10M	
1A HDR TO 1B HDR RP RW CROSS CONN VALVE															
MOV-1RW-104A	2	B	Active	14	Butterfly	MOV	30-3 (C-6)	O	O/S		DIAG-ST-O	6RFO		1OST-30.4	Per OMN-1 (passive direction)
1A RECIRC SPRAY HX INLET ISOL VLV											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
MOV-1RW-104B	2	B	Active	14	Butterfly	MOV	30-3 (F-6)	O	O/S		DIAG-ST-O	6RFO		1OST-30.5	Per OMN-1 (passive direction)
1B RECIRC SPRAY HX INLET ISOL VLV											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
MOV-1RW-104C	2	B	Active	14	Butterfly	MOV	30-3 (D-6)	O	O/S		DIAG-ST-O	6RFO		1OST-30.4	Per OMN-1 (passive direction)
1C RECIRC SPRAY HX INLET ISOL VLV											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Plant River Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
MOV-1RW-104D	2	B	Active	14	Butterfly	MOV	30-3 (G-6)	O	O/S		DIAG-ST-O	6RFO		1OST-30.5	Per OMN-1 (passive direction)
1D RECIRC SPARY HX RW INLET ISOL VLV											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
MOV-1RW-105A	2	B	Active	14	Butterfly	MOV	30-3 (C-9)	O	O/S		DIAG-ST-O	6RFO		1OST-30.4	Per OMN-1 (passive direction)
1A RECIRC SPRAY HX OUTLET ISOL VLV											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
MOV-1RW-105B	2	B	Active	14	Butterfly	MOV	30-3 (E-9)	O	O/S		DIAG-ST-O	6RFO		1OST-30.5	Per OMN-1 (passive direction)
1B RECIRC SPRAY HX OUTLET ISOL VLV											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
MOV-1RW-105C	2	B	Active	14	Butterfly	MOV	30-3 (D-9)	O	O/S		DIAG-ST-O	6RFO		1OST-30.4	Per OMN-1 (passive direction)
1C RECIRC SPRAY HX RW OUTLET ISOL VLV											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
MOV-1RW-105D	2	B	Active	14	Butterfly	MOV	30-3 (F-9)	O	O/S		DIAG-ST-O	6RFO		1OST-30.5	Per OMN-1 (passive direction)
1D RECIRC SPRAY HX OUTLET ISOL VLV											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
MOV-1RW-106A	3	B	Active	24	Butterfly	MOV	30-3 (C-1)	O	O/S		ET	Q		1OST-30.4	Per OMN-1
CCR HX RW SERIES ISOL VLV											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
MOV-1RW-106B	3	B	Active	24	Butterfly	MOV	30-3 (F-1)	O	O/S		ET	Q		1OST-30.5	Per OMN-1
CCR HX RW SERIES ISOL VLV											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1

SYSTEM NAME: Reactor Plant River Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
MOV-1RW-113A	3	B	Active	4	Gate	MOV	30-1 (F-10)	S	O		ET	Q		1OST-30.4	Per OMN-1
DIESEL GEN HX (1EE-E-1A) INLET 1A SUPPLY HDR ISOL											DIAG-ST-O	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1RW-113B	3	B	Active	4	Gate	MOV	30-1 (F-10)	S	O		ET	Q		1OST-30.4	Per OMN-1
DIESEL GEN HX (1EE-E-1A) INLET 1A SUPPLY HDR ISOL											DIAG-ST-O	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1RW-113C	3	B	Active	4	Gate	MOV	30-1 (G-10)	S	O		ET	Q		1OST-30.5	Per OMN-1
DIESEL GEN HX (1EE-E-1B) INLET 1B SUPPLY HDR ISOL											DIAG-ST-O	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1RW-113D1	3	B	Active	4	Gate	MOV	30-1 (G-9)	S	O		ET	Q		1OST-30.5	Per OMN-1
DIESEL GEN HX (1EE-E-1B) INLET 1B SUPPLY HDR ISOL											DIAG-ST-O	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1RW-114A	3	B	Active	24	Butterfly	MOV	30-3 (B-1)	O	O/S		ET	Q		1OST-30.4	Per OMN-1
CCR HX RW SERIES ISOL VLV											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
MOV-1RW-114B	3	B	Active	24	Butterfly	MOV	30-3 (F-1)	O	O/S		ET	Q		1OST-30.5	Per OMN-1
CCR HX RW SERIES ISOL VLV											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
MOV-1RW-116	3	B	Passive	8	Butterfly	MOV	30-3 (D-1)	S	S		RPV	2YR		1OST-1.10M	
1A HDR RP RW SUP TO CNMT AIR RECIRC CLRS/CMPR															
MOV-1RW-116A	3	B	Active	24	Butterfly	MOV	30-1 (B-10)	S	O/S		ET	Q		1OST-30.1A	Per OMN-1
ARW PUMP SUP TO A HDR RP RW											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1RW-116B	3	B	Active	24	Butterfly	MOV	30-1 (D-10)	S	O/S		ET	Q		1OST-30.1B	Per OMN-1
ARW PUMP SUP TO B HDR RP RW											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
MOV-1RW-117	3	B	Passive	8	Butterfly	MOV	30-3 (F-1)	S	S		RPV	2YR		1OST-1.10M	
1B HDR RP RW SUP TO CNMT AIR RECIRC CLRS/CMPR															

BV Unit 1

VALVE TABLE

SYSTEM NAME: Reactor Plant River Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
RV-1RW-101A RECIRC SPRAY HX (1RS-E-1A) OUTLET RELIEF	2	C	Active	3/4 x 1	Relief	RV	30-3 (C-8)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1RW-101B RECIRC SPRAY HX (1RS-E-1B) OUTLET RELIEF	2	C	Active	3/4 x 1	Relief	RV	30-3 (E-8)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1RW-101C RECIRC SPRAY HX (1RS-E-1C) OUTLET RELIEF	2	C	Active	3/4 x 1	Relief	RV	30-3 (D-8)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1RW-101D RECIRC SPRAY HX (1RS-E-1D) OUTLET RELIEF	2	C	Active	3/4 x 1	Relief	RV	30-3 (F-8)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1RW-102A RP CCCW HX (1CC-E-1A) RELIEF	3	C	Active	3/4 x 1	Relief	RV	30-3 (C-2)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1RW-102B RP CCW HX (1CC-E-1B) RELIEF	3	C	Active	3/4 x 1	Relief	RV	30-3 (D-2)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1RW-102C RP CCW HX (1CC-E-1C) RELIEF	3	C	Active	3/4 x 1	Relief	RV	30-3 (E-2)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1RW-106A DIESEL GEN HX (1EE-E-1A) RELIEF	3	C	Active	3/4 x 1	Relief	RV	30-1 (E-8)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1RW-106B DIESEL GEN HX (1EE-E-1B) RELIEF	3	C	Active	3/4 x 1	Relief	RV	30-1 (E-7)	S	O/S		SPT	10YR		1BVT 1.60.5	

BV Unit 1

VALVE TABLE

SYSTEM NAME: Fire Protection **SYSTEM NUMBER:** 33

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1FP-800 WEIGHT LOADED CHECK VALVE	2	A/C	Active	3	Check		33-2 (D-4)	S	S		LJ-C	SP		1BVT 1.47.5	Penet. #32 per 1OST-47.127
											CV-ME	CSD	VCSJ - 27	1OST-1.10R	
1FP-804 WEIGHT LOADED CHECK VALVE	2	A/C	Active	3	Check		33-2 (D-5)	S	S		LJ-C	SP		1BVT 1.47.5	Penet. #31 per 1OST-47.126
											CV-ME	CSD	VCSJ - 27	1OST-1.10R	
1FP-827 WEIGHT LOADED CHECK VLV	2	A/C	Active	4	Check		33-2 (D-4)	S	S		LJ-C	SP		1BVT 1.47.5	Penet. #13 per 1OST-47.113
											CV-ME	CSD	VCSJ - 27	1OST-1.10R	
TV-1FP-105 CABLE PENET DELUGE ISOL TRIP VLV	2	A	Active	4	Gate	TV	33-2 (C-5)	S	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #31 per 1OST-47.126
											FS-S	Q		1OST-47.3P	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1FP-106 RHR AREA DELUGE ISOL TRIP VALVE	2	A	Active	4	Gate	TV	33-2 (D-4)	S	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #32 per 1OST-47.127
											FS-S	Q		1OST-47.3P	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.
TV-1FP-107 CNMT HOSE REELS ISOL TRIP VALVE	2	A	Active	4	Globe	TV	33-2 (C-4)	S	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #13 per 1OST-47.113
											FS-S	Q		1OST-47.3P	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech. Specs.

BV Unit 1

VALVE TABLE

SYSTEM NAME: Compressed Air **SYSTEM NUMBER:** 34

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1IA-116 (PCV-1RC-455D) AIR SUPPLY ISOL CHECK	3	A/C	Active	0.75	Check		11-2 (F-7)	S	S		CV-BDT-O	R		1OST-6.12	During cycling of PORV with instrument air.
											CV-S-LT	R	VROJ - 48		
											LT	2YR			
1IA-117 (PCV-1RC-455C) AIR SUPPLY ISOL CHECK	3	A/C	Active	0.75	Check		11-2 (G-7)	S	S		CV-BDT-O	R		1OST-6.12	During cycling of PORV with instrument air.
											CV-S-LT	R	VROJ - 48		
											LT	2YR			
1IA-378 (PCV-1RC-456) AIR SUPPLY ISOL CHECK	3	A/C	Active	0.5	Check		11-2 (G-8)	S	S		CV-BDT-O	R		1OST-6.12	During cycling of PORV with instrument air.
											CV-S-LT	R	VROJ - 48		
											LT	2YR			
1IA-90 INSTR AIR TO CNMT INSTR AIR ISOL	2	A	Passive	2	Gate		34-2 (E-2)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #47 per 1OST-47.133
											RPV	2YR		1OST-47.3O	RPV of Reach Rod
1IA-91 INSTR AIR TO CNMT INSTR AIR CHECK	2	A/C	Active	1	Check		34-2 (E-3)	O	S		LJ-C	SP		1BVT 1.47.5	Penet. #47 per 1OST-47.133
											CV-BDT-O	R		1OST-6.12	During cycling of PORV with instrument air.
											CV-BDT-O	NSO		ISTC-3550	Via instrument air supply to CNMT per CRO Log
											CV-S-LT	CVCM	VROJ - 47	1BVT 1.47.5	Penet. #47 per 1OST-47.133. Frequency per Appendix J, Option B per CVCM Program Plan 1IA-CMP-1.
1SA-14 STATION AIR TO CONTAINMENT ISOLATION	2	A	Passive	2	Gate		34-1 (B-10)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #42 per 1OST-47.129
1SA-15 STATION AIR TO CONTAINMENT CHECK	2	A/C	Passive	2	Check		34-1 (B-10)	S	S		LJ-C	SP		1BVT 1.47.5	Penet. #42 per 1OST-47.129

BV Unit 1

VALVE TABLE

SYSTEM NAME: Compressed Air **SYSTEM NUMBER:** 34

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1VS-108 INTAKE STRUCT WTR TIGHT DOOR #6 (PCV-1IA-107F) CHECK		C	Active	0.5	Check		34-8 (E-9)	S	O/S		CV-O	CVCM		1/2OST-30.21B	Tested with [1VS-50, 54] with frequency alternated with [1VS-42, 46, 58] per CVCM Program Plan 1VS-CMP-1.
											CV-S-LT	CVCM			Tested with [1VS-50, 54] with frequency alternated with [1VS-42, 46, 58] per CVCM Program Plan 1VS-CMP-1.
1VS-42 INTAKE STRUCT WTR TIGHT DOOR #1 (PCV-1IA-107A) CHECK		C	Active	0.5	Check		34-8 (B-8)	S	O/S		CV-O	CVCM		1/2OST-30.21A	Tested with [1VS-46, 58] with frequency alternated with [1VS-50, 54, 108] per CVCM Program Plan 1VS-CMP-1.
											CV-S-LT	CVCM			Tested with [1VS-46, 58] with frequency alternated with [1VS-50, 54, 108] per CVCM Program Plan 1VS-CMP-1.

SYSTEM NAME: Compressed Air **SYSTEM NUMBER:** 34

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1VS-46 INTAKE STRUCT WTR TIGHT DOOR #2 (PCV-1IA-107B) CHECK		C	Active	0.5	Check		34-8 (B-9)	S	O/S		CV-O	CVCM		1/2OST-30.21A	Tested with [1VS-42, 58] with frequency alternated with [1VS-50, 54, 108] per CVCM Program Plan 1VS-CMP-1.
											CV-S-LT	CVCM			Tested with [1VS-42, 58] with frequency alternated with [1VS-50, 54, 108] per CVCM Program Plan 1VS-CMP-1.
1VS-50 INTAKE STRUCT WTR TIGHT DOOR #3 (PCV-1IA-107C) CHECK		C	Active	0.5	Check		34-8 (D-8)	S	O/S		CV-O	CVCM		1/2OST-30.21B	Tested with [1VS-54, 108] with frequency alternated with [1VS-42, 46, 58] per CVCM Program Plan 1VS-CMP-1.
											CV-S-LT	CVCM			Tested with [1VS-54, 108] with frequency alternated with [1VS-42, 46, 58] per CVCM Program Plan 1VS-CMP-1.
1VS-54 INTAKE STRUCT WTR TIGHT DOOR #4 (PCV-1IA-107D) CHECK		C	Active	0.5	Check		34-8 (D-9)	S	O/S		CV-O	CVCM		1/2OST-30.21B	Tested with [1VS-50, 108] with frequency alternated with [1VS-42, 46, 58] per CVCM Program Plan 1VS-CMP-1.
											CV-S-LT	CVCM			Tested with [1VS-50, 108] with frequency alternated with [1VS-42, 46, 58] per CVCM Program Plan 1VS-CMP-1.

SYSTEM NAME: Compressed Air **SYSTEM NUMBER:** 34

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1VS-58 INTAKE STRUCT WTR TIGHT DOOR #5 (PCV-1IA-107E) CHECK		C	Active	0.5	Check		34-8 (E-8)	S	O/S		CV-O	CVCM		1/2OST-30.21A	Tested with [1VS-42, 46] with frequency alternated with [1VS-50, 54, 108] per CVCM Program Plan 1VS-CMP-1.
											CV-S-LT	CVCM			Tested with [1VS-42, 46] with frequency alternated with [1VS-50, 54, 108] per CVCM Program Plan 1VS-CMP-1.
RV-1IA-107A (1IA-TK-4A) RELIEF	3	C	Active	1/2 x 1	Relief	RV	34-8 (B-8)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1IA-107B (1IA-TK-4B) RELIEF	3	C	Active	1/2 x 1	Relief	RV	34-8 (B-9)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1IA-107C (1IA-TK-4C) RELIEF	3	C	Active	1/2 x 1	Relief	RV	34-8 (C-8)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1IA-107D (1IA-TK-4D) RELIEF	3	C	Active	1/2 x 1	Relief	RV	34-8 (C-9)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1IA-107E [1IA-TK-4E] RELIEF	3	C	Active	1/2 x 1	Relief	RV	34-8 (E-8)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1IA-107F [1IA-TK-4F] RELIEF	3	C	Active	1/2 x 1	Relief	RV	34-8 (E-9)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1IA-108 RELIEF VALVE AFTER PCV-1IA-108	3	C	Active	1 x 1.5	Relief	RV	11-2 (E-9)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1IA-109 RELIEF VALVE AFTER PCV-1IA-109	3	C	Active	1 x 1.5	Relief	RV	11-2 (F-9)	S	O/S		SPT	10YR		1BVT 1.60.5	

BV Unit 1

VALVE TABLE

SYSTEM NAME: Compressed Air **SYSTEM NUMBER:** 34

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
RV-1IA-117	3	C	Active	1 x 1.5	Relief	RV	11-2 (G-9)	S	O/S		SPT	10YR		1BVT 1.60.5	
RELIEF VALVE AFTER PCV-1IA-117															
TV-1IA-400	2	A	Active	2	Gate	TV	34-2 (E-2)	O	S	S	LJ-C	SP		1BVT 1.47.5	Penet. #47 per 1OST-47.133
CNMT INSTR AIR OUTSIDE ISOL VALVE											FS-S	Q		1OST-47.3O	
											ST-S-A	Q			
											ST-S-B	Q			
											RPV	2YR			

SYSTEM NAME: 4KV Station Service **SYSTEM NUMBER:** 36

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1DA-100 1A AIR COMP DISCH CHECK	3	C	Active	0.75	Check		36-1 (A-2)	O/S	S		CV-BDT-O CV-S-LT	Q Q		1OM-54.3 1OST-36.1	Verified by 1OM-54.3, Station Log PAB1 after performing Attach. A in 1OST-36.1
1DA-101 2A AIR COMP DISCH CHECK	3	C	Active	0.75	Check		36-1 (A-4)	O/S	S		CV-BDT-O CV-S-LT	Q Q		1OM-54.3 1OST-36.1	Verified by 1OM-54.3, Station Log PAB1 after performing Attach. A in 1OST-36.1
1DA-130 1B AIR COMP DISCH CHECK	3	C	Active	0.75	Check		36-1 (A-7)	O/S	S		CV-BDT-O CV-S-LT	Q Q		1OM-54.3 1OST-36.2	Verified by 1OM-54.3, Station Log PAB1 after performing Attach. A in 1OST-36.2
1DA-131 2B AIR COMP DISCH CHECK	3	C	Active	0.75	Check		36-1 (A-9)	O/S	S		CV-BDT-O CV-S-LT	Q Q		1OM-54.3 1OST-36.2	Verified by 1OM-54.3, Station Log PAB1 after performing Attach. A in 1OST-36.2
1FO-10 1D TRANS PUMP DISCH CHECK	3	C	Active	0.75	Check		36-2 (E-5)	S	O/S		CV-O CV-S	Q Q		1OST-36.2	
1FO-116 FUEL OIL PP SUCTION CROSSCONNECT NO. 1 DG ISOL	3	B	Active	2	Gate		36-2 (B-1)	LS	O		MAN	2YR		1OST-47.3G	
1FO-117 FUEL OIL PP SUCTION CROSSCONNECT NO. 2 DG ISOL	3	B	Active	2	Gate		36-2 (F-1)	LS	O		MAN	2YR		1OST-47.3G	

SYSTEM NAME: 4KV Station Service **SYSTEM NUMBER:** 36

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1FO-35 1A/1B TRANS PUMP SUCT CHECK	3	A/C	Active	2	Check		36-2 (B-3)	S	O/S		CV-O	Q		1OST-36.1	
											LM	NSO		1OM-54.3	Monitored shiftly by 1OM-54.3, Station Log PAB1 per ISTC-3610.
											CV-DIS	CVCM	VROJ - 49	1CMP-75-CRANE CHECK-4M	Sample Disassembly and Inspection frequency with [1FO-36] per CVCM Program Plan 1FO-CMP-1.
											PMT	CVCM	VROJ - 49	1OST-36.1	Partial stroke open per 1OST-36.1 after Disassembly and Inspection.
1FO-36 1C/1D TRANS PUMP SUCT CHECK	3	A/C	Active	2	Check		36-2 (E-3)	S	O/S		CV-O	Q		1OST-36.2	
											LM	NSO		1OM-54.3	Monitored shiftly by 1OM-54.3, Station Log PAB1 per ISTC-3610.
											CV-DIS	CVCM	VROJ - 49	1CMP-75-CRANE CHECK-4M	Sample Disassembly and Inspection frequency with [1FO-35] per CVCM Program Plan 1FO-CMP-1.
											PMT	CVCM	VROJ - 49	1OST-36.2	Partial stroke open per 1OST-36.2 after Disassembly and Inspection.
1FO-7 1A TRANS PUMP DISCH CHECK	3	C	Active	0.75	Check		36-2 (B-5)	S	O/S		CV-O	Q		1OST-36.1	
											CV-S	Q			
1FO-8 1B TRANS PUMP DISCH CHECK	3	C	Active	0.75	Check		36-2 (A-5)	S	O/S		CV-O	Q		1OST-36.1	
											CV-S	Q			
1FO-9 1C TRANS PUMP DISCH CHECK	3	C	Active	0.75	Check		36-2 (E-5)	S	O/S		CV-O	Q		1OST-36.2	
											CV-S	Q			

BV Unit 1

VALVE TABLE

SYSTEM NAME: 4KV Station Service **SYSTEM NUMBER:** 36

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
RV-1EE-101A 1A TRANS PUMP RELIEF	3	C	Active	3/4 x 1	Relief	RV	36-2 (B-4)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1EE-101B 1B TRANS PUMP RELIEF	3	C	Active	3/4 x 1	Relief	RV	36-2 (A-4)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1EE-101C 1C TRANS PUMP RELIEF	3	C	Active	3/4 x 1	Relief	RV	36-2 (E-4)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1EE-101D 1D TRANS PUMP RELIEF	3	C	Active	3/4 x 1	Relief	RV	36-2 (E-4)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1EE-201A 3A AIR TANK RELIEF	3	C	Active	0.5	Relief	RV	36-1 (C-1)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1EE-201B 3B AIR TANK RELIEF	3	C	Active	0.5	Relief	RV	36-1 (D-1)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1EE-201C 3C AIR TANK RELIEF	3	C	Active	0.5	Relief	RV	36-1 (D-1)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1EE-202A 3D AIR TANK RELIEF	3	C	Active	0.5	Relief	RV	36-1 (C-5)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1EE-202B 3E AIR TANK RELIEF	3	C	Active	0.5	Relief	RV	36-1 (D-5)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1EE-202C 3F AIR TANK RELIEF	3	C	Active	0.5	Relief	RV	36-1 (D-5)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1EE-203A 4A AIR TANK RELIEF	3	C	Active	0.5	Relief	RV	36-1 (C-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1EE-203B 4B AIR TANK RELIEF	3	C	Active	0.5	Relief	RV	36-1 (D-6)	S	O/S		SPT	10YR		1BVT 1.60.5	

BV Unit 1

VALVE TABLE

SYSTEM NAME: 4KV Station Service **SYSTEM NUMBER:** 36

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
RV-1EE-203C 4C AIR TANK RELIEF	3	C	Active	0.5	Relief	RV	36-1 (D-6)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1EE-204A 4D AIR TANK RELIEF	3	C	Active	0.5	Relief	RV	36-1 (C-10)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1EE-204B 4E AIR TANK RELIEF	3	C	Active	0.5	Relief	RV	36-1 (D-10)	S	O/S		SPT	10YR		1BVT 1.60.5	
RV-1EE-204C 4F AIR TANK RELIEF	3	C	Active	0.5	Relief	RV	36-1 (D-10)	S	O/S		SPT	10YR		1BVT 1.60.5	

BV Unit 1

VALVE TABLE

SYSTEM NAME: Control Area Ventilation **SYSTEM NUMBER:** 44A

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1VS-544	3	A/C	Active	0.25	Check		44A-2 (F-7)	S	O/S		CV-O-PR	Q		1/2OST-44A.12A	
CHECK VALVE FOR AIR SUPPLY TO [1VS-D-40-1A] BLADDER											CV-S-LT	Q		1/2OST-44A.16A	
											LT	2YR			
1VS-545	3	A/C	Active	0.25	Check		44A-2 (G-7)	S	O/S		CV-O-PR	Q		1/2OST-44A.12B	
CHECK VALVE FOR AIR SUPPLY TO [1VS-D-40-1B] BLADDER											CV-S-LT	Q		1/2OST-44A.16B	
											LT	2YR			
1VS-546	3	A/C	Active	0.25	Check		44A-2 (E-7)	S	O/S		CV-O-PR	Q		1/2OST-44A.12A	
CHECK VALVE FOR AIR SUPPLY TO [1VS-D-40-1C] BLADDER											CV-S-LT	Q		1/2OST-44A.16A	
											LT	2YR			
1VS-547	3	A/C	Active	0.25	Check		44A-2 (F-7)	S	O/S		CV-O-PR	Q		1/2OST-44A.12B	
CHECK VALVE FOR AIR SUPPLY TO [1VS-D-40-1D] BLADDER											CV-S-LT	Q		1/2OST-44A.16B	
											LT	2YR			
1VS-D-40-1A	3	B	Active	48	Butterfly	D	44A-4 (C-2)	O	S		ST-S	Q		1/2OST-44A.12A	
CONTROL ROOM AIR INTAKE DMPR											ST-S	Q		1/2OST-44A.11A	
											RPV	2YR			
											RPV	2YR		1/2OST-44A.12A	
1VS-D-40-1B	3	B	Active	48	Butterfly	D	44A-4 (C-3)	O	S		ST-S	Q		1/2OST-44A.12B	
CONTROL ROOM AIR INTAKE DMPR											ST-S	Q		1/2OST-44A.11B	
											RPV	2YR			
											RPV	2YR		1/2OST-44A.12B	
1VS-D-40-1C	3	B	Active	48	Butterfly	D	44A-4 (B-5)	O	S		ST-S	Q		1/2OST-44A.12A	
CONTROL ROOM AIR EXHAUST DMPR											ST-S	Q		1/2OST-44A.11A	
											RPV	2YR			
											RPV	2YR		1/2OST-44A.12A	
1VS-D-40-1D	3	B	Active	48	Butterfly	D	44A-4 (B-5)	O	S		ST-S	Q		1/2OST-44A.12B	
CONTROL ROOM AIR EXHAUST DMPR											ST-S	Q		1/2OST-44A.11B	
											RPV	2YR			
											RPV	2YR		1/2OST-44A.12B	

BV Unit 1

VALVE TABLE

SYSTEM NAME: Containment Area Ventilation **SYSTEM NUMBER:** 44C

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1VS-D-5-3A	2	A	Active	42	Butterfly	D	16-1 (D-5)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #90 per 1OST-47.153
CNMT PURGE & EXHAUST OUTSIDE CNMT ISOLATION											ET	CSD or R	VCSJ - 28	1OST-1.10L	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
1VS-D-5-3B	2	A	Active	42	Butterfly	D	16-1 (D-5)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #90 per 1OST-47.153
CNMT PURGE & EXHAUST INSIDE CNMT ISOL											ET	CSD or R	VCSJ - 28	1OST-1.10L	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
1VS-D-5-5A	2	A	Active	42	Butterfly	D	16-1 (E-5)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #91 per 1OST-47.154
CNMT PURGE SUPPLY OUTSIDE CNMT ISOL											ET	CSD or R	VCSJ - 28	1OST-1.10L	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
1VS-D-5-5B	2	A	Active	42	Butterfly	D	16-1 (E-5)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #91 per 1OST-47.154
CNMT ISOL PURGE SUP DAMPER											ET	CSD or R	VCSJ - 28	1OST-1.10L	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
1VS-D-5-6	2	A	Passive	8	Ball	D	16-1 (E-5)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #91 per 1OST-47.154
CONTAINMENT PURGE VACUUM BREAK															

BV Unit 1

VALVE TABLE

SYSTEM NAME: Post DBA Hydrogen Control **SYSTEM NUMBER:** 46

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1HY-101	2	A	Passive	2	Ball		46-1 (A-3)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #93 per 1OST-47.156
RECOMBINER 1A CONTAINMENT UPSTREAM ISOLATION											RPV	2YR		1OST-47.3O	RPV of Reach Rod
1HY-102	2	A	Passive	2	Ball		46-1 (E-3)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #92 per 1OST-47.155
RECOMBINER 1B CONTAINMENT UPSTREAM ISOLATION											RPV	2YR		1OST-47.3I	RPV of Reach Rod
1HY-103	2	A	Passive	2	Ball		46-1 (A-3)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #93 per 1OST-47.156
REOCMBINER 1A CONTAINMENT DOWNSTREAM ISOLATION											RPV	2YR		1OST-47.3O	RPV of Reach Rod
1HY-104	2	A	Passive	2	Ball		46-1 (E-3)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #92 per 1OST-47.155
RECOMBINER 1B CONTAINMENT DOWNSTREAM ISOLATION											RPV	2YR		1OST-47.3I	RPV of Reach Rod
1HY-110	2	A	Passive	2	Ball		46-1 (C-2)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #88 per 1OST-47.151
RECOMBINER 1A CONTAINMENT RETURN ISOLATION															
1HY-111	2	A	Passive	2	Ball		46-1 (G-2)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #87 per 1OST-47.150
RECOMBINER 1B CONTAINMENT RETURN ISOLATION															
1HY-196	2	A	Passive	2	Ball		46-1 (C-3)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #88 per 1OST-47.151
"A" H2 RECOMBINER OUTLET ISOL															
1HY-197	2	A	Passive	2	Ball		46-1 (G-3)	LS	S		LJ-C	SP		1BVT 1.47.5	Penet. #87 per 1OST-47.150
"B" H2 RECOMBINER OUTLET ISOL															
SOV-1HY-102A1	2	A	Active	0.375	Globe	SOV	46-2 (A-3)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #109-44 per 1OST-47.168
A H2 ANALYZER CNMT DOME INLET FLOW SAMPLE											RPV	SP	VRR - 03	1OST-47.168	
											FS-S	Q		1OST-47.3O	
											ST-O	Q			
											ST-S	Q			
SOV-1HY-102A2	2	A	Active	0.375	Globe	SOV	46-2 (B-4)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #109-44 per 1OST-47.168
A H2 ANALYZER CNMT DOME INLET FLOW SAMPLE											RPV	SP	VRR - 03	1OST-47.168	
											FS-S	Q		1OST-47.3O	
											ST-O	Q			
											ST-S	Q			

SYSTEM NAME: Post DBA Hydrogen Control **SYSTEM NUMBER:** 46

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
SOV-1HY-102B1	2	A	Active	0.375	Globe	SOV	46-2 (E-3)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #95-64 per 1OST-47.158
B H2 ANALYZER CNMT DOME INLET FLOW SAMPLE											RPV	SP	VRR - 03	1OST-47.158	
											FS-S	Q		1OST-47.3I	
											ST-O	Q			
											ST-S	Q			
SOV-1HY-102B2	2	A	Active	0.375	Globe	SOV	46-2 (E-4)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #95-64 per 1OST-47.158
B H2 ANALYZER CNMT DOME INLET FLOW SAMPLE											RPV	SP	VRR - 03	1OST-47.158	
											FS-S	Q		1OST-47.3I	
											ST-O	Q			
											ST-S	Q			
SOV-1HY-103A1	2	A	Active	0.375	Globe	SOV	46-2 (B-3)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #109-49 per 1OST-47.169
A H2 ANALYZER PRZR CUBICLE INLET FLOW SAMPLE											RPV	SP	VRR - 03	1OST-47.169	
											FS-S	Q		1OST-47.3O	
											ST-O	Q			
											ST-S	Q			
SOV-1HY-103A2	2	A	Active	0.375	Globe	SOV	46-2 (B-4)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #109-49 per 1OST-47.169
A H2 ANALYZER PRZR CUBICLE INLET FLOW SAMPLE											RPV	SP	VRR - 03	1OST-47.169	
											FS-S	Q		1OST-47.3O	
											ST-O	Q			
											ST-S	Q			
SOV-1HY-103B1	2	A	Active	0.375	Globe	SOV	46-2 (F-3)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #95-69 per 1OST-47.159
B H2 ANALYZER PRZR CUBICLE INLET FLOW SAMPLE											RPV	SP	VRR - 03	1OST-47.159	
											FS-S	Q		1OST-47.3I	
											ST-O	Q			
											ST-S	Q			
SOV-1HY-103B2	2	A	Active	0.375	Globe	SOV	46-2 (F-4)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #95-69 per 1OST-47.159
B H2 ANALYZER PRZR CUBICLE INLET FLOW SAMPLE											RPV	SP	VRR - 03	1OST-47.159	
											FS-S	Q		1OST-47.3I	
											ST-O	Q			
											ST-S	Q			

BV Unit 1

VALVE TABLE

SYSTEM NAME: Post DBA Hydrogen Control — SYSTEM NUMBER: 46

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
SOV-1HY-104A1	2	A	Active	0.375	Globe	SOV	46-2 (C-3)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #109-52 per 1OST-47.170
A H2 ANALYZER FLOW SAMPLE DISCH											RPV	SP	VRR - 03	1OST-47.170	
											FS-S	Q		1OST-47.3O	
											ST-O	Q			
											ST-S	Q			
SOV-1HY-104A2	2	A	Active	0.375	Globe	SOV	46-2 (C-4)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #109-52 per 1OST-47.170
A H2 ANALYZER FLOW SAMPLE DISCH											RPV	SP	VRR - 03	1OST-47.170	
											FS-S	Q		1OST-47.3O	
											ST-O	Q			
											ST-S	Q			
SOV-1HY-104B1	2	A	Active	0.375	Globe	SOV	46-2 (G-3)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #95-72 per 1OST-47.160
B H2 ANALYZER FLOW SAMPLE DISCH											RPV	SP	VRR - 03	1OST-47.160	
											FS-S	Q		1OST-47.3I	
											ST-O	Q			
											ST-S	Q			
SOV-1HY-104B2	2	A	Active	0.375	Globe	SOV	46-2 (F-4)	S	O/S	S	LJ-C	SP		1BVT 1.47.5	Penet. #95-72 per 1OST-47.160
B H2 ANALYZER FLOW SAMPLE DISCH											RPV	SP	VRR - 03	1OST-47.160	
											FS-S	Q		1OST-47.3I	
											ST-O	Q			
											ST-S	Q			

BV Unit 1

VALVE TABLE

SYSTEM NAME: Containment **SYSTEM NUMBER:** 47

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
1VS-167 PH-P-1 DOOR EQUALIZING VALVE	2	A	Passive	1.5	Ball		47-1 (B-9)	S	S		LJ-C	SP		1BVT 1.47.5	Airlock Penets. per 1OST-47.172
1VS-168 PH-P-1 DOOR EQUALIZING VALVE	2	A	Passive	1.5	Ball		47-1 (B-9)	S	S		LJ-C	SP		1BVT 1.47.5	Airlock Penets. per 1OST-47.172
1VS-169 PH-P-1 DOOR EQUALIZING VALVE	2	A	Passive	1.5	Ball		47-1 (B-7)	S	S		LJ-C	SP		1BVT 1.47.5	Airlock Penets. per 1OST-47.172
1VS-170 PH-P-1 DOOR EQUALIZING VALVE	2	A	Passive	1.5	Ball		47-1 (B-7)	S	S		LJ-C	SP		1BVT 1.47.5	Airlock Penets. per 1OST-47.172
1VS-183 EQUIPMENT HATCH AIRLOCK EQUALIZING VALVE	2	A	Passive	2	Ball		47-1 (F-7)	S	S		LTJ	SP		1BVT 1.47.10	Type B LT (1OST-47.176)
1VS-184 EQUIPMENT HATCH AIRLOCK EQUALIZING VALVE	2	A	Passive	2	Ball		47-1 (F-5)	S	S		LJ-C	SP		1BVT 1.47.5	Equip Hatch Airlock per 1OST-47.173

Enclosure B
L-17-298

Fourth Ten-Year Interval Inservice Testing Program for BVPS Unit No. 2
(359 pages follow)

FirstEnergy Nuclear Operating Company (FENOC)

Beaver Valley Power Station

Unit 2

Inservice Testing (IST) Program For Pumps And Valves

4th Ten-Year Inservice Test Interval

September 20, 2017 – September 19, 2027

Commercial Operation: November 17, 1987

Issue 4, Revision 0

Effective Date of Procedure: 9/20/17

Addresses: FirstEnergy Nuclear Operating Company (FENOC)
76 South Main Street
Akron, OH 44308

Beaver Valley Power Station
P. O. Box 4, Route 168
Shippingport, PA 15077

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SECTION I: PUMP TESTING REQUIREMENTS

Title 10, Part 50.55a of the Code of Federal Regulations, Paragraph (f)(4)(ii) requires that 10-year IST Programs comply with the latest NRC approved edition and addenda of the Code incorporated by reference in Paragraph (a)(1)(iv), 12 months prior to the start of the 120-month inspection interval. The fourth 10-year inservice testing interval for Beaver Valley Power Station (BVPS) Unit 2 commences on September 20, 2017. The Inservice Testing (IST) Program for pumps at BVPS, Unit 2, is based on the following:

- American Society of Mechanical Engineers (ASME) OM Code-2004 Edition, Code for Operation and Maintenance of Nuclear Plants, with Addenda through OMb-2006.
- Generic Letter No. 89-04, "Guidance on Developing Acceptable Inservice Testing Programs".
- NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants".
- US NRC Regulatory Guide 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code"

The pumps included in this program are all centrifugal and positive displacement pumps that are provided with an emergency power source, which are required in shutting down a reactor to the safe shutdown condition, maintaining the safe shutdown condition, or mitigating the consequences of an accident, at BVPS, Unit 2. BVPS-2 is licensed for a safe shutdown of cold shutdown.

Exclusions

The following pumps are excluded from the requirements of Subsection ISTB:

- Drivers, except where the pump and driver form an integral unit and the pump bearings are in the driver.
- Pumps that are supplied with emergency power solely for operating convenience.
- Skid-mounted pumps that are tested as part of the major component and are justified by BVPS-2 to be adequately tested. Skid-Mounted Pumps are pumps which are integral to or support operation of a parent pump or major component. NUREG-1482, Section 3.4, "Skid-mounted Components and Component Subassemblies" provides further discussion pertaining to skid-mounted components.

NOTE:	Transitioning to the applicable edition of the ASME OM Code for the IST Fourth 10-Year Interval requires the Grouping of pumps according to function including Comprehensive Pump Testing. The pump Groupings, instrument accuracy requirements, test parameters and acceptance criteria for tests parameters are detailed in the following.

When a Group A test is required a Comprehensive test may be substituted. When a Group B test is required a Group A test or Comprehensive test may be substituted. A preservice test may be substituted for any inservice test.

Group A Pumps

The ASME OM Code defines Group A pumps as those pumps that are operated continuously or routinely during normal operation, cold shutdown, or refueling operations. BVPS considers the following Unit 2 pumps as being categorized as Group A as well as justification for grouping. Justification does not necessarily consider all safety related functions.

- **Charging / High Head Safety Injection Pumps, [2CHS*P21A, 21B, 21C]** – The Charging Pumps support the Reactor Coolant System (RCS) during all normal modes of plant operation. The functions performed include, but are not limited to, the following: maintenance of seal water injection flow to the Reactor Coolant Pumps (RCPs); control of RCS inventory; supplying pressurizer auxiliary spray and reducing the radioactivity level in the reactor coolant. The pumps also serve as the High Head Safety Injection (HHSI) Pumps for emergency cool cooling during post accident conditions.

- **Boric Acid Transfer Pumps, [2CHS*P22A, 22B]** – The Boric Acid Transfer Pumps provide a solution of soluble boric acid for reactor coolant makeup. These pumps also provide boric acid for emergency boration.

- **Residual Heat Removal Pumps, [2RHS*P21A, 21B]** – The primary function of the Residual Heat Removal (RHR) Pumps is to remove heat energy from the core and the RCS during plant cool down.

- **Component Cooling Water Pumps, [2CCP*P21A, 21B, 21C]** - The Component Cooling Water Pumps operate continuously during normal plant operation to supply cooling water to reactor plant components and non-essential heat loads as well as cooling water to the RCP motor bearings and thermal barrier. Their safety related function is to provide cooling water for RHR System support.

- **Service Water Pumps [2SWS*P21A, 21B, 21C]** - The Service Water Pumps operate continuously during normal plant operation to provide cooling water for heat removal from power plant auxiliary subsystems. During post accident conditions they provide the heat sink to the following components: at least two recirculation spray coolers, one charging pump lube oil cooler, one control room air-conditioning refrigerant condenser or one control room air-conditioning unit, one emergency diesel generator cooling system heat exchanger, and one safeguards area air-conditioning unit.

Group B Pumps

The ASME OM Code defines Group B pumps as those pumps in standby systems that are not operated routinely except for testing. BVPS-2 considers the following pumps as being categorized as Group B as well as justification for grouping.

- **Low Head Safety Injection Pumps, [2SIS*P21A, 21B] -** The Low Head Safety Injection Pumps are not utilized during any plant operating evolution. The pumps remain in standby during all operating Modes. The pumps are required to operate primarily during a large break loss-of-coolant accident (LOCA), in addition to other design basis accidents (DBA), in order to provide low head safety injection and recirculation flow to the RCS, and for long term shutdown cooling during post-LOCA conditions.

- **Quench Spray Pumps, [2QSS*P21A, 21B]** - The Quench Spray Pumps are not utilized during any plant operating evolution. The pumps remain in standby during all operating modes. The pumps are required to operate only during a loss-of-coolant accident (LOCA) for containment heat removal and pressure suppression. The Quench Spray System also serves in removing fission products released into the containment atmosphere during a LOCA by the admission of sodium hydroxide to the spray stream.

- **Recirculation Spray Pumps, [2RSS*P21A, 21B, 21C, 21D]** - The Recirculation Spray Pumps are not utilized during any plant operating evolution. The pumps remain in standby during all operating modes. The pumps are required to operate only during a loss-of-coolant accident (LOCA) for long term containment heat removal and pressure suppression after sufficient inventory has collected in the containment sump to support pump operation. The C and D Recirculation Spray Pumps also have the capability of providing sump inventory to the suction supply of the High Head Safety Injection Pumps when RWST level is low. Group B pumps lacking the required fluid inventory (e.g., pumps in dry sumps) shall only receive a comprehensive pump test once every 2 years with the required fluid inventory provided during this test. A Group B test in not required.

- **Turbine Driven Auxiliary Feedwater Pump, [2FWE*P22].** - The Turbine Driven Auxiliary Feedwater Pump is not utilized during any plant operating evolution. The pump remains in standby during all operating modes and is required to operate only in the event of a main turbine trip with a total loss of all electrical power (Station Blackout) in order to provide emergency makeup to the Steam Generators during loss of normal feedwater.

- **Motor Driven Auxiliary Feedwater Pumps, [2FWE*P23A, 23B]** - The Motor Driven Auxiliary Feedwater Pumps may be utilized during startup from refueling outages to fill the steam generators and to maintain steam generator level prior to initiation of normal feedwater. However, restart is not dependent upon operation of the Motor Driven Auxiliary Feedwater Pumps since the Steam Generator Startup Feedwater Pump [2FWS-P24] may be used to perform this non-safety related function. With the possible exception of the above, the Motor Driven Auxiliary Feedwater Pumps remain in standby during all operating modes. The pumps also serve as an emergency source of feedwater supply to the steam generators during a loss of normal feedwater, loss of offsite power, secondary side pipe ruptures, or cool down following a steam generator tube rupture.

- **Fuel Oil Transfer Pumps, [2EGF*P21A, 21B, 21C, 21D]** - The Fuel Oil Transfer Pumps are not utilized during any plant operating evolution. The pumps remain in standby during all operating Modes. The pumps are required to operate only during emergency diesel generator operation to replenish day tank inventory.

Instrument Accuracy Requirements

Instrument accuracy shall be within the limits specified in Table ISTB-3510-1, as reflected below. If a parameter is determined by analytical methods instead of measurement, then the determination shall meet the parameter accuracy requirement of Table ISTB-3510-1. For individual analog instruments, the required accuracy is percent of full scale. For digital instruments, the required accuracy is over the calibrated range. For a combination of instruments, the required accuracy is loop accuracy. Table ISTB-3510-1 below reflects the required instrument accuracies for both the Group A test and Group B test as well Comprehensive testing applicable to Group A and Group B pumps and Preservice tests.

Per ISTB-3510(b), The full-scale of each analog instrument shall be not greater than three times the reference value. Digital instruments shall be selected such that the reference value does not exceed 90% of the calibrated range of the instrument.

Table ISTB-3510-1

Required Instrument Accuracy (%)

Quantity	Group A and Group B Tests, %	Comprehensive and Preservice Tests, %
Pressure	± 2	± ½
Flow Rate	± 2	± 2
Speed	± 2	± 2
Vibration	± 5	± 5
Differential Pressure	± 2	± ½

Instrument accuracy is defined as the allowable inaccuracy of an instrument loop based on the square root of the sum of the square of the inaccuracies of each instrument in the loop when considered separately. Alternatively, the allowable inaccuracy of the instrument loop may be based on the output for a known input into the instrument loop.

Instrument loop is defined as two or more instruments working together to provide a single output (e.g., a vibration probe and its associated signal conditioning and readout devices, transmitter and indicator, etc.). Per ASME OM Code Interpretation 04-07, pump suction and discharge pressure instruments are not considered an instrument loop when used in conjunction to determine differential pressure.

Test Parameters

NOTE: In accordance with ASME OM Code Case OM-20 as approved by Pump Relief Request No. 1 (PRR1), all pump test frequencies less than 2 years may be extended by a 25% grace period, if necessary, with up to a 6 month extension for test intervals ≥2 years. A 25% grace period also applies for pumps on double frequency. Test frequencies based on plant conditions (e.g., CSD or R) cannot be extended.

The requirements of the Code and the guidance provided by NUREG-1482, will be followed at all times unless specific relief has been granted by the NRC. A Group A or Group B inservice test, run quarterly, as applicable, and a Comprehensive inservice test, run biennially, to measure or observe the test quantities listed in Table ISTB-3000-1, below, is required for all pumps in the IST Program. In addition, a Periodic Verification Test (PVT), run biennially, may also be required for those pumps listed in Pump Relief Request No. 3 (PRR3).

Pursuant to ISTB-3540, "Vibration", vibration measurements on centrifugal pumps (except vertical line shaft pumps) shall be taken in a plane approximately perpendicular to the rotating shaft in two orthogonal directions on each accessible pump –bearing housing. Measurement shall also be taken in the axial direction on each accessible pump thrust bearing housing. 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. In a portable instrument is used to measure vibrations, the measurement points shall be clearly identified on the pump (or on a figure) to permit subsequent duplication in both location and plane.

Pursuant to ISTB-3550, "Flow Rate"; When measuring flow rate, a rate or quantity meter shall be installed in the pump test circuit. If a meter does not indicate the flow rate directly, the record shall include the method used to reduce the data. Internal recirculated flow is not required to be measured. External recirculated flow is not required to be measured if it is not practical to isolate, has a fixed resistance, and has been evaluated by BVPS-2 to not have a substantial effect on the results of the test.

TABLE ISTB-3000-1

INSERVICE TEST PARAMETERS

Quantity	**Preservice Test**	**Group A Test**	**Group B Test**	**Comprehensive Test**	**Remarks**
Speed: N	X	X	X	X (Note 2)	If variable speed ONLY
Differential Pressure: ΔP	X	X	X (Note 1)	X (Note 2)	Centrifugal pumps, including vertical line shaft pumps
Discharge Pressure: P	X	X	X	X	Positive displacement pumps
Flow Rate: Q	X	X	X (Note 1)	X (Note 2)	- - - -
Vibration: Velocity, V_v	X	X		X	Peak

NOTE:

(1) For positive displacement pumps, flow rate shall be measured or determined. For all other pumps, differential pressure or flow rate shall be measured or determined.

(2) In addition to a Comprehensive Test, this quantity is also required for those pumps identified in Pump Relief Request No. 3 (PRR3) requiring a Periodic Verification Test.

Test Duration

(a) 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 required quantities shall be made and recorded.

(b) For the group B test, after pump conditions are stable, at least one measurement or determination of the required quantity shall be made and recorded.

(c) For the Periodic Verification Test (if required by Pump Relief Request No. 3), after pump flow has been increased to its highest design basis accident flow, the required differential pressure is measured and recorded.

Reference Values

(a) Initial reference values shall be determined from the results of testing meeting the requirements of ISTB-3100, Preservice Testing, or from the results of the first inservice test. In a system where resistance can be varied, flow rate and differential pressure shall be measured at a minimum of five (5) points. If practicable, these points shall be from pump minimum flow to at least the comprehensive pump test flow rate (or periodic verification test flow rate if required by Pump Relief Request No. 3). A pump curve shall be established based on the measured points with at least one point designated as the reference point(s). A pump curve is not required in systems where resistance cannot be varied nor for positive displacement pumps.

(b) New or additional reference values shall be established as required by ISTB-3310, ISTB-3320, or ISTB-6200(c).

(c) Reference values shall be established only when the pump is known to be operating acceptably.

(d) Reference values shall be established at a point(s) of operation (reference point) readily duplicated during subsequent tests.

(e) Reference values shall be established in a region(s) of relatively stable pump flow.

 (1) Reference values shall be established within ±20% of pump design flow rate (i.e., the flow rate at the design point or the accident analysis flow, with operation at the best efficiency point (BEP) desired provided all are greater than or equal to the maximum accident analysis flow) for the Comprehensive pump test.

 (2) Reference values shall be established within ±20% of pump design flow for the Group A and Group B tests, if practicable. If not practicable, the reference point flow shall be established at the highest practical flow rate.

(f) All subsequent test results shall be compared to these initial reference values or to new reference values established per ISTB-3310, ISTB-3320, or ISTB-6200(c).

(g) Related conditions that can significantly influence the measurement or determination of the reference value shall be analyzed in accordance with ISTB-6400.

(h) Group A, B and comprehensive pump tests shall be conducted with the pump operating as close as practical to a specified reference point.

 (1) Pump speed for variable speed pumps shall be adjusted to the reference point ±1%.

 (2) The resistance of the system shall be varied until the flow rate is as close as practical to the reference point with differential pressure determined and compared

to its reference value. For those pumps listed in Pump Relief Request No. 10 (PRR10), an allowable tolerance of +2/-1 percent of the reference flow rate value (without the need to include instrument uncertainties) is acceptable in accordance with ASME OM Code Case OMN-21. For those pumps NOT included in Pump Relief Request No. 10, and per NUREG-1482, Section 5.3 (Allowable Variance from Reference Points), the NRC staff has determined that, if the design does not allow for establishing and maintaining flow at an exact value, the allowed tolerance for setting the fixed parameter must be established for each case individually, including the accuracy of the instrument and the precision of its display. A total tolerance of ±2% of the reference flow value (including instrument accuracy) is allowed without prior NRC approval.

(3) Vibrations (velocity) measurements shall be broad band (unfiltered) and at peak while compared to a reference value.

(i) All deviations from reference values shall be compared with the ranges of Tables ISTB-5121-1, 5221-1, 5321-1 and 5321-2 and corrective actions taken as specified in ISTB-6200.

Reference Pump Curves

Utilization of a pump curve in the BVPS-1 IST Program for performing testing and establishing acceptance criteria is considered acceptable since the guidelines provided by NUREG-1482, Section 5.2 relating to the use of a pump curve shall be followed. The licensee will also meet the requirements of ASME OM Code Case OMN-16, "Use of Pump Curve for Testing," in the development and use of pump curves, which is unconditionally approved for use by Regulatory Guide 1.92 (Rev. 1), "Operation and Maintenance Code Case Acceptability, ASME OM Code".

(a) A pump curve shall only be developed, or manufacturer's pump curve validated, when the pump is known to be operating acceptably.

(b) The reference points used to develop or validate a pump curve shall be measured using instruments at least as accurate (accuracy and range) as required by ISTB-3510. The instrument accuracy requirements specified in Table ISTB-3510-1 for Comprehensive and Preservice tests shall apply when developing a pump curve.

(c) A pump curve shall be based on an adequate number of reference points, with a minimum of five (5). If practicable, these points shall be from pump minimum flow to at least the comprehensive pump test flow rate (or periodic verification test flow rate if required by Pump Relief Request No. 3), and shall have at least one data point for each 20% of the maximum pump curve range.

(d) Sufficient reference points shall be beyond the "flat" portion (low flow rates) of the pump curve in a range which includes or is as close as practical to the design basis flow rate.

(e) Acceptance criteria based on a pump curve shall not conflict with technical specifications or UFSAR operability criteria (minimum operating point/curve) for flow rate and differential pressure, for the affected pump.

(f) If vibration levels vary significantly over the range of pump conditions, a method of assigning appropriate vibration acceptance criteria should be developed for different regions of the pump curve. If vibration levels are relatively unaffected by changing differential pressure or flow over the range of the pump curve, then a single set of data may be used for acceptance criteria provided it is the most conservative measured data.

(g) When the reference pump curve may have been affected by repair, replacement, or routine servicing, a new reference pump curve shall be determined or the previous pump curve revalidated by an inservice test.

Centrifugal Pump Test Acceptance Criteria

The allowable ranges for centrifugal pump test parameters are specified in Table ISTB-5121-1 and are reflected below. It should be noted that the hydraulic acceptance criteria defining Acceptable Range and Required Action Range for the quarterly Group A and Group B tests are less stringent than the acceptance range imposed on the hydraulic test parameters associated with the biennial Comprehensive test. In addition, an Alert Range is imposed on the hydraulic parameters for centrifugal pumps during the Comprehensive test.

Table ISTB-5121-1

Centrifugal Pump Test Acceptance Criteria

Test Type	Pump Speed	Test Parameter	Acceptable Range	Alert Range	Required Action Range Low	Required Action Range High
Group A[1,2]	N/A	Q	0.90 to 1.10 Q_r	None	< 0.90 Q_r	> 1.10 Q_r
	N/A	ΔP	0.90 to 1.10 ΔP_r	None	< 0.90 ΔP_r	> 1.10 ΔP_r
	≥600	V_v or V_d	≤ 2.5V_r	> 2.5V_r to 6 V_r or >0.325 to 0.7 in/sec	None	>6V_r or >0.7 in/sec
Group B	N/A	Q	0.90 to 1.10 Q_r	None	< 0.90 Q_r	> 1.10 Q_r
	N/A	ΔP	0.90 to 1.10 ΔP_r	None	< 0.90 ΔP_r	> 1.10 ΔP_r
Comprehensive[1,2,3]	N/A	Q	0.94 to 1.03 Q_r	0.90 to <0.94 Q_r	< 0.90 Q_r	> 1.03 Q_r
	N/A	ΔP	0.93 to 1.03 ΔP_r	0.90 to <0.93 ΔP_r	< 0.90 ΔP_r	> 1.03 ΔP_r
	≥600	V_v or V_d	≤ 2.5V_r	> 2.5V_r to 6 V_r or >0.325 to 0.7 In/sec	None	>6Vr or >0.7 in/sec

NOTES: The subscript *r* denotes reference value, the subscript *v* denotes vibration velocity reference value, and the subscript *d* denotes displacement.

(1) Vibration parameter per Table ISTB-3000-1. V_r is vibration reference value in the selected units.

(2) Refer to Fig. ISTB-5223-1 to establish velocity limits for pumps with speeds <600 rpm.

(3) An upper Acceptable Range limit of 1.06 Q_r and 1.06 ΔP_r instead of 1.03 Q_r and 1.03 ΔP_r may be used for the Comprehensive pump test of those pumps listed in Pump Relief Request No. 3 (PRR3).

All deviations from the reference values shall be compared with the ranges of Table ISTB-5121-1 and corrective action taken as specified in ISTB-6200, as reflected in the Corrective Action section following pump test acceptance criteria. The vibration measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges of Table ISTB-5121-1. For example, if vibration exceeds either 6V_r, or 0.7 in./sec, the pump is in the required action range.

Vertical Line Shaft Centrifugal Pump Test Acceptance Criteria

The allowable ranges for vertical line shaft centrifugal pump test parameters are specified in Table ISTB-5221-1 and are reflected below. It should be noted that the hydraulic acceptance criteria defining Acceptable Range and Required Action Range for the quarterly Group A and Group B tests are less stringent than the acceptance range imposed on the hydraulic test parameters associated with the biennial Comprehensive test.

A vertical line shaft pump is defined as a vertically suspended pump, where the pump driver and the pumping element are connected by a line shaft within an enclosing column which contains the pump bearings, making pump bearing vibration measurements impracticable.

Table ISTB-5221-1

Vertical Line Shaft and Centrifugal Pumps Test Acceptance Criteria

Test Type	Pump Speed	Test Parameter	Acceptable Range	Alert Range	Required Action Range	
					Low	High
Group A[1,2]	N/A	Q	0.95 to 1.10 Q_r	0.93 to <0.95 Q_r	< 0.93 Q_r	> 1.10 Q_r
	N/A	ΔP	0.95 to 1.10 ΔP_r	0.93 to <0.95 ΔP_r	< 0.93 ΔP_r	> 1.10 ΔP_r
	$\geq$600	V_v or V_d	$\leq 2.5V_r$	> $2.5V_r$ to 6 V_r or >0.325 to 0.7 in/sec	None	>$6V_r$ or >0.7 in/sec
Group B	N/A	Q	0.90 to 1.10 Q_r	None	< 0.90 Q_r	> 1.10 Q_r
	N/A	ΔP	0.90 to 1.10 ΔP_r	None	< 0.90 ΔP_r	> 1.10 ΔP_r
Comprehensive[1,2,3]	N/A	Q	0.95 to 1.03 Q_r	0.93 to <0.95 Q_r	< 0.93 Q_r	> 1.03 Q_r
	N/A	ΔP	0.95 to 1.03 ΔP_r	0.93 to <0.95 ΔP_r	< 0.93 ΔP_r	> 1.03 ΔP_r
	$\geq$600	V_v or V_d	$\leq 2.5V_r$	> 2.5Vr to 6 V_r or >0.325 to 0.7 in/sec	None	>$6V_r$ or >0.7 in/sec

NOTES: The subscript *r* denotes reference value, the subscript *v* denotes vibration velocity reference value, and the subscript *d* denotes displacement.

(1) Vibration parameter per Table ISTB-3000-1. V_r is vibration reference value in the selected units.

(2) Refer to Fig. ISTB-5223-1 to establish velocity limits for pumps with speeds <600 rpm.

(3) An upper Acceptable Range limit of 1.06 Q_r and 1.06 ΔP_r instead of 1.03 Q_r and 1.03 ΔP_r may be used for the Comprehensive pump test of those pumps listed in Pump Relief Request No. 3 (PRR3).

All deviations from the reference values shall be compared with the ranges of Table ISTB-5221-1 and corrective action taken as specified in ISTB-6200, as reflected in the Corrective Action section following pump test acceptance criteria. The vibration measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges of Table ISTB-5221-1. For example, if vibration exceeds either $6V_r$, or 0.7 in./sec, the pump is in the required action range.

Positive Displacement Pump Test Acceptance Criteria

The allowable ranges for positive displacement parameters are specified in Table ISTB-5321-1 and Table ISTB-5321-2, and are reflected below. It should be noted that the hydraulic acceptance criteria defining Acceptable Range and Required Action Range for the quarterly Group A and Group B tests are less stringent than the acceptance range imposed on the hydraulic test parameters associated with the biennial Comprehensive test.

Table ISTB-5321-1

Positive Displacement Pump (Except Reciprocating) Test Acceptance Criteria

Test Type	Pump Speed	Test Parameter	Acceptable Range	Alert Range	Required Action Range	
					Low	High
Group A[1,2]	N/A	Q	0.95 to 1.10 Q_r	0.93 to <0.95 Q_r	< 0.93 Q_r	> 1.10 Q_r
	N/A	P	0.93 to 1.10 P_r	0.90 to <0.93 P_r	< 0.90 P_r	> 1.10 P_r
	≥600	V_v or V_d	≤ 2.5V_r	> 2.5Vr to 6 V_r or >0.325 to 0.7 in/sec	None	>6V_r or >0.7 in/sec
Group B	N/A	Q	0.90 to 1.10 Q_r	None	< 0.90 Q_r	> 1.10 Q_r
Comprehensive[1,2,3]	N/A	Q	0.95 to 1.03 Q_r	0.93 to <0.95 Q_r	< 0.93 Q_r	> 1.03 Q_r
	N/A	P	0.93 to 1.03 P_r	0.90 to <0.93 P_r	< 0.90 P_r	> 1.03 P_r
	≥600	V_v or V_d	≤ 2.5V_r	> 2.5Vr to 6 V_r or >0.325 to 0.7 in/sec	None	>6V_r or >0.7 in/sec

NOTES: The subscript *r* denotes reference value, the subscript *v* denotes vibration velocity reference value, and the subscript *d* denotes displacement.

(1) Vibration parameter per Table ISTB-3000-1. V_r is vibration reference value in the selected units.

(2) Refer to Fig. ISTB-5223-1 to establish velocity limits for pumps with speeds <600 rpm.

(3) An upper Acceptable Range limit of 1.06 Q_r and 1.06 P_r instead of 1.03 Q_r and 1.03 P_r may be used for the Comprehensive pump test of those pumps listed in Pump Relief Request No. 3 (PRR3).

Table ISTB-5321-2

Reciprocating Positive Displacement Pump Test Acceptance Criteria

Test Type	Pump Speed	Test Parameter	Acceptable Range	Alert Range	Required Action Range	
					Low	High
Group A	N/A	Q	0.95 to 1.10 Q_r	0.93 to <0.95 Qr	< 0.93 Q_r	> 1.10 Q_r
	N/A	P	0.93 to 1.10 P_r	0.90 to <0.93 Pr	< 0.90 P_r	> 1.10 P_r
	N/A	V_v or V_d	≤ 2.5V_r	> 2.5V_r to 6 V_r	None	>6V_r
Group B	N/A	Q	0.90 to 1.10 Q_r	None	< 0.90 Q_r	> 1.10 Q_r
Comprehensive[1]	N/A	Q	0.95 to 1.03 Q_r	0.93 to <0.95 Q_r	< 0.93 Q_r	> 1.03 Q_r
	N/A	P	0.93 to 1.03 P_r	0.90 to <0.93 P_r	< 0.90 P_r	> 1.03 P_r
	N/A	V_v or V_d	≤ 2.5V_r	> 2.5V_r to 6 V_r	None	>6V_r

NOTES: The subscript *r* denotes reference value, the subscript *v* denotes vibration velocity reference value, and the subscript *d* denotes displacement.

(1) An upper Acceptable Range limit of 1.06 Q_r and 1.06 P_r instead of 1.03 Q_r and 1.03 P_r may be used for the Comprehensive pump test of those pumps listed in Pump Relief Request No. 3 (PRR3).

All deviations from the reference values shall be compared with the ranges of Table ISTB 5321-1 or Table ISTB-5321-2, as applicable, and corrective action taken as specified in ISTB-6200, as reflected in the Corrective Action section following pump test acceptance criteria. The vibration measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges of Table ISTB-5321-1. For example, if vibration exceeds either $6V_r$, or 0.7 in./sec, the pump is in the required action range.

Corrective Action

(a) **Alert Range [ISTB-6200(a)]**. If the measured test parameter values fall within the alert range of Table ISTB-5121-1, Table ISTB-5221-1, Table ISTB-5321-1 or Table ISTB-5321-2, as applicable, the frequency of testing specified in paragraph ISTB-3400 shall be doubled until the cause of the deviation is determined and the condition corrected.

(b) **Action Range [ISTB-6200(b)]**. If the measured test parameter values fall within the required action range of Table ISTB-5121-1, Table ISTB-5221-1, Table ISTB-5321-1 or Table ISTB-5321-2, as applicable, the pump shall be declared inoperable until either the cause of the deviation has been determined and the condition corrected, or an analysis of the pump is performed and new reference values are established in accordance with paragraph ISTB-6200(c). The analysis of the pump's condition with respect to system operability and Technical Specifications shall also be made as follows:

(1) If the inoperable pump is specifically identified in the technical specifications, then the applicable technical specification required action statements shall be followed.

(2) If the inoperable pump is in a system covered by a technical specification, an assessment of its condition shall be made to determine if it makes the system inoperable. If the condition of the pump renders the system inoperable, then the applicable system technical specification required action statements shall be followed.

(3) Nothing in the ASME OM Code shall be construed to supersede the requirements of any technical specification.

(c) **New Reference Values [ISTB-6200(c)]**. In cases where the pump's test parameters are within either the alert or required action ranges of Table ISTB-5121-1, Table ISTB-5221-1, Table ISTB-5321-1 or Table ISTB-5321-2, as applicable, and the pump's continued use at the changed values is supported by an analysis, a new set of reference values may be established. The analysis shall include verification of the pump's operational readiness. The analysis shall include both a pump level and a system level evaluation of operational readiness, the cause of the change in pump performance, and an evaluation of all trends indicated by available data. The results of this analysis shall be documented in the record of tests.

When a test shows measured parameter values that fall outside of the acceptable range of Table ISTB-5121-1, Table ISTB-5221-1, Table ISTB-5321-1 or Table ISTB-5321-2, as applicable, that have resulted from an identified systematic error, such as improper system lineup or inaccurate instrumentation, the test shall be rerun after correcting the error.

If the reference value of a particular parameter being measured or determined can be significantly influenced by other related conditions, then these conditions shall be analyzed and documented in the record of tests.

Records and Reports

Records of the results of inservice tests and corrective actions as required by ISTB-9000 are maintained in computerized or in tabular form. Pump performance characteristics will be examined for trends.

Pump Definitions

Operational Readiness - The ability of a component to perform its intended function when required.

Plant Operation - The conditions of startup, operation at power, hot standby, and reactor cool down, as defined by the plant Technical Specifications.

Reference Point - A point of operation at which reference values are established and inservice test parameters are measured for comparison with applicable acceptance criteria.

Reference Values - One or more values of test parameters measured or determined when the equipment is known to be operating acceptably.

Safe Shutdown - The operating Mode a plant must achieve subsequent to a design basis accident as reflected in the plant safety analysis. BVPS-2 is licensed as cold shutdown being safe shutdown.

Trending - A comparison of current data to previous data obtained under similar conditions for the same equipment.

NOTE:	The following three sections of this document are the "Pump Outline Tables", "Pump Relief Requests", and "Pump Minimum Operating Point (MOP) Curves" sections.

Pump Outline Tables

The "Pump Outline Tables" are a listing of all the pumps in the IST Program, their testing requirements, and their specific pump relief request reference numbers. The pumps are arranged according to system and pump number. The following abbreviations and designations are used on the Pump Outline Tables and throughout the IST Program for pumps:

N - Speed

P - Discharge Pressure

ΔP - Differential Pressure

Q	- Flow rate
V	- Vibration
2BVT	- Unit 2 Beaver Valley Test
2OST	- Unit 2 Operating Surveillance Test
CMP	- Corrective Maintenance Procedure
CPT	- Comprehensive Pump Test
PVT	- Periodic Verification Test
Q	- Quarterly Test Frequency
CSD	- Cold Shutdown Frequency
R	- Refueling Test Frequency
2YR	- Required every 2 years (biennial), but normally done at refueling
PRR	- Pump Relief Request
X	- Meets or exceeds OM Code ISTB requirements
NA	- Not Applicable

Pump Relief Requests

The "Pump Relief Requests" section contains the detailed technical description of particular conditions and equipment installations prohibiting the testing of some of the characteristics of safety-related pumps. An alternate test method and the frequency of revised testing are also included to meet the intent of 10CFR50.55a. The relief request(s) for a specific pump is referenced by the number(s) listed on the pump's testing outline sheet.

Pump Minimum Operating Point (MOP) Curves

The "Pump Minimum Operating Point (MOP) Curves" section contains a graphical representation of the minimum allowable pump flow versus head, which is required to meet the applicable safety analysis, for each centrifugal pump in the Unit 2 IST Program.

SECTION II: PUMP OUTLINE TABLES

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
21A Charging Pump	2CHS*P21A	2	7-Chemical and Volume Control

Function:	**Type:**	**Dwg. OM No.:**
To support the RCS during all normal modes of plant operation which includes, but is not limited to, the following: maintenance of seal water injection flow to the RCPs; control of RCS inventory; supplying pressurizer auxiliary spray and reducing the radioactivity level in the reactor coolant. The pump also serves as the High Head Safety Injection Pump for emergency cool cooling during post accident conditions.	Centrifugal	7-1A
	Group:	**Dwg. Coord.:**
	A	C-4

Remarks: Pump is tested quarterly (Group A test) on recirculation flow with the VCT via the normal charging header while at power or via the miniflow recirc path with the RWST when shutdown. Comprehensive and Periodic Verification tests ~~is~~ are performed during refueling outages at full flow from the RWST to the RCS during HHSI full flow testing. The design point is 150 gpm, the BEP is approximately 350 gpm, and the highest design basis accident flow per Calc. 10080-N-794 (Rev.1, Add.2) is 472.4 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR2, PRR3, PRR4 and PRR10.

Parameter (Group A)	2OST- (Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	7.4 (Q)	X (PRR2)	Calculated using Pump Discharge Pressure Indicator [2CHS-PI151B] and Pump Suction Pressure Indicator [2CHS-PI151A], local. See PRR2 for range and accuracy of Pump Suction Pressure Indicator [2CHS-PI151A].
Q	7.4 (Q)	X	Summation of flow rates from Flow Indicators [2CHS-FI124A, 127A, 130A, 160], computer point [F0128A] for [2CHS-FI122A], Control Room, and [2CHS-FI170], local.
V	7.4 (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	2OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	11.14B (R)	X	Calculated using a temporary suction and discharge pressure test gauge, local.
Q	11.14B (R)	X	Calculated from the voltage measured at a d/p transmitter installed at [2SIS-FT943 or 940] (local).
V	11.14B (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	11.14B (R)	X	Calculated using a temporary suction and discharge pressure test gauge, local.
Q	11.14B (R)	X	Calculated from the voltage measured at a d/p transmitter installed at [2SIS-FT943 or 940] (local).

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name: 21B Charging Pump	**Pump Number:** 2CHS*P21B	**Code Class:** 2	**System:** 7-Chemical and Volume Control

Function: To support the RCS during all normal modes of plant operation which includes, but is not limited to, the following: maintenance of seal water injection flow to the RCPs; control of RCS inventory; supplying pressurizer auxiliary spray and reducing the radioactivity level in the reactor coolant. The pump also serves as the High Head Safety Injection Pump for emergency cool cooling during post accident conditions..	**Type:** Centrifugal	**Dwg. OM No.:** 7-1A
	Group: A	**Dwg. Coord.:** D-4

Remarks: Pump is tested quarterly (Group A test) on recirculation flow with the VCT via the normal charging header while at power or via the miniflow recirc path with the RWST when shutdown. Comprehensive and Periodic Verification tests ~~is~~ are performed during refueling outages at full flow from the RWST to the RCS during HHSI full flow testing. The design point is 150 gpm, the BEP is approximately 350 gpm, and the highest design basis accident flow per Calc. 10080-N-794 (Rev.1, Add.2) is 472.4 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR2, PRR3, PRR4 and PRR10.

Parameter (Group A)	2OST- (Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	7.5 (Q)	X (PRR2)	Calculated using Pump Discharge Pressure Indicator [2CHS-PI152B] and Pump Suction Pressure Indicator [2CHS-PI152A], local. See PRR2 for range and accuracy of Pump Suction Pressure Indicator [2CHS-PI152A].
Q	7.5 (Q)	X	Summation of flow rates from Flow Indicators [2CHS-FI124A, 127A, 130A, 160], computer point [F0128A] for [2CHS-FI122A], Control Room, and [2CHS-FI170], local.
V	7.5 (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	2OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	11.14B (R)	X	Calculated using a temporary suction and discharge pressure test gauge, local.
Q	11.14B (R)	X	Calculated from the voltage measured at a d/p transmitter installed at [2SIS-FT943 or 940] (local).
V	11.14B (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	11.14B (R)	X	Calculated using a temporary suction and discharge pressure test gauge, local.
Q	11.14B (R)	X	Calculated from the voltage measured at a d/p transmitter installed at [2SIS-FT943 or 940] (local).

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
21C Charging Pump	2CHS*P21C	2	7-Chemical and Volume Control

Function: To support the RCS during all normal modes of plant operation which includes, but is not limited to, the following: maintenance of seal water injection flow to the RCPs; control of RCS inventory; supplying pressurizer auxiliary spray and reducing the radioactivity level in the reactor coolant. The pump also serves as the High Head Safety Injection Pump for emergency cool cooling during post accident conditions.	**Type:** Centrifugal **Group:** A	**Dwg. OM No.:** 7-1A **Dwg. Coord.:** E-4

Remarks: Pump is tested quarterly (Group A test) on recirculation flow with the VCT via the normal charging header while at power or via the miniflow recirc path with the RWST when shutdown. Comprehensive and Periodic Verification tests ~~is~~ are performed during refueling outages at full flow from the RWST to the RCS during HHSI full flow testing. The design point is 150 gpm, the BEP is approximately 350 gpm, and the highest design basis accident flow per Calc. 10080-N-794 (Rev.1, Add.2) is 472.4 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR2, PRR3, PRR4 and PRR10.

Parameter (Group A)	2OST-(Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	7.6 (Q)	X (PRR2)	Calculated using Pump Discharge Pressure Indicator [2CHS-PI153B] and Pump Suction Pressure Indicator [2CHS-PI153A], local. See PRR2 for range and accuracy of Pump Suction Pressure Indicator [2CHS-PI153A].
Q	7.6 (Q)	X	Summation of flow rates from Flow Indicators [2CHS-FI124A, 127A, 130A, 160], computer point [F0128A] for [2CHS-FI122A], Control Room, and [2CHS-FI170], local.
V	7.6 (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	11.14B (R)	X	Calculated using a temporary suction and discharge pressure test gauge, local.
Q	11.14B (R)	X	Calculated from the voltage measured at a d/p transmitter installed at [2SIS-FT943 or 940] (local).
V	11.14B (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 4850 rpm.
ΔP	11.14B (R)	X	Calculated using a temporary suction and discharge pressure test gauge, local.
Q	11.14B (R)	X	Calculated from the voltage measured at a d/p transmitter installed at [2SIS-FT943 or 940] (local).

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
22A Boric Acid Transfer Pump	2CHS*P22A	3	7-Chemical and Volume Control

Function: To provide a solution of soluble boric acid for reactor coolant makeup. The pump also provides boric acid for emergency boration.	**Type:** Centrifugal	**Dwg. OM No.:** 7-2
	Group: A	**Dwg. Coord.:** C-2

Remarks: Pump is tested quarterly (Group A test) at full flow by recirculating the Boric Acid Tank. The Comprehensive and Periodic Verification tests utilize the same flow path once every 2 years. The design point is 75 gpm, the BEP is approximately 100 gpm, and the highest design basis accident flow rate per EM109114 is 71 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR2, PRR3, PRR4 and PRR10.

Parameter (Group A)	2OST-(Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3505 rpm.
ΔP	7.1 (Q)	X (PRR2)	Calculated using Pump Discharge Pressure Indicator [2CHS-PI105] and Pump Suction Pressure Indicator [2CHS-PI123A], local. See PRR2 for range and accuracy of Pump Suction Pressure Indicator [2CHS-PI123A].
Q	7.1 (Q)	X	Flow Indicator [2CHS-FI123A], local.
V	7.1 (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3505 rpm.
ΔP	7.1 (2YR)	X	Calculated using Pump Discharge Pressure Indicator [2CHS-PI105] (local) and a temporary suction pressure test gauge, local.
Q	7.1 (2YR)	X	Flow Indicator [2CHS-FI123A], local.
V	7.1 (2YR)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3505 rpm.
ΔP	7.1 (2YR)	X	Calculated using Pump Discharge Pressure Indicator [2CHS-PI105] (local) and a temporary suction pressure test gauge, local.
Q	7.1 (2YR)	X	Flow Indicator [2CHS-FI123A], local.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name: 22B Boric Acid Transfer Pump	**Pump Number:** 2CHS*P22B	**Code Class:** 3	**System:** 7-Chemical and Volume Control	
Function: To provide a solution of soluble boric acid for reactor coolant makeup. The pump also provides boric acid for emergency boration.			**Type:** Centrifugal	**Dwg. OM No.:** 7-2
			Group: A	**Dwg. Coord.:** F-2
Remarks: Pump is tested quarterly (Group A test) at full flow by recirculating the Boric Acid Tank. The Comprehensive and Periodic Verification tests utilize the same flow path once every 2 years. The design point is 75 gpm, the BEP is approximately 100 gpm, and the highest design basis accident flow rate per EM109114 is 71 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR2, PRR3, PRR4 and PRR10.				

Parameter (Group A)	2OST-(Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3505 rpm.
ΔP	7.2 (Q)	X (PRR2)	Calculated using Pump Discharge Pressure Indicator [2CHS-PI110] and Pump Suction Pressure Indicator [2CHS-PI123B], local. See PRR2 for range and accuracy of Pump Suction Pressure Indicator [2CHS-PI123B].
Q	7.2 (Q)	X	Flow Indicator [2CHS-FI123B], local.
V	7.2 (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3505 rpm.
ΔP	7.2 (2YR)	X	Calculated using Pump Discharge Pressure Indicator [2CHS-PI110] (local) and a temporary suction pressure test gauge, local.
Q	7.2 (2YR)	X	Flow Indicator [2CHS-FI123B], local.
V	7.2 (2YR)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3505 rpm.
ΔP	7.2 (2YR)	X	Calculated using Pump Discharge Pressure Indicator [2CHS-PI110] (local) and a temporary suction pressure test gauge, local.
Q	7.2 (2YR)	X	Flow Indicator [2CHS-FI123B], local.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**	
21A Residual Heat Removal Pump	2RHS*P21A	2	10-Residual Heat Removal	
Function: To remove heat energy from the core and the RCS during plant cool down.			**Type:** Vertically-Mounted Centrifugal	**Dwg. OM No.:** 10-1
			Group: A	**Dwg. Coord.:** B-3
Remarks: Per PRR5, the pump is tested during cold shutdowns (Group A Test) and during refueling outages (Comprehensive and Periodic Verification Tests) at full flow by recirculating the RCS. The design point is 4000 gpm, the BEP is approximately 4000 gpm, and the highest design basis accident flow rate per Calc. BV2-SET-024 and EM 113379 is 4000 gpm (MOP and req'd discharge check valve flow). . During cold shutdowns and extended outages, the Group A test will occur at least once every 92 days. The Comprehensive test will be performed in lieu of the Group A test at least once during refueling outages. Also see PRR1, PRR3, PRR4 and PRR10.				

Parameter (Group A)	2OST-(Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	10.1 (CSD)	X	Calculated from the voltage measured in the racks from Pump Discharge Pressure Transmitter [2RHS-PT602A] and Pump Suction Pressure Transmitter [2RHS-PT603A]
Q	10.1 (CSD)	X	Summation of flow rates from Flow Indicators [2RHS-FI607A], and [2CHS-FI150], and computer point [F0617A] for [2RHS-FI605A],Control Room.
V	10.1 (CSD)	X	Portable monitoring equipment using velocity units. Motor bearing vibrations will be obtained because the pump bearings are in the driver.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	10.1 (R)	X	Calculated from the voltage measured in the racks from Pump Discharge Pressure Transmitter [2RHS-PT602A] and Pump Suction Pressure Transmitter [2RHS-PT603A]
Q	10.1 (R)	X	Summation of flow rates from Flow Indicators [2RHS-FI607A], and [2CHS-FI150], and computer point [F0617A] for [2RHS-FI605A],Control Room.
V	10.1 (R)	X	Portable monitoring equipment using velocity units. Motor bearing vibrations will be obtained because the pump bearings are in the driver.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	10.1 (R)	X	Calculated from the voltage measured in the racks from Pump Discharge Pressure Transmitter [2RHS-PT602A] and Pump Suction Pressure Transmitter [2RHS-PT603A]
Q	10.1 (R)	X	Summation of flow rates from Flow Indicators [2RHS-FI607A], and [2CHS-FI150], and computer point [F0617A] for [2RHS-FI605A],Control Room.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name: 21B Residual Heat Removal Pump	**Pump Number:** 2RHS*P21B	**Code Class:** 2	**System:** 10-Residual Heat Removal	
Function: To remove heat energy from the core and the RCS during plant cool down.			**Type:** Vertically-Mounted Centrifugal	**Dwg. OM No.:** 10-1
			Group: A	**Dwg. Coord.:** E-3
Remarks: Per PRR5, the pump is tested during cold shutdowns (Group A Test) and during refueling outages (Comprehensive and Periodic Verification Tests) at full flow by recirculating the RCS. The design point is 4000 gpm, the BEP is approximately 4000 gpm, and the highest design basis accident flow rate per Calc. BV2-SET-024 and EM 113379 is 4000 gpm (MOP and req'd discharge check valve flow). . During cold shutdowns and extended outages, the Group A test will occur at least once every 92 days. The Comprehensive test will be performed in lieu of the Group A test at least once during refueling outages. Also see PRR1, PRR3 and PRR10.				

Parameter (Group A)	2OST-(Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	10.2 (CSD)	X	Calculated from the voltage measured in the racks from Pump Discharge Pressure Transmitter [2RHS-PT602B] and Pump Suction Pressure Transmitter [2RHS-PT603B]
Q	10.2 (CSD)	X	Summation of flow rates from Flow Indicators [2RHS-FI607B], and [2CHS-FI150], and computer point [F0627A] for [2RHS-FI605B], Control Room.
V	10.2 (CSD)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	10.2 (R)	X	Calculated from the voltage measured in the racks from Pump Discharge Pressure Transmitter [2RHS-PT602B] and Pump Suction Pressure Transmitter [2RHS-PT603B]
Q	10.2 (R)	X	Summation of flow rates from Flow Indicators [2RHS-FI607B], and [2CHS-FI150], and computer point [F0627A] for [2RHS-FI605B], Control Room.
V	10.2 (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	10.2 (R)	X	Calculated from the voltage measured in the racks from Pump Discharge Pressure Transmitter [2RHS-PT602B] and Pump Suction Pressure Transmitter [2RHS-PT603B]
Q	10.2 (R)	X	Summation of flow rates from Flow Indicators [2RHS-FI607B], and [2CHS-FI150], and computer point [F0627A] for [2RHS-FI605B], Control Room.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
21A Low Head Safety Injection Pump	2SIS*P21A	2	11-Safety Injection

Function: To operate primarily during a large break LOCA, in addition to other design basis accidents, in order to provide low head safety injection and recirculation flow to the RCS, and for long term shutdown cooling during post-LOCA conditions. The pump is not utilized during any plant operating evolution and remains in standby during all operating Modes.	**Type:** Centrifugal **Group:** B	**Dwg. OM No.:** 11-1 **Dwg. Coord.:** E-2

Remarks: Pump is tested quarterly (Group B test) on recirculation flow with the RWST. Comprehensive and Periodic Verification tests is are performed during refueling outages at full flow to the RCS. The design point is 3000 gpm, the BEP is approximately 4500 gpm, and the highest design basis accident flow rate per Calc. PS-C-104 is 3615 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR2, PRR3 and PRR10.

Parameter (Group B)	2OST-(Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1778 rpm.
ΔP	11.1 (Q)	X (PRR2)	Calculated using Pump Discharge Pressure Indicator [2SIS-PI943] and Pump Suction Pressure Indicator [2SIS-PI938], local. See PRR2 for range and accuracy of Pump Suction Pressure Indicator [2SIS-PI938].
Q	11.1 (Q)	X	Flow indicator [2SIS-FIS970A], local.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1778 rpm.
ΔP	11.14A (R)	X	Calculated using Pump Discharge Pressure Indicator [2SIS-PI943] (local) and a temporary suction pressure test gauge, local.
Q	11.14A (R)	X	Computer point [F5946A] for flow indicator [2SIS-FI945], Control Room.
V	11.14A (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1778 rpm.
ΔP	11.14A (R)	X	Calculated using Pump Discharge Pressure Indicator [2SIS-PI943] (local) and a temporary suction pressure test gauge, local.
Q	11.14A (R)	X	Computer point [F5946A] for flow indicator [2SIS-FI945], Control Room.

BVPS-2 IST
PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
21B Low Head Safety Injection Pump	2SIS*P21B	2	11-Safety Injection

Function: To operate primarily during a large break LOCA, in addition to other design basis accidents, in order to provide low head safety injection and recirculation flow to the RCS, and for long term shutdown cooling during post-LOCA conditions. The pump is not utilized during any plant operating evolution and remains in standby during all operating Modes.

Type:	**Dwg. OM No.:**
Centrifugal	11-1
Group:	**Dwg. Coord.:**
B	G-2

Remarks: Pump is tested quarterly (Group B test) on recirculation flow with the RWST. Comprehensive and Periodic Verification tests is are performed during refueling outages at full flow to the RCS. The design point is 3000 gpm, the BEP is approximately 4500 gpm, and the highest design basis accident flow rate per Calc. PS-C-104 is 3615 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR2, PRR3 and PRR10.

Parameter (Group B)	2OST-(Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1778 rpm.
ΔP	11.2 (Q)	X (PRR2)	Calculated using Pump Discharge Pressure Indicator [2SIS-PI944] and Pump Suction Pressure Indicator [2SIS-PI939], local. See PRR2 for range and accuracy of Pump Suction Pressure Indicator [2SIS-PI939].
Q	11.2 (Q)	X	Flow indicator [2SIS-FIS970B], local.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1778 rpm.
ΔP	11.14A (R)	X	Calculated using Pump Discharge Pressure Indicator [2SIS-PI944] (local) and a temporary suction pressure test gauge, local.
Q	11.14A (R)	X	Computer point [F5945A] for flow indicator [2SIS-FI946], Control Room.
V	11.14A (R)	X	Portable monitoring equipment using velocity units.

Parameter PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1778 rpm.
ΔP	11.14A (R)	X	Calculated using Pump Discharge Pressure Indicator [2SIS-PI944] (local) and a temporary suction pressure test gauge, local.
Q	11.14A (R)	X	Computer point [F5945A] for flow indicator [2SIS-FI946], Control Room.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name: 21A Quench Spray Pump	**Pump Number:** 2QSS*P21A	**Code Class:** 2	**System:** 13-Containment Depressurization	
Function: To operate only during a loss-of-coolant accident (LOCA) for containment heat removal and pressure suppression, in addition to removing fission products released into the containment atmosphere during a LOCA by the admission of sodium hydroxide to the spray stream. The pump is not utilized during any plant operating evolution and remains in standby during all operating modes.			**Type:** Centrifugal **Group:** B	**Dwg. OM No.:** 13-2 **Dwg. Coord.:** A-9
Remarks: Pump is tested quarterly (Group B test) at full flow by recirculating the RWST. This same flow path is utilized during performance of the Comprehensive Pump Test once every 2 years. The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. The design point is 3000 gpm, the BEP is approximately 3000 gpm, the highest design basis accident flow rate per Calc. 10080-N-813 (Rev.2) is 3200 gpm (required discharge check valve flow), therefore, the Periodic Verification Test is performed while recirculating the RWST at ≥3200 gpm once every 2 years. Also see PRR1, PRR3 and PRR10.				

Parameter (Group B)	2OST-(Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3548 rpm.
ΔP	13.1 (Q)	X	Calculated using Pump Discharge Pressure Indicator [2QSS-PI101A] and Pump Suction Pressure Indicator [2QSS-PI102A], Control Room.
Q	13.1 (Q)	X	Flow Indicator [2QSS-FIS101A or 102A], local.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3548 rpm.
ΔP	13.1 (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and a temporary suction pressure test gauge (local).
Q	13.1 (2YR)	X	Flow Indicator [2QSS-FIS101A or 102A], local.
V	13.1 (2YR)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3548 rpm.
ΔP	13.1 (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and a temporary suction pressure test gauge (local).
Q	13.1 (2YR)	X	Flow Indicator [2QSS-FIS101A or 102A], local.

BVPS-2 IST PUMP OUTLINE TABLE				
Pump Name: 21B Quench Spray Pump	**Pump Number:** 2QSS*P21B	**Code Class:** 2	**System:** 13-Containment Depressurization	
Function: To operate only during a loss-of-coolant accident (LOCA) for containment heat removal and pressure suppression, in addition to removing fission products released into the containment atmosphere during a LOCA by the admission of sodium hydroxide to the spray stream. The pump is not utilized during any plant operating evolution and remains in standby during all operating modes.			**Type:** Centrifugal **Group:** B	**Dwg. OM No.:** 13-2 **Dwg. Coord.:** G-9
Remarks: Pump is tested quarterly (Group B test) at full flow by recirculating the RWST. This same flow path is utilized during performance of the Comprehensive Pump Test once every 2 years. The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. The design point is 3000 gpm, the BEP is approximately 3000 gpm, the highest design basis accident flow rate per Calc. 10080-N-813 (Rev.2) is 3200 gpm (required discharge check valve flow), therefore, the Periodic Verification Test is performed while recirculating the RWST at ≥3200 gpm once every 2 years. Also see PRR1, PRR3 and PRR10.				

Parameter (Group B)	2OST-(Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3548 rpm.
ΔP	13.2 (Q)	X	Calculated using Pump Discharge Pressure Indicator [2QSS-PI101B] and Pump Suction Pressure Indicator [2QSS-PI102B], Control Room.
Q	13.2 (Q)	X	Flow Indicator [2QSS-FIS101B or 102B], local.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3548 rpm.
ΔP	13.2 (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and a temporary suction pressure test gauge (local).
Q	13.2 (2YR)	X	Flow Indicator [2QSS-FIS101B or 102B], local.
V	13.2 (2YR)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3548 rpm.
ΔP	13.2 (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and a temporary suction pressure test gauge (local).
Q	13.2 (2YR)	X	Flow Indicator [2QSS-FIS101B or 102B], local.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**	
21A Recirculation Spray Pump	2RSS*P21A	2	13-Containment Depressurization	
Function: To operate only during a loss-of-coolant accident (LOCA) for long term containment heat removal and pressure suppression after sufficient inventory has collected in the containment sump to support pump operation. The pump is not utilized during any plant operating evolution and remains in standby during all operating modes.			**Type:** Vertical Line Shaft **Group:** B	**Dwg. OM No.:** 13-1 **Dwg. Coord.:** F-3
Remarks: Per ISTB-3430, "Pumps Lacking Required Fluid Inventory", pumps in dry sumps need not be tested every 3 months, however, they shall be tested at least once every 2 years with the required fluid inventory provided during this test. This pump is normally tested during refueling outages by filling a temporary dike built around the containment sump area and circulating water through a test loop at full flow (Comprehensive and Periodic Verification tests). The design point is 3500 gpm, the BEP is approximately 3500 gpm, and the highest design basis accident flow rate per Calc. 12241-US(B)-190-2 is 3500 gpm (MOP). In all cases, the Comprehensive test will be performed in lieu of the Group B test at refueling. Also see PRR1, PRR3 and PRR10.				

Parameter (Group B)	2OST-(Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
Q	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	2BVT 1.13.5 (R)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure using the level in the dike as measured by a ruler (local), in accordance with Section 5.5.3 of NUREG-1482.
Q	2BVT 1.13.5 (R)	X	Computer point [F2591A] or flow Indicator [2RSS-FI157A], Control Room.
V	2BVT 1.13.5 (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	2BVT 1.13.5 (R)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure using the level in the dike as measured by a ruler (local), in accordance with Section 5.5.3 of NUREG-1482.
Q	2BVT 1.13.5 (R)	X	Computer point [F2591A] or flow Indicator [2RSS-FI157A], Control Room.

BVPS-2 IST PUMP OUTLINE TABLE				
Pump Name: 21B Recirculation Spray Pump	**Pump Number:** 2RSS*P21B	**Code Class:** 2	**System:** 13-Containment Depressurization	
Function: To operate only during a loss-of-coolant accident (LOCA) for long term containment heat removal and pressure suppression after sufficient inventory has collected in the containment sump to support pump operation. The pump is not utilized during any plant operating evolution and remains in standby during all operating modes.			**Type:** Vertical Line Shaft **Group:** B	**Dwg. OM No.:** 13-1 **Dwg. Coord.:** E-8
Remarks: Per ISTB-3430, "Pumps Lacking Required Fluid Inventory", pumps in dry sumps need not be tested every 3 months, however, they shall be tested at least once every 2 years with the required fluid inventory provided during this test. This pump is normally tested during refueling outages by filling a temporary dike built around the containment sump area and circulating water through a test loop at full flow (Comprehensive and Periodic Verification tests). The design point is 3500 gpm, the BEP is approximately 3500 gpm, and the highest design basis accident flow rate per Calc. 12241-US(B)-190-2 is 3500 gpm (MOP). In all cases, the Comprehensive test will be performed in lieu of the Group B test at refueling. Also see PRR1, PRR3 and PRR10.				

Parameter (Group B)	2OST-(Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
Q	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	2BVT 1.13.5 (R)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure using the level in the dike as measured by a ruler (local), in accordance with Section 5.5.3 of NUREG-1482.
Q	2BVT 1.13.5 (R)	X	Computer point [F2592A] or flow Indicator [2RSS-FI157B], Control Room.
V	2BVT 1.13.5 (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	2BVT 1.13.5 (R)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure using the level in the dike as measured by a ruler (local), in accordance with Section 5.5.3 of NUREG-1482.
Q	2BVT 1.13.5 (R)	X	Computer point [F2592A] or flow Indicator [2RSS-FI157B], Control Room.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
21C Recirculation Spray Pump	2RSS*P21C	2	13-Containment Depressurization

Function: To operate only during a loss-of-coolant accident (LOCA) for long term containment heat removal and pressure suppression after sufficient inventory has collected in the containment sump to support pump operation. The pump is also required to provide sump inventory to the suction supply of the HHSI Pumps when the RWST level is low. The pump is not utilized during any plant operating evolution and remains in standby during all operating modes.	**Type:** Vertical Line Shaft **Group:** B	**Dwg. OM No.:** 13-1 **Dwg. Coord.:** E-5

Remarks: Per ISTB-3430, "Pumps Lacking Required Fluid Inventory", pumps in dry sumps need not be tested every 3 months, however, they shall be tested at least once every 2 years with the required fluid inventory provided during this test. This pump is normally tested during refueling outages by filling a temporary dike built around the containment sump area and circulating water through a test loop at full flow (Comprehensive and Periodic Verification tests). The design point is 3500 gpm, the BEP is approximately 3500 gpm, and the highest design basis accident flow rate per Calc. 12241-US(B)-190-2 is 3500 gpm (MOP). In all cases, the Comprehensive test will be performed in lieu of the Group B test at refueling. Also see PRR1, PRR3 and PRR10.

Parameter (Group B)	2OST-(Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
Q	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	2BVT 1.13.5 (R)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure using the level in the dike as measured by a ruler (local), in accordance with Section 5.5.3 of NUREG-1482.
Q	2BVT 1.13.5 (R)	X	Computer point [F2593A] or flow Indicator [2RSS-FI157C], Control Room.
V	2BVT 1.13.5 (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	2BVT 1.13.5 (R)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure using the level in the dike as measured by a ruler (local), in accordance with Section 5.5.3 of NUREG-1482.
Q	2BVT 1.13.5 (R)	X	Computer point [F2593A] or flow Indicator [2RSS-FI157C], Control Room.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**	
21D Recirculation Spray Pump	2RSS*P21D	2	13-Containment Depressurization	
Function: To operate only during a loss-of-coolant accident (LOCA) for long term containment heat removal and pressure suppression after sufficient inventory has collected in the containment sump to support pump operation. The pump is also required to provide sump inventory to the suction supply of the HHSI Pumps when the RWST level is low. The pump is not utilized during any plant operating evolution and remains in standby during all operating modes.			**Type:** Vertical Line Shaft **Group:** B	**Dwg. OM No.:** 13-1 **Dwg. Coord.:** E-6
Remarks: Per ISTB-3430, "Pumps Lacking Required Fluid Inventory", pumps in dry sumps need not be tested every 3 months, however, they shall be tested at least once every 2 years with the required fluid inventory provided during this test. This pump is normally tested during refueling outages by filling a temporary dike built around the containment sump area and circulating water through a test loop at full flow (Comprehensive and Periodic Verification tests). The design point is 3500 gpm, the BEP is approximately 3500 gpm, and the highest design basis accident flow rate per Calc. 12241-US(B)-190-2 is 3500 gpm (MOP). In all cases, the Comprehensive test will be performed in lieu of the Group B test at refueling. Also see PRR1, PRR3 and PRR10.				

Parameter (Group B)	2OST- (Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
Q	NA	NA	Comprehensive test will be performed in lieu of the Group B test.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	2OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	2BVT 1.13.5 (R)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure using the level in the dike as measured by a ruler (local), in accordance with Section 5.5.3 of NUREG-1482.
Q	2BVT 1.13.5 (R)	X	Computer point [F2594A] or flow Indicator [2RSS-FI157D], Control Room.
V	2BVT 1.13.5 (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1769 rpm.
ΔP	2BVT 1.13.5 (R)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure using the level in the dike as measured by a ruler (local), in accordance with Section 5.5.3 of NUREG-1482.
Q	2BVT 1.13.5 (R)	X	Computer point [F2594A] or flow Indicator [2RSS-FI157D], Control Room.

BVPS-2 IST PUMP OUTLINE TABLE				
Pump Name: 21A Component Cooling Water Pump	**Pump Number:** 2CCP*P21A	**Code Class:** 3	**System:** 15-Primary Component Cooling Water	
Function: To operate continuously during normal plant operation to supply cooling water to reactor plant components and non-essential heat loads as well as cooling water to the RCP motor bearings and thermal barrier. Its safety related function is to provide cooling water for RHR system support.			**Type:** Centrifugal **Group:** A	**Dwg. OM No.:** 15-1 **Dwg. Coord.:** B-4
Remarks: Pump is tested quarterly (Group A test) through various CCP supplied heat exchangers using a pump curve developed per the guidelines of ASME OM Code Case OMN-16. The Comprehensive and Periodic Verification tests are performed during refueling outages when additional flow can be directed through the RHR heat exchanger and throttled to greater than the highest design basis accident flow rate of 6457 gpm (required discharge check valve flow) per EM 109115 and Calculation 12241-MT-250. The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR2 and PRR3.				

Parameter (Group A)	2OST-(Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1779 rpm.
ΔP	15.1 (Q)	X (PRR2)	Calculated using Pump Discharge Pressure Indicator [2CCP-PI145A], Control Room, and Pump Suction Pressure Indicator [2CCP-PI150A], local. See PRR2 for range and accuracy of Pump Suction Pressure Indicator [2CCP-PI150A]. ΔP will be converted to a developed head and compared to a pump curve using a head ratio (Hr) based on the ΔP limits of Table ISTB-5121-1.
Q	15.1 (Q)	X	Flow Indicator [2CCP-FI117A1], Control Room. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.
V	15.1 (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1779 rpm.
ΔP	15.1 or 15.5(5A)(5B) (R)	X	Calculated using a temporary discharge pressure test gauge (local) and a temporary suction pressure test gauge, local.
Q	15.1 or 15.5(5A)(5B) (R)	X	Flow Indicator [2CCP-FI117A1], Control Room.
V	15.1 or 15.5(5A)(5B) (R)	X	Portable monitoring equipment using velocity units.

BVPS-2 IST PUMP OUTLINE TABLE			
Pump Name: 21A Component Cooling Water Pump	**Pump Number:** 2CCP*P21A	**Code Class:** 3	**System:** 15-Primary Component Cooling Water

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1779 rpm.
ΔP	15.1 or 15.5(5A)(5B) (R)	X	Calculated using a temporary discharge pressure test gauge (local) and a temporary suction pressure test gauge, local.
Q	15.1 or 15.5(5A)(5B) (R)	X	Flow Indicator [2CCP-FI117A1], Control Room.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
21B Component Cooling Water Pump	2CCP*P21B	3	15-Primary Component Cooling Water

Function: To operate continuously during normal plant operation to supply cooling water to reactor plant components and non-essential heat loads as well as cooling water to the RCP motor bearings and thermal barrier. Its safety related function is to provide cooling water for RHR system support.

Type:	**Dwg. OM No.:**
Centrifugal	15-1
Group:	**Dwg. Coord.:**
A	F-4

Remarks: Pump is tested quarterly (Group A test) through various CCP supplied heat exchangers using a pump curve developed per the guidelines of ASME OM Code Case OMN-16. The Comprehensive and Periodic Verification tests are performed during refueling outages when additional flow can be directed through the RHR heat exchanger and throttled to greater than the highest design basis accident flow rate of 6457 gpm (required discharge check valve flow) per EM 109115 and Calculation 12241-MT-250. The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR2 and PRR3.

Parameter (Group A)	2OST-(Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1779 rpm.
ΔP	15.2 (Q)	X (PRR2)	Calculated using Pump Discharge Pressure Indicator [2CCP-PI145B], Control Room, and Pump Suction Pressure Indicator [2CCP-PI150B], local. See PRR2 for range and accuracy of Pump Suction Pressure Indicator [2CCP-PI150B]. ΔP will be converted to a developed head and compared to a pump curve using a head ratio (Hr) based on the ΔP limits of Table ISTB-5121-1.
Q	15.2 (Q)	X	Summation of flow rates from Flow Indicators [2CCP-FI117B1], Control Room, [2CCP-FI103] and [2CCP-FI102], local. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.
V	15.2 (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1779 rpm.
ΔP	15.2 or 15.5(5A)(5B) (R)	X	Calculated using a temporary discharge pressure test gauge (local) and a temporary suction pressure test gauge, local.
Q	15.2 or 15.5(5A)(5B) (R)	X	Summation of flow rates from Flow Indicators [2CCP-FI117B1], Control Room, [2CCP-FI103] and [2CCP-FI102], local.
V	15.2 or 15.5(5A)(5B) (R)	X	Portable monitoring equipment using velocity units.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
21B Component Cooling Water Pump	2CCP*P21B	3	15-Primary Component Cooling Water

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1779 rpm.
ΔP	15.2 or 15.5(5A)(5B) (R)	X	Calculated using a temporary discharge pressure test gauge (local) and a temporary suction pressure test gauge, local.
Q	15.2 or 15.5(5A)(5B) (R)	X	Summation of flow rates from Flow Indicators [2CCP-FI117B1], Control Room, [2CCP-FI103] and [2CCP-FI102], local.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**	
21C Component Cooling Water Pump	2CCP*P21C	3	15-Primary Component Cooling Water	
Function: To operate continuously during normal plant operation to supply cooling water to reactor plant components and non-essential heat loads as well as cooling water to the RCP motor bearings and thermal barrier. Its safety related function is to provide cooling water for RHR system support.			**Type:** Centrifugal **Group:** A	**Dwg. OM No.:** 15-1 **Dwg. Coord.:** D-4
Remarks: Pump is tested quarterly (Group A test) through various CCP supplied heat exchangers using a pump curve developed per the guidelines of ASME OM Code Case OMN-16. The Comprehensive and Periodic Verification tests are performed during refueling outages when additional flow can be directed through the RHR heat exchanger and throttled to greater than the highest design basis accident flow rate of 6457 gpm (required discharge check valve flow) per EM 109115 and Calculation 12241-MT-250. The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR2 and PRR3.				

Parameter (Group A)	2OST-(Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1779 rpm.
ΔP	15.3 (Q)	X (PRR2)	Calculated using Pump Discharge Pressure Indicator [2CCP-PI145C], Control Room, and Pump Suction Pressure Indicator [2CCP-PI150C], local. See PRR2 for range and accuracy of Pump Suction Pressure Indicator [2CCP-PI150C]. ΔP will be converted to a developed head and compared to a pump curve using a head ratio (Hr) based on the ΔP limits of Table ISTB-5121-1.
Q	15.3 (Q)	X	Flow Indicator [2CCP-FI117A1], Control Room <u>OR</u> summation of flow rates from Flow Indicators [2CCP-FI117B1], Control Room, [2CCP-FI103] and [2CCP-FI102], local. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.
V	15.3 (Q)	X	Portable monitoring equipment using velocity units.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1779 rpm.
ΔP	15.3 or 15.5(5A)(5B) (R)	X	Calculated using a temporary discharge pressure test gauge (local) and a temporary suction pressure test gauge, local.
Q	15.3 or 15.5(5A)(5B) (R)	X	Flow Indicator [2CCP-FI117A1], Control Room <u>OR</u> summation of flow rates from Flow Indicators [2CCP-FI117B1], Control Room, [2CCP-FI103] and [2CCP-FI102], local.
V	15.3 or 15.5(5A)(5B) (R)	X	Portable monitoring equipment using velocity units.

BVPS-2 IST PUMP OUTLINE TABLE			
Pump Name: 21C Component Cooling Water Pump	**Pump Number:** 2CCP*P21C	**Code Class:** 3	**System:** 15-Primary Component Cooling Water

Parameter (PVT)	**1OST- (Frequency)**	**Req'd (PRR3)**	**Periodic Verification Test Comments**
N	NA	NA	Constant speed induction motor. Pump speed is 1779 rpm.
ΔP	15.3 or 15.5(5A)(5B) (R)	X	Calculated using a temporary discharge pressure test gauge (local) and a temporary suction pressure test gauge, local.
Q	15.3 or 15.5(5A)(5B) (R)	X	Flow Indicator [2CCP-FI117A1], Control Room OR summation of flow rates from Flow Indicators [2CCP-FI117B1], Control Room, [2CCP-FI103] and [2CCP-FI102], local.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
Turbine Driven Auxiliary Feedwater Pump	2FWE*P22	3	24-Auxiliary Feedwater

Function:	**Type:**	**Dwg. OM No.:**
To provide emergency makeup to the Steam Generators during loss of normal feedwater following a main turbine trip with a total loss of all electrical power (Station Blackout). The pump is not utilized during any plant operating evolution and remains in standby during all operating modes.	Centrifugal	24-3
	Group: B	**Dwg. Coord.:** E-4

Remarks: Pump is tested quarterly (Group B test) on recirculation flow with the PPDWST and at full flow (Comprehensive and Periodic Verification tests) from the PPDWST to the Steam Generators when in Mode 3 during shutdown for refueling or during startup from refueling outages. The design point is 700 gpm, the BEP is approximately 800 gpm, and the highest design basis accident flow rate per Calc. 10080-N-862-0 and EM115883 is 522-gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR3 and PRR10.

Parameter (Group B)	2OST- (Frequency)	Req'd	Group B Test Comments
N	24.4 (Q)	X	Variable speed turbine with no installed rpm indication. Use portable monitoring equipment – Stroboscope, with pump speed governed to within ±1% of the reference point per ISTB-5122(a).
ΔP	24.4 (Q)	X	Calculated using Pump Discharge Pressure Indicator [2FWE-PI155] and Pump Suction Pressure Indicator [2FWE-PI156], local.
Q	24.4 (Q)	X	Flow Indicator [2FWE-FI155], local.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	2OST- (Frequency)	Req'd	Comprehensive Test Comments
N	24.4A (R)	X	Variable speed turbine with no installed rpm indication. Use portable monitoring equipment – Stroboscope, with pump speed governed to within ±1% of the reference point per ISTB-5122(a).
ΔP	24.4A (R)	X	Calculated using Pump Discharge Pressure Indicator [2FWE-PI155] and Pump Suction Pressure Indicator [2FWE-PI156], local.
Q	24.4A (R)	X	Summation of flow to Steam Generators through Flow Indicators [2FWE-FI100A, B and C] using computer points [F0601A, F0602A and F0603A] (Control Room).
V	24.4A (R)	X	Portable monitoring equipment using velocity units.

BVPS-2 IST PUMP OUTLINE TABLE			
Pump Name: Turbine Driven Auxiliary Feedwater Pump	**Pump Number:** 2FWE*P22	**Code Class:** 3	**System:** 24-Auxiliary Feedwater

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	24.4A (R)	X	Variable speed turbine with no installed rpm indication. Use portable monitoring equipment – Stroboscope, with pump speed governed to within ±1% of the reference point per ISTB-5122(a).
ΔP	24.4A (R)	X	Calculated using Pump Discharge Pressure Indicator [2FWE-PI155] and Pump Suction Pressure Indicator [2FWE-PI156], local.
Q	24.4A (R)	X	Summation of flow to Steam Generators through Flow Indicators [2FWE-FI100A, B and C] using computer points [F0601A, F0602A and F0603A] (Control Room).

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
23A Motor Driven Auxiliary Feedwater Pump	2FWE*P23A	3	24-Auxiliary Feedwater

Function: To serve as an emergency source of feedwater supply to the Steam Generators during a loss of normal feedwater, loss of offsite power, secondary side pipe ruptures, or cool down following a steam generator tube rupture. The pump is not normally utilized during any plant operating evolution and normally remains in standby during all operating modes.

Type:	**Dwg. OM No.:**
Centrifugal	24-3
Group:	**Dwg. Coord.:**
B	F-4

Remarks: Pump is tested quarterly (Group B) on recirculation flow with the PPDWST and at full flow (Comprehensive and Periodic Verification tests) from the PPDWST to the Steam Generators during refueling outages. The design point is 350 gpm, the BEP is approximately 500 gpm, and the highest design basis accident flow rate per Calc. 10080-N-861-0 and EM 115883 is 319 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR2, PRR3, PRR4 and PRR10.

Parameter (Group B)	2OST-(Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3546 rpm.
ΔP	24.2 (Q)	X	Calculated using Pump Discharge Pressure Indicator [2FWE-PI155A] and Pump Suction Pressure Indicator [2FWE-PI156A], local.
Q	24.2 (Q)	X	Flow Indicator [2FWE-FI155A], local.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3546 rpm.
ΔP	24.6A (R)	X	Calculated using Pump Discharge Pressure Indicator [2FWE-PI155A] and Pump Suction Pressure Indicator [2FWE-PI156A], local.
Q	24.6A (R)	X	Summation of flow to Steam Generators through Flow Indicators [2FWE-FI100A, B and C] using computer points [F0601A, F0602A and F0603A] (Control Room).
V	24.6A (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3546 rpm.
ΔP	24.6A (R)	X	Calculated using Pump Discharge Pressure Indicator [2FWE-PI155A] and Pump Suction Pressure Indicator [2FWE-PI156A], local.
Q	24.6A (R)	X	Summation of flow to Steam Generators through Flow Indicators [2FWE-FI100A, B and C] using computer points [F0601A, F0602A and F0603A] (Control Room).

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
23B Motor Driven Auxiliary Feedwater Pump	2FWE*P23B	3	24-Auxiliary Feedwater

Function:	**Type:**	**Dwg. OM No.:**
To serve as an emergency source of feedwater supply to the Steam Generators during a loss of normal feedwater, loss of offsite power, secondary side pipe ruptures, or cool down following a steam generator tube rupture. The pump is not normally utilized during any plant operating evolution and normally remains in standby during all operating modes.	Centrifugal	24-3
	Group:	**Dwg. Coord.:**
	B	G-4

Remarks: Pump is tested quarterly (Group B) on recirculation flow with the PPDWST and at full flow (Comprehensive and Periodic Verification tests) from the PPDWST to the Steam Generators during refueling outages. The design point is 350 gpm, the BEP is approximately 500 gpm, and the highest design basis accident flow rate per Calc. 10080-N-862-0 and EM 115883 is 319 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR2, PRR3, PRR4 and PRR10.

Parameter (Group B)	2OST-(Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3546 rpm.
ΔP	24.3 (Q)	X	Calculated using Pump Discharge Pressure Indicator [2FWE-PI155B] and Pump Suction Pressure Indicator [2FWE-PI156B], local.
Q	24.3 (Q)	X	Flow Indicator [2FWE-FI155B], local.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3546 rpm.
ΔP	24.6B (R)	X	Calculated using Pump Discharge Pressure Indicator [2FWE-PI155B] and Pump Suction Pressure Indicator [2FWE-PI156B], local.
Q	24.6B (R)	X	Summation of flow to Steam Generators through Flow Indicators [2FWE-FI100A, B and C] using computer points [F0601A, F0602A and F0603A] (Control Room).
V	24.6B (R)	X	Portable monitoring equipment using velocity units.

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 3546 rpm.
ΔP	24.6B (R)	X	Calculated using Pump Discharge Pressure Indicator [2FWE-PI155B] and Pump Suction Pressure Indicator [2FWE-PI156B], local.
Q	24.6B (R)	X	Summation of flow to Steam Generators through Flow Indicators [2FWE-FI100A, B and C] using computer points [F0601A, F0602A and F0603A] (Control Room).

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name: 21A Service Water Pump	**Pump Number:** 2SWS*P21A	**Code Class:** 3	**System:** 30-Service Water	
Function: To operate continuously during normal plant operation to provide cooling water for heat removal from power plant auxiliary subsystems. During post accident conditions it provides the heat sink to the following components: at least two recirculation spray coolers, one charging pump lube oil cooler, one control room air-conditioning refrigerant condenser or one control room air-conditioning unit, one emergency diesel generator cooling system heat exchanger, and one safeguards area air-conditioning unit.			**Type:** Vertical Line Shaft **Group:** A	**Dwg. OM No.:** 30-1 **Dwg. Coord.:** C-2
Remarks: Pump is tested quarterly (Group A test) through various SWS supplied heat exchangers using a pump curve developed per the guidelines of ASME OM Code Case OMN-16. This same flow path is utilized during the performance of the Comprehensive and Periodic Verification tests once every 2 years. The design point is 14,700 gpm, the BEP is approximately 13,000 gpm, and the highest design basis accident flow rate per Calc. 10080-N-726-0 is 12,720 gpm (MOP). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR3, PRR4, PRR7, PRR8 and PRR9.				

Parameter (Group A)	2OST-(Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 885 rpm.
ΔP	30.2 (Q)	X	Calculated using Pump Discharge Pressure Indicator [2SWS-PI101A] and the calculated suction pressure using river water elevation from Ohio River Level Recorder [LR-1CW-101], local, as permitted by NUREG-1482, Section 5.5.3, "Use of Tank or Bay Level to Calculate Differential Pressure". ΔP will be converted to a developed head and compared to a pump curve using a head ratio (Hr) based on the ΔP limits of Table ISTB-5121-1. Expanded ranges are permitted during the summer when river water temperature is > 60F per PRR9.
Q	30.2 (Q)	X	Flow Indicator [2SWS-FIT100], local. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.
V	30.2 (Q)	X (PRR7)	Portable monitoring equipment using velocity units. The motor outboard axial (MOA) vibration measurement is not accessible and will not be obtained per PRR7.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 885 rpm.
ΔP	30.2 (2YR)	X (PRR8)	Calculated using a temporary discharge pressure test gauge per PRR8 and the calculated suction pressure using the Ohio River Level Recorder [LR-1CW-101], local. ΔP will be converted to a developed head and compared to a pump curve using a head ratio (Hr) based on the ΔP limits of Table ISTB-5121-1. Expanded ranges are permitted during the summer when river water temperature is > 60F per PRR9.
Q	30.2 (2YR)	X	Flow Indicator [2SWS-FIT100], local. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.
V	30.2 (2YR)	X (PRR7)	Portable monitoring equipment using velocity units. The motor outboard axial (MOA) vibration measurement is not accessible and will not be obtained per PRR7.

BVPS-2 IST PUMP OUTLINE TABLE			
Pump Name: 21A Service Water Pump	**Pump Number:** 2SWS*P21A	**Code Class:** 3	**System:** 30-Service Water

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 885 rpm.
ΔP	30.2 (2YR)	X (PRR8)	Calculated using a temporary discharge pressure test gauge per PRR8 and the calculated suction pressure using the Ohio River Level Recorder [LR-1CW-101], local. ΔP will be converted to a developed head and verified greater than a minimum operating point (MOP) curve.
Q	30.2 (2YR)	X	Flow Indicator [2SWS-FIT100], local. Flow cannot be throttled to a specific value, therefore, a pump/MOP curve will be used in accordance with OMN-16.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
21B Service Water Pump	2SWS*P21B	3	30-Service Water

Function: To operate continuously during normal plant operation to provide cooling water for heat removal from power plant auxiliary subsystems. During post accident conditions it provides the heat sink to the following components: at least two recirculation spray coolers, one charging pump lube oil cooler, one control room air-conditioning refrigerant condenser or one control room air-conditioning unit, one emergency diesel generator cooling system heat exchanger, and one safeguards area air-conditioning unit.	**Type:** Vertical Line Shaft	**Dwg. OM No.:** 30-1
	Group: A	**Dwg. Coord.:** D-2

Remarks: Pump is tested quarterly (Group A test) through various SWS supplied heat exchangers using a pump curve developed per the guidelines of ASME OM Code Case OMN-16. This same flow path is utilized during the performance of the Comprehensive and Periodic Verification tests once every 2 years. The design point is 14,700 gpm, the BEP is approximately 13,000 gpm, and the highest design basis accident flow rate per Calc. 10080-N-726-0 is 12,720 gpm (MOP). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR3, PRR4, PRR7, PRR8 and PRR9.

Parameter (Group A)	2OST-(Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 885 rpm.
ΔP	30.3 (Q)	X	Calculated using Pump Discharge Pressure Indicator [2SWS-PI101B] and the calculated suction pressure using river water elevation from Ohio River Level Recorder [LR-1CW-101], local, as permitted by NUREG-1482, Section 5.5.3, "Use of Tank or Bay Level to Calculate Differential Pressure". ΔP will be converted to a developed head and compared to a pump curve using a head ratio (Hr) based on the ΔP limits of Table ISTB-5121-1. Expanded ranges are permitted during the summer when river water temperature is > 60F per PRR9.
Q	30.3 (Q)	X	Flow Indicator [2SWS-FIT100S], local. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.
V	30.3 (Q)	X (PRR7)	Portable monitoring equipment using velocity units. The motor outboard axial (MOA) vibration measurement is not accessible and will not be obtained per PRR7.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 885 rpm.
ΔP	30.3 (2YR)	X (PRR8)	Calculated using a temporary discharge pressure test gauge per PRR8 and the calculated suction pressure using the Ohio River Level Recorder [LR-1CW-101], local. ΔP will be converted to a developed head and compared to a pump curve using a head ratio (Hr) based on the ΔP limits of Table ISTB-5121-1. Expanded ranges are permitted during the summer when river water temperature is > 60F per PRR9.
Q	30.3 (2YR)	X	Flow Indicator [2SWS-FIT100S], local. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.
V	30.3 (2YR)	X (PRR7)	Portable monitoring equipment using velocity units. The motor outboard axial (MOA) vibration measurement is not accessible and will not be obtained per PRR7.

BVPS-2 IST **PUMP OUTLINE TABLE**			
Pump Name: 21B Service Water Pump	**Pump Number:** 2SWS*P21B	**Code Class:** 3	**System:** 30-Service Water

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 885 rpm.
ΔP	30.3 (2YR)	X (PRR8)	Calculated using a temporary discharge pressure test gauge per PRR8 and the calculated suction pressure using the Ohio River Level Recorder [LR-1CW-101], local. ΔP will be converted to a developed head and verified greater than a minimum operating point (MOP) curve.
Q	30.3 (2YR)	X	Flow Indicator [2SWS-FIT100S], local. Flow cannot be throttled to a specific value, therefore, a pump/MOP curve will be used in accordance with OMN-16.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
21C Service Water Pump	2SWS*P21C	3	30-Service Water

Function: To operate continuously during normal plant operation to provide cooling water for heat removal from power plant auxiliary subsystems. During post accident conditions it provides the heat sink to the following components: at least two recirculation spray coolers, one charging pump lube oil cooler, one control room air-conditioning refrigerant condenser or one control room air-conditioning unit, one emergency diesel generator cooling system heat exchanger, and one safeguards area air-conditioning unit.	**Type:** Vertical Line Shaft	**Dwg. OM No.:** 30-1
	Group: A	**Dwg. Coord.:** G-2

Remarks: Pump is tested quarterly (Group A test) through various SWS supplied heat exchangers using a pump curve developed per the guidelines of ASME OM Code Case OMN-16. This same flow path is utilized during the performance of the Comprehensive and Periodic Verification tests once every 2 years. The design point is 14,700 gpm, the BEP is approximately 13,000 gpm, and the highest design basis accident flow rate per Calc. 10080-N-726-0 is 12,720 gpm (MOP). The Comprehensive Pump Test may be performed in lieu of the quarterly Group A test. Also see PRR1, PRR3, PRR4, PRR7, PRR8and PRR9.

Parameter (Group A)	2OST-(Frequency)	Req'd	Group A Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 885 rpm.
ΔP	30.6A (Q)	X	Calculated using Pump Discharge Pressure Indicator [2SWS-PI101C] and the calculated suction pressure using river water elevation from Ohio River Level Recorder [LR-1CW-101], local, as permitted by NUREG-1482, Section 5.5.3, "Use of Tank or Bay Level to Calculate Differential Pressure". ΔP will be converted to a developed head and compared to a pump curve using a head ratio (Hr) based on the ΔP limits of Table ISTB-5121-1. Expanded ranges are permitted during the summer when river water temperature is > 60F per PRR9.
Q	30.6A (Q)	X	Flow Indicator [2SWS-FIT100(S)], local. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.
V	30.6A (Q)	X (PRR7)	Portable monitoring equipment using velocity units. The motor outboard axial (MOA) vibration measurement is not accessible and will not be obtained per PRR7.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 885 rpm.
ΔP	30.6A (2YR)	X (PRR8)	Calculated using a temporary discharge pressure test gauge per PRR8 and the calculated suction pressure using the Ohio River Level Recorder [LR-1CW-101], local. ΔP will be converted to a developed head and compared to a pump curve using a head ratio (Hr) based on the ΔP limits of Table ISTB-5121-1. Expanded ranges are permitted during the summer when river water temperature is > 60F per PRR9.
Q	30. 6A (2YR)	X	Flow Indicator [2SWS-FIT100(S)], local. Flow cannot be throttled to a specific value, therefore, a pump curve will be used in accordance with OMN-16.
V	30. 6A (2YR)	X (PRR7)	Portable monitoring equipment using velocity units. The motor outboard axial (MOA) vibration measurement is not accessible and will not be obtained per PRR7.

BVPS-2 IST PUMP OUTLINE TABLE			
Pump Name: 21C Service Water Pump	**Pump Number:** 2SWS*P21C	**Code Class:** 3	**System:** 30-Service Water

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 885 rpm.
ΔP	30.6A (2YR)	X (PRR8)	Calculated using a temporary discharge pressure test gauge per PRR8 and the calculated suction pressure using the Ohio River Level Recorder [LR-1CW-101], local. ΔP will be converted to a developed head and verified greater than a minimum operating point (MOP) curve.
Q	30. 6A (2YR)	X	Flow Indicator [2SWS-FIT100(S)], local. Flow cannot be throttled to a specific value, therefore, a pump/MOP curve will be used in accordance with OMN-16.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**	
21A Fuel Oil Transfer Pump	2EGF*P21A	3	36-Diesel Fuel Oil	
Function: To operate only during emergency diesel generator operation to replenish day tank inventory. The pump is not utilized during any plant operating evolution and remains in standby during all operating Modes.			**Type:** Vertical Line Shaft	**Dwg. OM No.:** 36-1
			Group: B	**Dwg. Coord.:** F-3
Remarks: Pump is normally tested bi-monthly (Group B test) at full flow from the fuel oil storage tank to the day tank. This same flow path is utilized during the performance of the Comprehensive and Periodic Verification tests once every 2 years. The design point is 40 gpm, the BEP is approximately 40 gpm, and the highest design basis accident flow rate per Calc. 12241-MT-224 (Rev.21) and supplement to EM 115883 is 20 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR2, PRR3, PRR4 and PRR6.				

Parameter (Group B)	2OST- (Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1745 rpm.
ΔP	36.1(1A) (Q)	X (PRR2)	Calculated using Pump Discharge Pressure Indicator [2EGF-PI201A] (local) and the calculated suction pressure using Fuel Oil Storage Tank level from [2EGF-LIS201A], local, as permitted by NUREG-1482,Section 5.5.3, "Use of Tank or Bay Level to Calculate Differential Pressure." See PRR2 for range and accuracy of Pump Discharge Pressure Indicator [2EGF-PI201A].
Q	36.1(1A) (Q)	X (PRR6)	No instrumentation is provided for flow. A level change over time in the day tank will be measured using Level Gauge [2EGF*LG201], local, and converted to flow rate per PRR6.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	2OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1745 rpm.
ΔP	36.1(1A) (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure from the level in the Fuel Oil Storage Tank using a sounding tape (local) as permitted by NUREG-1482, Section 5.5.3, "Use of Tank or Bay Level to Calculate Differential Pressure."
Q	36.1(1A) (2YR)	X (PRR6)	No instrumentation is provided for flow. A level change over time in the day tank will be measured using Level Gauge [2EGF*LG201], local, and converted to flow rate per PRR6.
V	36.1(1A) (2YR)	X	Portable monitoring equipment using velocity units.

BVPS-2 IST PUMP OUTLINE TABLE			
Pump Name: 21A Fuel Oil Transfer Pump	**Pump Number:** 2EGF*P21A	**Code Class:** 3	**System:** 36-Diesel Fuel Oil

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1745 rpm.
ΔP	36.1(1A) (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure from the level in the Fuel Oil Storage Tank using a sounding tape (local) as permitted by NUREG-1482, Section 5.5.3, "Use of Tank or Bay Level to Calculate Differential Pressure."
Q	36.1(1A) (2YR)	X (PRR6)	No instrumentation is provided for flow. A level change over time in the day tank will be measured using Level Gauge [2EGF*LG201], local, and converted to flow rate per PRR6.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name: 21B Fuel Oil Transfer Pump	**Pump Number:** 2EGF*P21B	**Code Class:** 3	**System:** 36-Diesel Fuel Oil

Function: To operate only during emergency diesel generator operation to replenish day tank inventory. The pump is not utilized during any plant operating evolution and remains in standby during all operating Modes.	**Type:** Vertical Line Shaft	**Dwg. OM No.:** 36-1
	Group: B	**Dwg. Coord.:** E-3

Remarks: Pump is normally tested bi-monthly (Group B test) at full flow from the fuel oil storage tank to the day tank. This same flow path is utilized during the performance of the Comprehensive and Periodic Verification tests once every 2 years. The design point is 40 gpm, the BEP is approximately 40 gpm, and the highest design basis accident flow rate per Calc. 12241-MT-224 (Rev.21) and supplement to EM 115883 is 20 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR2, PRR3, PRR4 and PRR6.

Parameter (Group B)	2OST-(Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1745 rpm.
ΔP	36.1(1A) (Q)	X (PRR2)	Calculated using Pump Discharge Pressure Indicator [2EGF-PI201B] (local) and the calculated suction pressure using Fuel Oil Storage Tank level from [2EGF-LIS201A], local, as permitted by NUREG-1482, Section 5.5.3, "Use of Tank or Bay Level to Calculate Differential Pressure." See PRR2 for range and accuracy of Pump Discharge Pressure Indicator [2EGF-PI201B].
Q	36.1(1A) (Q)	X (PRR6)	No instrumentation is provided for flow. A level change over time in the day tank will be measured using Level Gauge [2EGF*LG201], local, and converted to flow rate per PRR6.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1745 rpm.
ΔP	36.1(1A) (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure from the level in the Fuel Oil Storage Tank using a sounding tape (local) as permitted by NUREG-1482, Section 5.5.3, "Use of Tank or Bay Level to Calculate Differential Pressure."
Q	36.1(1A) (2YR)	X (PRR6)	No instrumentation is provided for flow. A level change over time in the day tank will be measured using Level Gauge [2EGF*LG201], local, and converted to flow rate per PRR6.
V	36.1(1A) (2YR)	X	Portable monitoring equipment using velocity units.

BVPS-2 IST PUMP OUTLINE TABLE			
Pump Name: 21B Fuel Oil Transfer Pump	**Pump Number:** 2EGF*P21B	**Code Class:** 3	**System:** 36-Diesel Fuel Oil

Parameter (PVT)	1OST-(Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1745 rpm.
ΔP	36.1(1A) (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure from the level in the Fuel Oil Storage Tank using a sounding tape (local) as permitted by NUREG-1482, Section 5.5.3, "Use of Tank or Bay Level to Calculate Differential Pressure."
Q	36.1(1A) (2YR)	X (PRR6)	No instrumentation is provided for flow. A level change over time in the day tank will be measured using Level Gauge [2EGF*LG201], local, and converted to flow rate per PRR6.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**	
21C Fuel Oil Transfer Pump	2EGF*P21C	3	36-Diesel Fuel Oil	
Function: To operate only during emergency diesel generator operation to replenish day tank inventory. The pump is not utilized during any plant operating evolution and remains in standby during all operating Modes.			**Type:** Vertical Line Shaft	**Dwg. OM No.:** 36-1
			Group: B	**Dwg. Coord.:** F-8
Remarks: Pump is normally tested bi-monthly (Group B test) at full flow from the fuel oil storage tank to the day tank. This same flow path is utilized during the performance of the Comprehensive and Periodic Verification tests once every 2 years. The design point is 40 gpm, the BEP is approximately 40 gpm, and the highest design basis accident flow rate per Calc. 12241-MT-224 (Rev.21) and supplement to EM 115883 is 20 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR2, PRR3, PRR4 and PRR6.				

Parameter (Group B)	2OST- (Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1745 rpm.
ΔP	36.2(2A) (Q)	X (PRR2)	Calculated using Pump Discharge Pressure Indicator [2EGF-PI201C] (local) and the calculated suction pressure using Fuel Oil Storage Tank level from [2EGF-LIS201B], local, as permitted by NUREG-1482, Section 5.5.3, "Use of Tank or Bay Level to Calculate Differential Pressure." See PRR2 for range and accuracy of Pump Discharge Pressure Indicator [2EGF-PI201C].
Q	36.2(2A) (Q)	X (PRR6)	No instrumentation is provided for flow. A level change over time in the day tank will be measured using Level Gauge [2EGF*LG202], local, and converted to flow rate per PRR6.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	2OST- (Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1745 rpm.
ΔP	36.2(2A) (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure from the level in the Fuel Oil Storage Tank using a sounding tape (local) as permitted by NUREG-1482, Section 5.5.3, "Use of Tank or Bay Level to Calculate Differential Pressure."
Q	36.2(2A) (2YR)	X (PRR6)	No instrumentation is provided for flow. A level change over time in the day tank will be measured using Level Gauge [2EGF*LG202], local, and converted to flow rate per PRR6.
V	36.2(2A) (2YR)	X	Portable monitoring equipment using velocity units.

BVPS-2 IST

PUMP OUTLINE TABLE

Pump Name:	**Pump Number:**	**Code Class:**	**System:**
21C Fuel Oil Transfer Pump	2EGF*P21C	3	36-Diesel Fuel Oil

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1745 rpm.
ΔP	36.2(2A) (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure from the level in the Fuel Oil Storage Tank using a sounding tape (local) as permitted by NUREG-1482, Section 5.5.3, "Use of Tank or Bay Level to Calculate Differential Pressure."
Q	36.2(2A) (2YR)	X (PRR6)	No instrumentation is provided for flow. A level change over time in the day tank will be measured using Level Gauge [2EGF*LG202], local, and converted to flow rate per PRR6.

BVPS-2 IST PUMP OUTLINE TABLE				
Pump Name: 21D Fuel Oil Transfer Pump	**Pump Number:** 2EGF*P21D	**Code Class:** 3	**System:** 36-Diesel Fuel Oil	
Function: To operate only during emergency diesel generator operation to replenish day tank inventory. The pump is not utilized during any plant operating evolution and remains in standby during all operating Modes.			**Type:** Vertical Line Shaft	**Dwg. OM No.:** 36-1
			Group: B	**Dwg. Coord.:** E-8
Remarks: Pump is normally tested bi-monthly (Group B test) at full flow from the fuel oil storage tank to the day tank. This same flow path is utilized during the performance of the Comprehensive and Periodic Verification tests once every 2 years. The design point is 40 gpm, the BEP is approximately 40 gpm, and the highest design basis accident flow rate per Calc. 12241-MT-224 (Rev.21) and supplement to EM 115883 is 20 gpm (required discharge check valve flow). The Comprehensive Pump Test may be performed in lieu of the quarterly Group B test. Also see PRR1, PRR2, PRR3, PRR4 and PRR6.				

Parameter (Group B)	2OST-(Frequency)	Req'd	Group B Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1760 rpm.
ΔP	36.2(2A) (Q)	X (PRR2)	Calculated using Pump Discharge Pressure Indicator [2EGF-PI201D] (local) and the calculated suction pressure using Fuel Oil Storage Tank level from [2EGF-LIS201B], local, as permitted by NUREG-1482, Section 5.5.3, "Use of Tank or Bay Level to Calculate Differential Pressure." See PRR2 for range and accuracy of Pump Discharge Pressure Indicator [2EGF-PI201D].
Q	36.2(2A) (Q)	X (PRR6)	No instrumentation is provided for flow. A level change over time in the day tank will be measured using Level Gauge [2EGF*LG202], local, and converted to flow rate per PRR6.
V	NA	NA	Not required during the quarterly Group B test.

Parameter (CPT)	2OST-(Frequency)	Req'd	Comprehensive Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1760 rpm.
ΔP	36.2(2A) (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure from the level in the Fuel Oil Storage Tank using a sounding tape (local) as permitted by NUREG-1482, Section 5.5.3, "Use of Tank or Bay Level to Calculate Differential Pressure."
Q	36.2(2A) (2YR)	X (PRR6)	No instrumentation is provided for flow. A level change over time in the day tank will be measured using Level Gauge [2EGF*LG202], local, and converted to flow rate per PRR6.
V	36.2(2A) (2YR)	X	Portable monitoring equipment using velocity units.

BVPS-2 IST PUMP OUTLINE TABLE			
Pump Name: 21D Fuel Oil Transfer Pump	**Pump Number:** 2EGF*P21D	**Code Class:** 3	**System:** 36-Diesel Fuel Oil

Parameter (PVT)	1OST- (Frequency)	Req'd (PRR3)	Periodic Verification Test Comments
N	NA	NA	Constant speed induction motor. Pump speed is 1760 rpm.
ΔP	36.2(2A) (2YR)	X	Calculated using a temporary discharge pressure test gauge (local) and the calculated suction pressure from the level in the Fuel Oil Storage Tank using a sounding tape (local) as permitted by NUREG-1482, Section 5.5.3, "Use of Tank or Bay Level to Calculate Differential Pressure."
Q	36.2(2A) (2YR)	X (PRR6)	No instrumentation is provided for flow. A level change over time in the day tank will be measured using Level Gauge [2EGF*LG202], local, and converted to flow rate per PRR6.

SECTION III: PUMP RELIEF REQUESTS

PUMP RELIEF REQUEST 1

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(2)

-- Hardship Without a Compensating Increase in Quality and Safety --

1. **ASME Code Components Affected**

All pumps within the Beaver Valley Power Station, Unit No. 2 Inservice Test (IST) Program.

2. **Applicable Code Edition and Addenda**

ASME OM Code, 2004 Edition with Addenda through OMb-2006.

3. **Applicable Code Requirements**

This request applies to the frequency specifications of the ASME OM Code for all pump testing contained within the IST Program scope. The applicable ASME OM Code sections include the following.

ISTA-3120, "Inservice Test Interval," (a) states, "The frequency for inservice testing shall be in accordance with the requirements of Section IST."

ISTB-3400, "Frequency of Inservice Tests," states, "An inservice test shall be run on each pump as specified in Table ISTB-3400-1."

Table ISTB-3400-1, "Inservice Test Frequency," notes that Group A and Group B pump tests are to be conducted quarterly and comprehensive pump tests are to be conducted biennially.

4. **Reason for Request**

Test period requirements for pumps set forth in specific ASME OM Code documents present a hardship without a compensating increase in quality and safety. ASME OM Code Case OMN-20, "Inservice Test Frequency," was approved and is proposed to be used as an alternative to the test periods specified in the ASME OM code.

Operational flexibility is needed when scheduling pump tests to minimize conflicts between the ASME OM Code specified test interval, plant conditions, and other maintenance and test activities. Lack of a frequency tolerance applied to ASME OM Code testing places a hardship on the plant when scheduling pump tests.

Code Case OMN-20 is not referenced in the latest revision of Regulatory Guide 1.192, "Operation and Maintenance Code Case acceptability, ASME OM Code" (August 2014), as an acceptable OM Code Case to comply with 10 CFR 50.55a(f) requirements as allowed by 10 CFR 50.55a(b)(6).

5. **Proposed Alternative and Basis for Use**

The proposed alternative is OMN-20, "Inservice Test Frequency," which addresses testing periods for pumps specified in ASME OM Division 1, Section IST, 2009 Edition through OMa-2011 Addenda, and all earlier editions and addenda of ASME OM Code.

PUMP RELIEF REQUEST 1

This request is being made in accordance with 10 CFR 50.55a(z)(2), in that the existing requirements are considered a hardship without a compensating increase in quality and safety for the following reasons:

1) For testing periods up to two years, Code Case OMN-20 provides an allowance to extend the testing periods by up to 25 percent. The period extension is to facilitate test scheduling and considers plant operating conditions that may not be suitable for performance of the required testing (for example, 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. Use of the test period extension has been a practice in the nuclear industry for many decades and not applying an extension would be a hardship when there is no evidence that the period extensions affect component reliability.

2) For testing periods of greater than or equal to two years, OMN-20 allows an extension of up to six months. The ASME OM Committee determined that such an extension is appropriate. The six-month extension will have a minimal impact on component reliability considering that the most probable result of performing any inservice test is satisfactory verification of the test acceptance criteria. As such, pumps will continue to be adequately assessed for operational readiness when tested in accordance with the requirements specified in 10 CFR 50.55a(f) with the frequency extensions allowed by Code Case OMN-20.

ASME OM, Division 1, Section IST, and earlier editions and addenda of ASME OM Code specify component test frequencies 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.). 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 the table below.

Frequency	Specified Time Period Between Tests
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

Per OMN-20, the specified time period between tests may be reduced or extended as follows:

(1) For periods specified as less than two years, the period may be extended by up to 25 percent for any given test.

(2) For periods specified as greater than or equal to two 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).

PUMP RELIEF REQUEST 1

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.

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 the ASME OM Code.

6. **Duration of Proposed Alternative**

   The proposed alternative is requested for use during the fourth 10-year IST interval.

7. **Precedent**

   The NRC approved the use of OMN-20 for Fort Calhoun on February 19, 2016 (NRC Agencywide Documents Access and Management System (ADAMS) Accession Number ML16041A308), and for Grand Gulf Nuclear Station, Unit 1, on June 16, 2016 (ADAMS Accession Number ML16160A092).

PUMP RELIEF REQUEST 2

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. **ASME Code Components Affected**

2CHS*P21A, B and C	Charging Pumps, (Group A, Class 2)
2CHS*P22A and B	Boric Acid Transfer Pumps, (Group A, Class 3)
2SIS*P21A and B	Low Head Safety Injection Pumps, (Group B, Class 2)
2CCP*P21A, B and C	Component Cooling Water Pumps, (Group A, Class 3)
2EGF*P21A, B, C and D	Diesel Fuel Oil Transfer Pumps, (Group B, Class 3)

2. **Applicable Code Edition and Addenda**

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) (Code) – 2004 Edition, with Addenda through OMb-2006.

3. **Applicable Code Requirement**

ISTB-3510(b)(1), "Range," states:

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

4. **Reason for Request**

Certain instruments used when testing the affected pumps do not meet the requirements of ISTB-3510(b)(1); however, the accuracy of the instruments used is more conservative than the requirements of ISTB-3510(a), "Accuracy," and Table ISTB-3510-1, "Required Instrument Accuracy," for Group A and Group B tests and comprehensive tests. The combination of higher range and better accuracy for each instrument yields a reading at least equivalent to the reading achieved from instruments that meet ISTB-3510(b)(1).

5. **Proposed Alternative and Basis for Use**

The instruments listed in the attached table may be used as long as the combination of the higher range and better accuracy for each instrument yields a reading at least equivalent to the reading achieved from instruments that meet ISTB-3510(b)(1).

NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," Revision 2, Section 5.5.1, "Range and Accuracy of Analog Instruments," states:

> When the range of a permanently installed analog instrument is greater than three times the reference value, but the accuracy of the instrument is more conservative than that required by the Code, the staff may grant relief when the combination of the range and accuracy yields a reading that is as at least equivalent to that achieved using instruments that meet the Code requirements (i.e., up ±6 percent for Group A and B tests, and ±1.5 percent for pressure and differential pressure instruments for Preservice and Comprehensive tests).

The instruments identified in the attached table satisfy the guidance provided in NUREG-1482, Section 5.5.1. Additional basis for use and the applicable test type are provided in the attached table.

PUMP RELIEF REQUEST 2

Using the provisions of this relief request as an alternative to the requirements of ISTB-3510(b)(1) provides an acceptable level of quality and safety since their use yields a reading that is as at least equivalent to that achieved using instruments that meet the ASME OM Code requirements as described in NUREG-1482, Section 5.5.1.

6. **Duration of Proposed Alternative**

The proposed alternative is requested for use during the Beaver Valley Power Station, Unit No. 2, fourth 10-year inservice test interval.

7. **Precedent**

A similar request was approved for the Beaver Valley Power Station, Unit No. 2, third 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing the request is referenced below.

Beaver Valley Power Station, Unit No. 2, Docket No. 50-412, Safety Evaluation of Relief Request PRR2 for the Third 10-Year Inservice Testing Program, dated February 14, 2008 (ADAMS Accession No. ML080140299).

PUMP RELIEF REQUEST 2

IST PUMP INSTRUMENTATION			
Pump ID	**Instrument ID**	**Condition Requiring Relief**	**Basis for Relief/Alternate Test**
2CHS*P21A 2CHS*P21B 2CHS*P21C (Group A, Class 2)	2CHS-PI151A 2CHS-PI152A 2CHS-PI153A	The range of the gauges is greater than three times the reference pressures during quarterly recirculation flow testing.	These gauges are the suction pressure gauges for the charging pumps. They are sized for all modes of pump operation including accident conditions (that is, can take suction from the recirculation spray pumps) with a range of 0 to160 pounds per square inch gauge (psig). During recirculation flow testing, the suction pressures are approximately 20 to 25 percent of the range or approximately 28 to 39 psig. With a calibrated accuracy of 0.5 percent, this results in a reading more accurate than Code requirements. The use of these pressure instruments is applicable to Group A tests only since the combination of range and accuracy yields a reading of plus or minus (±) 2.86 percent which is less than the ±6 percent required by the Code for the Group A test. During comprehensive testing, temporary pressure instrumentation will be used having a calibrated accuracy of at least ±0.5 percent of full scale with a sufficient range to satisfy the ±1.5 percent required by the Code for the comprehensive test.

PUMP RELIEF REQUEST 2

IST PUMP INSTRUMENTATION			
Pump ID	**Instrument ID**	**Condition Requiring Relief**	**Basis for Relief/Alternate Test**
2CHS*P22A 2CHS*P22B (Group A, Class 3)	2CHS-PI123A 2CHS-PI123B	The range of the gauges is greater than three times the reference pressures during quarterly testing.	These gauges are the suction pressure gauges for the boric acid transfer pumps. They are sized for all modes of pump operation and boric acid storage tank levels with a range of 0 to 30 psig. During quarterly testing, the suction pressures are approximately 10 to 15 percent of the range or approximately 3 to 5 psig. With a calibrated accuracy of 0.5 percent, this results in a reading more accurate than Code requirements. The use of these pressure instruments is applicable to Group A tests only since the combination of range and accuracy yields a reading of approximately ±3.0 percent to ±5.0 percent, which is less than the ±6 percent required by the Code for the Group A test. During comprehensive testing, temporary pressure instrumentation will be used having a calibrated accuracy of at least ±0.5 percent of full scale with sufficient range to satisfy the ±1.5 percent required by the Code for the comprehensive test.

PUMP RELIEF REQUEST 2

IST PUMP INSTRUMENTATION			
Pump ID	**Instrument ID**	**Condition Requiring Relief**	**Basis for Relief/Alternate Test**
2SIS*P21A 2SIS*P21B (Group B, Class 2)	2SIS-PI938 2SIS-PI939	The range of the gauges is greater than three times the reference pressures during quarterly recirculation flow testing.	These gauges are the suction pressure gauges for the low head safety injection pumps. They are sized for recirculation and full flow testing with a range of 0 to 160 psig. During recirculation flow testing, the suction pressures are approximately 20 percent of the range or 32 psig. With a calibrated accuracy of 0.5 percent, this results in a reading more accurate than Code requirements. The use of these pressure instruments is applicable to Group B tests only since the combination of range and accuracy yields a reading of approx. ±2.5 percent which is less than the ±6 percent required by the Code for the Group B test. During comprehensive testing, temporary pressure instrumentation will be used having a calibrated accuracy of at least ±0.5 percent of full scale with sufficient range to satisfy the ±1.5 percent required by the Code for the comprehensive test.

PUMP RELIEF REQUEST 2

IST PUMP INSTRUMENTATION			
Pump ID	**Instrument ID**	**Condition Requiring Relief**	**Basis for Relief/Alternate Test**
2CCP*P21A 2CCP*P21B 2CCP*P21C (Group A, Class 3)	2CCP-PI150A 2CCP-PI150B 2CCP-PI150C	The range of the gauges is greater than three times the reference pressures during quarterly testing.	These are the suction pressure gauges for the component cooling water pumps. They are sized for all modes of pump operation with a range of 0 to 60 psig. The suction pressures vary between 27 and 32 percent of the range or 16 to 19 psig. With a calibrated accuracy of 0.5 percent, this results in a reading more accurate than Code requirements. The use of these pressure instruments is applicable to Group A tests only since the combination of range and accuracy yields a reading of approximately ± 1.57 to ± 1.87 percent which is less than the ±6 percent required by the Code for the Group A test. During comprehensive testing, temporary pressure instrumentation will be used having a calibrated accuracy of at least ±0.5 percent of full scale with sufficient range to satisfy the ±1.5 percent required by the Code for the comprehensive test.

PUMP RELIEF REQUEST 2

IST PUMP INSTRUMENTATION			
Pump ID	**Instrument ID**	**Condition Requiring Relief**	**Basis for Relief/Alternate Test**
2EGF*P21A 2EGF*P21B 2EGF*P21C 2EGF*P21D (Group B, Class 3)	2EGF-PI201A 2EGF-PI201B 2EGF-PI201C 2EGF-PI201D	The range of the gauges is greater than three times the reference pressures during bi-monthly testing.	These are the discharge pressure gauges for the emergency diesel generator fuel oil transfer pumps. They are sized for all modes of pump operation with a range of 0 to 30 psig. During bi-monthly testing, discharge pressures are between 9.5 and 10.5 psig, slightly below one third of the range. With a calibrated accuracy of 1.0 percent, this results in a reading more accurate than Code requirements. The use of these pressure instruments is applicable to Group B tests only since the combination of range and accuracy yields a reading of approximately ±2.85 percent to ±3.15 percent which is less than the ±6 percent required by the Code for the Group B test. During comprehensive testing, temporary pressure instrumentation will be used having a calibrated accuracy of at least ±0.5 percent of full scale with sufficient range to satisfy the ±1.5 percent required by the Code for the comprehensive test.

PUMP RELIEF REQUEST 3

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. ASME Code Components Affected

2CHS*P21A, B and C	Charging Pumps, (Group A, Class 3)
2CHS*P22A and B	Boric Acid Transfer Pumps, (Group A, Class 3)
2RHS*P21A and B	Residual Heat Removal Pumps, (Group A, Class 2)
2SIS*P21A and B	Low Head Safety Injection Pumps, (Group B, Class 2)
2QSS*P21A and B	Quench Spray Pumps, (Group B, Class 2)
2RSS*P21A, B, C and D	Recirculation Spray Pumps, (Group B, Class 2)
2CCP*P21A, B and C	Component Cooling Water Pumps, (Group A, Class 3)
2FWE*P22	Turbine-Driven Auxiliary Feedwater Pump, (Group B, Class 3)
2FWE*P23A and B	Motor-Driven Auxiliary Feedwater Pumps, (Group B, Class 3)
2SWS*P21A, B and C	Service Water Pumps, (Group A, Class 3)
2EGF*P21A, B, C and D	Diesel Fuel Oil Transfer Pumps, (Group B, Class 3)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. Applicable Code Requirement

ISTB-5123, "Comprehensive Test Procedure," refers to Table ISTB-5121-1, "Centrifugal Pump Test Acceptance Criteria," that requires an upper acceptable range limit of 1.03Qr and 1.03ΔPr where Qr is the reference flow rate and ΔPr is the reference differential pressure.

ISTB-5223, "Comprehensive Test Procedure," refers to Table ISTB-5221-1, "Vertical Line Shaft Centrifugal Pump Test Acceptance Criteria," that requires an upper Acceptable Range limit of 1.03Qr and 1.03ΔPr.

4. Reason for Request

For some pump tests, there has been difficulty implementing the upper acceptable range limit of 3 percent above the established hydraulic parameter reference value for the comprehensive pump test. Industry experience has shown that test results outside the criteria can easily occur when normal data scatter yields (1) a low measured reference value, and (2) high measured values for subsequent inservice tests. In these cases, some of the test data trend high near the upper acceptable range limit and may exceed the upper limit on occasion. The problem can be more severe for pumps with low differential pressures (50 pounds per square inch differential [psid] or less) due to the smaller acceptable range.

In these cases, the measured values that would exceed the plus 3 percent upper criteria would not represent an actual problem with either the test setup, instrumentation or the pump itself. The scatter induced collectively by the instrumentation and reference value variance is sufficient to approach or exceed the upper criterion.

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ASME OM Code Case OMN-19, "Alternate Upper Limit for the Comprehensive Pump Test," from the 2012 Edition of ASME OM Code, allows a multiplier of 1.06 times the reference value in lieu of the 1.03 multiplier for the comprehensive pump test's upper acceptable range and required action range (high) limits. As described in ASME OM Code Case OMN-19, a required action range high limit of plus 6 percent is a realistic value that should allow any true degradation issues to be identified while alleviating the need to unnecessarily declare pumps inoperable.

5. Proposed Alternative and Basis for Use

For the affected pumps listed above, an upper acceptable range limit of 1.06 times the reference value will be applied to the comprehensive pump test in accordance with ASME OM Code Case OMN-19. Also, a periodic verification test (PVT) at the design basis accident flow rate will be performed for each of these pumps.

The following requirements shall be applied to the PVT.

1) Apply the PVT to the affected pumps listed in this request.
2) Perform the PVT at least once every two years.
3) Determine if a PVT is required before declaring a pump operable following replacement, repair, or maintenance on the pump.
4) Declare the pump inoperable if the PVT flow rate and associated differential pressure cannot be achieved.
5) Maintain the necessary records for each PVT, including the applicable test parameters (for example, flow rate, the associated differential pressure and speed for variable speed pumps) and their basis.
6) Account for the PVT instrument accuracies in the test acceptance criteria.

The upper limit for differential pressure established by the ASME OM Code is not reflective of any possible degradation mechanism, but is rather a means to identify a potentially incorrect test setup. Exceeding this upper limit while testing would require the pump to be considered inoperable, but primarily as a means to investigate the test instrumentation or other potential problems. The use of a plus 6 percent upper criteria rather than the plus 3 percent upper criteria would not mask any actual pump problem and would still function as an adequate trigger to investigate the test setup.

Using the provisions of this request as an alternative to the specific requirements of ISTB-5123 and ISTB-5223, and Tables ISTB-5121-1 and ISTB 5221-1 as described above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety.

6. Duration of Proposed Alternative

The proposed alternative is requested for use during the fourth 10-year IST interval.

7. Precedent

A similar request was approved by the Nuclear Regulatory Commission staff in their safety evaluation referenced below.

PUMP RELIEF REQUEST 3

Virginia Electric and Power Company, Surry Power Station, Unit No. 1, Safety Evaluation of Pump Relief Request P-6 Regarding ASME OM Code Requirements for the Fifth 10-Year Inservice Test Program Interval, dated May 9, 2014 (ADAMS Accession No. ML14125A471).

PUMP RELIEF REQUEST 4

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. **ASME Code Components Affected**

2CHS*P21A, B, and C	Charging Pumps, (Group A, Class 3)
2CHS*P22A, and B	Boric Acid Transfer Pumps, (Group A, Class 3)
2RHS*P21A	Residual Heat Removal Pump, (Group A, Class 2)
2FWE*P23A, and B	Motor-Driven Aux Feedwater Pumps, (Group B, Class 3)
2SWS*P21A, B, and C	Service Water Pumps, (Group A, Class 3)
2EGF*P21A, B, C, and D	Diesel Fuel Oil Transfer Pumps, (Group B, Class 3)

2. **Applicable Code Edition and Addenda**

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. **Applicable Code Requirement**

ISTB-5121, "Group A Test Procedure," and ISTB-5123, "Comprehensive Test Procedure," state in subparagraphs ISTB-5121(e) and ISTB-5123(e):

All deviations from the reference values shall be compared with the ranges of Table ISTB-5121-1 and corrective action taken as specified in ISTB-6200. Vibration [The vibration] measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges of Table-ISTB-5121-1. For example, if vibration exceeds either 6Vr, or 0.7 in/sec [inches per second] (1.7 cm/sec) [centimeters per second], the pump is in the required action range.

ISTB-5221, "Group A Test Procedure," and ISTB-5223, "Comprehensive Test Procedure," state in subparagraphs ISTB-5221(e) and ISTB-5223(e):

All deviations from the reference values shall be compared with the ranges of Table ISTB-5221-1 and corrective action taken as specified in ISTB-6200. Vibration [The vibration] measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges of Table-ISTB-5221-1. For example, if vibration exceeds either 6Vr, or 0.7 in/sec (1.7 cm/sec), the pump is in the required action range.

ISTB-5321, "Group A Test Procedure," and ISTB-5323, "Comprehensive Test Procedure," state in subparagraphs ISTB-5321(e) and ISTB-5323(e):

All deviations from the reference values shall be compared with the ranges of Table ISTB-5321-1 or Table-5321-2, as applicable, and corrective action taken as specified in ISTB-6200. For reciprocating positive displacement pumps, vibration measurements shall be compared to both the relative criteria shown in the alert and required action ranges of Table ISTB-5321-2 [Table ISTB-5321-1]. For all other positive displacement pumps, vibration measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges of Table ISTB-5321-1 [Table ISTB-5321-2]. For example, if vibration exceeds either 6Vr, or 0.7 in/sec (1.7 cm/sec), the pump is in the required action range.

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Note: Beaver Valley Power Station (BVPS), Unit No. 2 (BVPS-2), has no reciprocating positive displacement pumps in the Inservice Test (IST) Program. Therefore, Table ISTB 5321-2 is not applicable.

4. Reason for Request

The pumps listed above tend to be smooth running pumps in the BVPS-2 IST Program. Each has at least one vibration reference value (V_r) that is currently less than 0.05 in/sec. A small value for V_r produces a small acceptable range for pump operation. The ASME OM Code acceptable range limit for pump vibrations from Table ISTB-5121-1, Table ISTB-5221-1, and Table ISTB-5321-1 for both the Group A test and comprehensive test is less than or equal to 2.5 V_r. Based on a small acceptable range, a smooth running pump could be subject to unnecessary corrective action if the measured vibration parameter exceeds this limit. ISTB-6200(a), "Corrective Action – Alert Range," states:

If the measured test parameter values fall within the alert range of Table ISTB-5121-1, Table ISTB-5221-1, Table ISTB-5321-1, or Table ISTB-5321-2, as applicable, the frequency of testing specified in ISTB-3400 shall be doubled until the cause of the deviation is determined and the condition is corrected.

For very small vibration reference values, flow variations, hydraulic noise and instrument error can be a significant portion of the reading and affect the repeatability of subsequent measurements. Also, experience gathered by the BVPS Predictive Maintenance (PdM) Group has shown that changes in vibration levels in the range of 0.05 in/sec do not normally indicate significant degradation in pump performance.

In order to avoid unnecessary corrective actions, a minimum value for V_r of 0.05 in/sec is proposed. This minimum value would be applied to individual vibration locations for those pumps with reference vibration values less than 0.05 in/sec. Therefore, the smallest ASME OM Code acceptable range limit for any IST pump vibration measurement location would be no lower than 2.5 times V_r, or 0.125 in/sec, which is within the "fair" range of the "General Machinery Vibration Severity Chart" provided by IRD Mechanalysis, Inc. Likewise, the smallest ASME OM Code alert range limit for any IST pump vibration measurement location for which the pump would be inoperable would be no lower than 6 times V_r, or 0.300 in/sec.

When new reference values are established per ISTB-3310, ISTB-3320 or ISTB-6200(c), the measured parameters will be evaluated for each location in order to determine if the provisions of this relief request still apply.

In addition to the requirements of ISTB for inservice testing, the pumps in the IST Program are also included in the BVPS PdM Program. The BVPS PdM Program currently employs predictive monitoring techniques such as: vibration monitoring and analysis beyond that required by ISTB, bearing temperature trending, oil sampling and analysis, and thermography analysis, as applicable.

If the measured parameters are outside the normal operating range or are determined by analysis to be trending toward an unacceptable degraded state, appropriate actions are taken that may include: initiation of a condition report, increased monitoring to establish a rate of change, review of component specific information to identify the cause of the condition, and removal of the pump from service to perform maintenance.

PUMP RELIEF REQUEST 4

5. Proposed Alternative and Basis for Use

In lieu of applying the vibration acceptance criteria ranges specified in Table ISTB-5121-1, Table ISTB-5221-1, or Table ISTB-5321-1, as applicable, smooth running pumps with a measured reference value below 0.05 in/sec for a particular vibration measurement location will have subsequent test results for that location compared to an acceptable range limit of 0.125 in/sec and an alert range limit of 0.300 in/sec (based on a minimum reference value 0.05 in/sec). These proposed ranges shall be applied to vibration test results during both Group A tests and comprehensive tests.

In addition to the Code requirements, the affected pumps listed in this request are included in and will remain in the BVPS PdM Program.

Using the provisions of this relief request as an alternative to the specific requirements of ISTB identified above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety without unnecessarily imposing corrective action since changes in vibration levels in the range of 0.05 in/sec do not normally indicate significant degradation in pump performance.

Using the provisions of this relief request as an alternative to the vibration acceptance criteria ranges specified in Table ISTB-5121-1, Table ISTB-5221-1, or Table ISTB-5321-1 provides an acceptable level of quality and safety since the alternative provides reasonable assurance of pump operational readiness and the ability to detect pump degradation.

6. Duration of Proposed Alternative

The proposed alternative is requested for use during the fourth 10-year IST interval.

7. Precedent

A similar request was approved by the Nuclear Regulatory Commission staff in their safety evaluation referenced below.

Beaver Valley Power Station, Unit No. 2, Docket No. 50-412, Safety Evaluation of Relief Request PRR8 for the Third Ten-Year Interval for Pumps and Valves Inservice Testing Program, Dated February 14, 2008 (ADAMS Accession No. ML080140299).

PUMP RELIEF REQUEST 5

Relief Request In Accordance with 10 CFR 50.55a(f)(5)(iii)

-- Inservice Testing Impracticality --

1. ASME Code Components Affected

2RHS*P21A and B Residual Heat Removal (RHR) Pumps, (Group A, Class 2)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. Applicable Code Requirement

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

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

Table ISTB-3400-1, "Inservice Test Frequency," requires Group A pumps to be tested on a quarterly frequency.

4. Impracticality of Compliance

The RHR pumps are in a standby condition during power operation and are not required to be in service until the reactor coolant system (RCS) temperature is less than or equal to 350 degrees Fahrenheit (°F) and RCS pressure is less than or equal to 360 pounds per square inch gauge (psig). Therefore, they are not exposed to operational wear except when the RCS is at low temperature and pressure and the RHR System is in operation for normal shutdown cooling.

The RHR pumps have a design pressure of 600 psig. They take suction from the RCS, pass flow through the RHR heat exchangers, and then discharge back to the RCS. The RHR System is considered to be a low pressure system that could be damaged if exposed to the normal operating RCS pressure of approximately 2235 psig. In order to prevent this, the RHR inlet and return isolation valves are interlocked with an output signal from the RCS pressure transmitters, which prevent the valves from being opened when the RCS pressure exceeds 360 psig. In addition, these valves are also maintained shut with their breakers de-energized and administratively controlled (caution tagged). Therefore, testing of the RHR pumps during normal operation is not practicable since there are no alternate supply sources and aligning the RCS to the suction of the RHR pumps, during operation at power, would result in damage to piping and components due to over-pressurization. Major plant and system modifications would be needed to allow quarterly Group A testing of the RHR pumps according to ASME OM Code requirements.

Based on the above, compliance with the ASME OM Code test frequency requirement for Group A pump tests is impractical.

5. Burden Caused by Compliance

Testing is only possible during a surveillance interval frequency of cold shutdown and refueling unless major plant and system modifications are made.

PUMP RELIEF REQUEST 5

6. Proposed Alternative and Basis for Use

These pumps will be tested during cold shutdowns and refueling outages, not more often than once every 92 days. For a cold shutdown or refueling outage that extends longer than 3 months, the pumps will be tested every 3 months in accordance with Table ISTB-3400-1. In the instance of an extended outage, a Group A test may be performed; otherwise, a comprehensive test will be performed each refueling outage.

This proposed alternative is necessary to prevent the potential for piping and component damage as a result of over-pressurization.

Using the provisions of this relief request as an alternative to the frequency requirements of Table ISTB-3400-1 provides a reasonable alternative to the Code requirements and assurance that the pumps are operationally ready.

7. Duration of Proposed Alternative

The proposed alternative is requested for use during the fourth 10-year inservice test interval.

8. Precedent

A similar request was approved for the Beaver Valley Power Station, Unit No. 2 third 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing the alternative is referenced below.

Beaver Valley Power Station, Unit No. 2, Docket No. 50-412, Safety Evaluation of Relief Request PRR7 for the Third 10-Year Inservice Testing Program, Dated February 14, 2008 (ADAMS Accession

PUMP RELIEF REQUEST 6

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. ASME Code Components Affected

2EGF*P21A, B, C, and D Diesel Fuel Oil Transfer Pumps, (Group B, Class 3)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. Applicable Code Requirement

ISTB-3510(a), "Accuracy," states in part that:

> Instrument accuracy shall be within the limits of Table ISTB-3510-1. If a parameter is determined by analytical methods instead of measurement, then the determination shall meet the parameter accuracy requirement of Table ISTB-3510-1 (e.g., flow rate determination shall be accurate to within ±2% of actual).

4. Reason for Request

There is no installed instrumentation provided to measure flow rate directly for these emergency diesel generator fuel oil transfer pumps. However, a level sight glass does exist on the side of the diesel generator fuel oil day tank, and can be used to measure a change in level over time as the pumps transfer fuel oil from the underground storage tank to the day tank.

5. Proposed Alternative and Basis for Use

Flow rate will be calculated by measuring the level change over time in the diesel generator fuel oil day tank, and converting this data into fuel oil transfer pump flow rate during both the Group B tests and comprehensive tests and periodic verification test per the emergency diesel generator and fuel oil transfer pump test procedures. The periodic verification test is performed as described in Mandatory Appendix V, "Pump Periodic Verification Test Program," of the 2012 ASME OM Code. A restricted reference flow rate (Qr) acceptance criteria will be used as follows:

Group B Tests

Acceptable Range	Alert Range	Required Action Range Low	Required Action Range High
0.91 to 1.09Q_r	None	less than 0.91Q_r	greater than 1.09Q_r

Comprehensive Tests

Acceptable Range	Alert Range	Required Action Range Low	Required Action Range High
0.96 to 1.05Qr	0.94 to less than 0.96Qr	less than 0.94Qr	greater than 1.05Qr

During this test, each pump is operated with a fixed flow path from the underground storage tank (suction) to the day tank (discharge). Suction pressure is nearly constant because of the very small change in storage tank level (approximately 1.5 inch drop in level during pump operation). This results in no more than a 0.05 pounds per square inch gauge (psig) change in suction pressure during pump operation and the change is considered to be negligible. The normal rise in day tank level is approximately 12 inches which corresponds to a quantity of approximately 350 gallons pumped during the 10 minutes of pump operation, resulting in a typical flow rate of approximately

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35 gallons per minute (gpm). This small rise in day tank level during pump operation could increase pump discharge pressure by as much as 0.4 psig. The resulting increase in pump differential pressure or head (approximately 1 foot) could also decrease pump discharge flow rate by as much as 2 gpm over the course of pump operation based on the shape of the pump curves at approximately 35 gpm for these centrifugal pumps. Therefore, an initial flow rate of approximately 36 gpm would decrease to approximately 34 gpm as the level in the day tank rises during the course of the test. The calculation method described above determines an average flow rate (approximately 35 gpm) over the course of the test.

Because flow rate can vary by as much as plus or minus (+/-) 1 gpm from the average flow obtained, the corresponding calculated flow rate is only accurate to within +/-2.86 percent. In addition, the level sight glass on the side of the day tank ranges from 12 inches to 47.25 inches and is in 0.125 inch increments for a calibrated accuracy of +/-0.355 percent. The stopwatch used to measure the time the pump is operating and pumping fuel oil is accurate to within +/-0.3 seconds per minute for a calibrated accuracy of +/-0.5 percent. Combining the accuracy of the flow rate reading, level sight glass, and stopwatch, using the square root of the sum of the squares method, results in an overall indicated accuracy of +/-2.93 percent.

Since this does not meet the +/-2 percent accuracy requirements of Table ISTB-3510-1, FENOC proposes to use the restricted flow rate acceptance criteria that is more conservative than the current flow rate acceptance criteria in Table ISTB-5221-1 for both the Group B and comprehensive tests.

The Acceptable Ranges for flow provided in Table ISTB-5221-1 for the Group B test and comprehensive pump test (CPT) are as follows.

Group B Tests

Acceptable Range	Alert Range	Required Action Range Low	Required Action Range High
0.90 to 1.10Q_r	None	less than 0.90Q_r	greater than 1.10Q_r

Comprehensive Tests

Acceptable Range	Alert Range	Required Action Range Low	Required Action Range High
0.95 to 1.03Q_r	0.93 to less than 0.95Q_r	less than 0.93Q_r	greater than 1.03Q_r

The accuracy of the proposed flow rate determination and the restricted flow rate acceptance criteria (both described above) meet the intent of the ASME OM Code required accuracy of 2 percent of actual flow rate, since the restricted flow rate acceptance criteria (that provide a more conservative range of acceptable values) listed above compensate for the 1 percent less accurate flow rate determination.

In addition, because these tests are performed at nearly the same conditions (a day tank level change from approximately 22 inches to 34 inches over 10 minutes) and use a fixed flow path, repeatable results (for trend analysis purposes) are ensured. FENOC has over 20 years of test experience using this test method (day tank level change over time). The method has demonstrated that it provides adequate capability to monitor for a declining trend in pump performance and reasonable assurance of acceptable pump operation.

PUMP RELIEF REQUEST 6

Although the diesel fuel oil transfer pumps are vertical line shaft centrifugal pumps, the proposed alternative is consistent with the guidelines provided in NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," Revision 2, Section 5.5.2, "Use of Tank Level to Calculate Flow Rate for Positive Displacement Pumps."

Using the provisions of this request as an alternative to the requirements of ISTB-3510(a) provides an acceptable level of quality and safety since the alternative provides reasonable assurance of pump operational readiness.

6. Duration of Proposed Alternative

The proposed alternative is requested for use during the fourth 10-year inservice test interval.

7. Precedent

A similar request was approved by the Nuclear Regulatory Commission staff in their safety evaluation referenced below.

Beaver Valley Power Station, Unit No. 2, Docket No. 50-412, Safety Evaluation of Relief Request PRR6 for the Third Ten-Year Interval for Pumps and Valves Inservice Testing Program, Dated February 14, 2008 (ADAMS Accession No. ML080140299).

PUMP RELIEF REQUEST 7

Relief Request In Accordance with 10 CFR 50.55a(f)(5)(iii)

-- Inservice Testing Impracticality --

1. **ASME Code Components Affected**

   2SWS*P21A, B and C   Service Water Pumps, (Group A, Class 3)

2. **Applicable Code Edition and Addenda**

   American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. **Applicable Code Requirement**

   ISTB-3540(b), "Vibration," states:

   > 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.

4. **Impracticality of Compliance**

   Access to the upper motor bearing housing on the vertical line shaft service water pumps for the purpose of measuring vibrations in the axial direction, cannot be obtained due to the presence of a permanently installed non-rigid metal top hat covering the entire top of the motor housing.

5. **Burden Caused by Compliance**

   The service water pumps would require modification to obtain the vibration measurements at the upper motor-bearing housing as required by ISTB-3540(b).

6. **Proposed Alternative and Basis for Use**

   Measure vibrations on the upper motor bearing housing in two orthogonal directions (excluding the axial direction), and measure vibrations on the lower motor bearing housing in three orthogonal directions (including the axial direction) during each quarterly Group A test and biennial comprehensive test per service water pump test procedures.

   Vibration measurements in the axial direction are accessible at the lower motor bearing housing of each pump, which will provide additional information for trending of pump/motor performance. The vibration measurements in the other orthogonal directions (horizontal and vertical) provide another predictor of vibration problems for vertical line shaft pumps.

   The proposed locations for taking vibration measurements should not be subject to dampening effects of non-rigid structural contact that could mask potential degradation. In recognition of inherent deficiencies in the vibration testing for vertical line shaft pumps, hydraulic performance requirements are more stringent for vertical line shaft pumps than for horizontal centrifugal pumps.

   Using the proposed locations for taking vibration measurements and other provisions of this request as an alternative to the requirements of ISTB-3450(b) provides reasonable assurance of operational readiness.

PUMP RELIEF REQUEST 7

7. **Duration of Proposed Alternative**

   The proposed alternative is requested for use during the fourth 10-year inservice test interval.

8. **Precedent**

   A similar request was approved for the Beaver Valley Power Station, Unit No. 2 third 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing the alternative is referenced below.

   Beaver Valley Power Station, Unit No. 2, Docket No. 50-412, Safety Evaluation of Relief Request PRR5 for the Third 10-Year Inservice Testing Program, dated February 14, 2008 (ADAMS Accession No. ML080140299).

PUMP RELIEF REQUEST 8

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. **ASME Code Components Affected**

2SWS*P21A, B and C Service Water Pumps, (Group A, Class 3)

2. **Applicable Code Edition and Addenda**

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. **Applicable Code Requirement**

Table ISTB-3510-1, "Required Instrument Accuracy," requires pressure instruments to be calibrated to at least 0.5 percent when used during the comprehensive pump test.

4. **Reason for Request**

Subarticle ISTB-3510(a), "Accuracy," states:

> Instrument accuracy shall be within the limits of Table ISTB-3510-1. If a parameter is determined by analytical methods instead of measurement, then the determination shall meet the parameter accuracy requirement of Table ISTB-3510-1 (e.g., flow rate determination shall be accurate to within ±2% of actual). For individual analog instruments, the required accuracy is percent of full scale. For digital instruments, the required accuracy is over the calibrated range. For a combination of instruments, the required accuracy is loop accuracy.

The Beaver Valley Power Station, Unit No. 2 (BVPS-2), service water pumps are vertical line-shaft pumps that receive their suction from a pit that communicates with the Ohio River. Differential pressure is calculated using local pump discharge pressure indicators and the calculated suction pressure using river water elevation from Ohio River level recorder. The transmitter associated with the level recorder is calibrated to 1.5 percent of full scale and the recorder is calibrated to 1.0 percent of full scale resulting in a loop accuracy of 1.8 percent of full scale. The overall loop accuracy exceeds the maximum 0.5 percent required by Table ISTB-3510-1 when performing a comprehensive or preservice test.

Typical Ohio River elevation is between 665 and 666 feet resulting in a small variance between calculated suction pressure when determined by the calculation method provided by the procedure. However, during the spring, river elevations may be higher due to rain. This condition is evaluated with the test results to ensure operational readiness of the pumps.

5. **Proposed Alternative and Basis for Use**

As an alternative to Table ISTB-3510-1, FENOC proposes to use the installed Ohio River level recorder with a loop accuracy of 1.8 percent (to determine service water pump suction pressure), and a 0-200 pounds per square inch gauge (psig), 0.1 percent or better accurate test pressure gauge (to determine service water pump discharge pressure). These instrument readings are used to determine service water pump differential pressure. Differential pressure for the service water pumps is determined by taking the difference between the pump discharge pressure measured in psig minus the river elevation corrected for elevation in feet back to the pump discharge centerline and converted to pressure.

PUMP RELIEF REQUEST 8

Suction pressure for the service water pumps is determined by converting a river elevation reading measured by level recorder to a calculated pressure. This level recorder has a full scale range from 648 feet to 705 feet (river elevation above sea level). Normal river elevation is 665 to 666 feet. The loop accuracy for the level recorder is 1.8 percent. The suction pressure reading over the range of the installed level recorder is accurate to within 0.45 psig. This accuracy is obtained by taking the full scale range of 57 feet, converting it to a pressure ([57 feet] / [2.31 feet/psig] = 25 psig), and multiplying it by 1.8 percent accuracy. The ASME OM Code would require this suction pressure reading to be accurate within 0.125 psig (25 psig x 0.5 percent accuracy).

Discharge pressure for service water pumps (2SWS*P21A, B and C) is to be obtained from a temporary test pressure gauge with a full scale range of 0 to 200 psig. The ASME OM Code would require this discharge pressure reading to be accurate within 1 psig (200 psig x 0.5 percent accuracy). In order to compensate for the 1.8 percent suction pressure loop accuracy, a 0.1 percent accurate temporary test pressure gauge will be used. This temporary test pressure gauge (to be used in place of the installed 0 to 160 psig, 0.5 percent accurate discharge pressure indicators will provide a discharge pressure reading over the range of the instrument with an accuracy of 0.2 psig (200 psig x 0.1 percent). Adding this to the installed 1.8 percent accurate suction pressure instrument reading yields an accuracy of 0.65 psig (0.45 psig plus 0.2 psig) for the combination of instruments.

When the Table ISTB-3510-1 required instrument accuracy of plus or minus (±)0.5 percent is applied to the river level readings, the suction pressure reading over the range of the instrument is required to be accurate to within 0.125 psig (25 psig x 0.5 percent). When the Table ISTB-3510-1 required instrument accuracy of ±0.5 percent is applied to the pump discharge pressure test gauge readings, the discharge pressure reading over the range of the test instrument is required to be accurate to within 1.0 psig (200 psig x 0.5 percent). Adding these required instrument accuracies together would yield an overall worst case (allowed) error of 1.125 psig (0.125 psig plus 1.0 psig). Therefore, the overall differential pressure reading, which can be read to within 0.65 psig, is better than the effective 1.125 psig differential pressure reading required by the ASME OM code for comprehensive pump testing.

The proposed alternative, using the 0.1 percent accurate test pressure gauge in place of the installed discharge pressure indicator, will yield an effective differential pressure reading (considering both suction and discharge pressure instrumentation together) that is more accurate than the ±0.5 percent instrument accuracy required by Table ISTB-3510-1 for Comprehensive pump testing.

Other activities are implemented at BVPS-2, in addition to those required by the ASME OM Code, that enhance the ability to detect pump degradation. As part of the BVPS-2 Predictive Maintenance Program, spectral analysis is also used to determine the mechanical condition of a pump. Spectral data can provide information to determine if misalignment, unbalance, resonance, looseness or a bearing problem is present. Through a review of the spectral data over a period of time, changes in the condition of the pump may also be determined. Additionally, as part of the BVPS-2 Preventive Maintenance Program, the pump motors are inspected, lubricated, and tested every 192 weeks. The pump and motor are completely overhauled every 516 weeks. This frequency is based on the expected condition of the pumps as a result of historical overhauls and was established to allow overhaul prior to the point of degradation resulting in questionable operational readiness.

The alternative to the accuracy requirements of Table ISTB-3510-1, when performing comprehensive or preservice tests, provides an acceptable level of quality and safety

PUMP RELIEF REQUEST 8

6. Duration of Proposed Alternative

The proposed alternative is requested for use during the fourth 10-year inservice test interval.

7. Precedent

A similar request was approved for the BVPS-2 third 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing this similar alternative is referenced below.

BVPS-2, Docket No. 50-412, Safety Evaluation of Relief Request PRR9 for the Third 10-Year Inservice Testing Program, Dated February 14, 2008 (ADAMS Accession No. ML080140299).

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Relief Request In Accordance with 10 CFR 50.55a(f)(5)(iii)

-- Inservice Testing Impracticality --

1. **ASME Code Components Affected**

2SWS*P21A, B, and C Service Water Pumps, (Group A, Class 3)

2. **Applicable Code Edition and Addenda**

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. **Applicable Code Requirement**

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

> All deviations from the reference values shall be compared with the ranges of Table ISTB-5221-1 and corrective action taken as specified in ISTB-6200.

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

> All deviations from the reference values shall be compared with the ranges of Table ISTB-5221-1 and corrective action taken as specified in ISTB-6200.

4. **Impracticality of Compliance**

The service water system operation is dependent on seasonal Ohio River water temperatures. Based on the most recent 10 years of data, pump flow rates vary between approximately 8,500 gallons per minute (gpm) in the cool winter months to approximately 15,000 gpm in the warm summer months. Due to variations in pump flow rate and differential pressure (pump head), a pump curve will be used to compare flow rate with developed pump head at the flow conditions indicated by plant seasonal heat load requirements.

Group A and comprehensive pump test acceptance criteria for differential pressure is provided in Table ISTB-5221-1, "Vertical Line Shaft Centrifugal Pump Test Acceptance Criteria." The developed head of a pump is calculated by multiplying the differential pressure by 2.31 feet per pounds per square inch gauge (feet/psig). Table ISTB-5221-1 differential pressure acceptance criteria, where ΔP_r is the differential pressure reference value, is as follows:

Group A Tests

Acceptable Range	Alert Range	Required Action Range Low	Required Action Range High
0.95 to 1.10ΔP_r	0.93 to less than 0.95ΔP_r	less than 0.93ΔP_r	greater than 1.10ΔP_r

Comprehensive Tests

Acceptable Range	Alert Range	Required Action Range Low	Required Action Range High
0.95 to 1.03ΔP_r	0.93 to less than 0.95ΔP_r	less than 0.93ΔP_r	greater than 1.03ΔP_r

The service water pumps are typically overhauled in the colder winter months when the demand on the service water system for cooling is less. The reference pump curve is developed during this time period. The service water pump shaft is made from stainless steel and the pump columns are made from carbon steel. As river water temperature increases, the stainless steel shaft expands at

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a different rate than the carbon steel columns resulting in a net change in the clearance at the impeller.

Because the carbon steel columns grow slightly more than the stainless steel shaft, a wider gap between the impeller and bowl is created. This causes an increase in pump lift, and results in lower hydraulic performance from the reference pump curve. As river water temperature rises above 60 degrees Fahrenheit (°F), pump hydraulic performance decreases, sometimes into the alert range of 0.93 to less than 0.95 ΔP_r.

As river water temperature begins to cool again, pump hydraulic performance tends to return to the original cold weather reference value.

Therefore, the ASME OM Code limits of Table ISTB-5221-1 are exceeded by the service water pumps when river water temperature is above 60°F. An allowable variation larger than these ranges is needed for both the Group A and comprehensive pump tests, as applicable, in order to trend pump performance.

5. **Burden Caused by Compliance**

Historical variations in pump head have caused the pumps to enter the alert range and require double frequency testing of the pumps when real degradation has not occurred.

6. **Proposed Alternative and Basis for Use**

Expanded ranges, as defined below will be used for the service water pumps during the Group A and comprehensive pump tests when the river water temperature is above 60°F in lieu of the acceptance criteria specified in Table ISTB-5221-1. The proposed expanded ranges to be used during both the Group A and comprehensive pump tests, as modified for developed pump head (H), are as follows:

Group A Tests

Acceptable Range	Alert Range	Required Action Range Low	Required Action Range High
0.93 to 1.10H	0.90 to less than 0.93H	less than 0.90H	greater than 1.10H

Comprehensive Tests

Acceptable Range	Alert Range	Required Action Range Low	Required Action Range High
0.93 to 1.06H	0.90 to less than 0.93H	less than 0.90H	greater than 1.06H

Group A and comprehensive pump testing will be performed in accordance with service water pump test procedures using the expanded ranges when river water temperature is above 60°F. These expanded ranges will still allow degrading conditions to be identified without needlessly placing the pump on double frequency testing and will provide assurance that the service water pumps will be capable of fulfilling their safety function.

Decreasing the acceptable range lower limit to 0.93 and the alert range lower limit to 0.90 is consistent with lower range limits required by the ASME Boiler and Pressure Vessel Code, Section XI, 1983 Edition, Table IWP-3100-2. Currently, there are several feet of margin below the lower required action range limit of 0.90 to the minimum operating point (MOP) curve for each pump. Service water pump 2SWS*P21A has 16.1 feet (6.74 percent) of margin to the MOP curve. Service water pump 2SWS*P21B has 21.5 feet (8.78 percent) of margin to the MOP curve. Service water

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pump 2SWS*P21C has 20.4 feet (8.38 percent) of margin to the MOP curve. If pump performance were to degrade in the summer months while river water temperature is above 60°F, enough margin exists above the respective pump's MOP curve to take action before challenging the design basis limits. In addition, once river water temperature decreases below 60°F, the more restrictive ASME OM Code limits from Table ISTB-5221-1 would resume, providing additional margin above the MOP curves.

Other activities are in place that enhance the ability to detect pump degradation. In addition to measuring vibrations on the upper motor bearing housing as required by the ASME OM Code, vibrations are also measured on the lower motor bearing housing each quarter. Spectral analysis of the vibrations is a good practice that can be used to determine the mechanical condition of a pump. Spectral data can provide information to determine if misalignment, unbalance, resonance, looseness, or a bearing problem is present. Trending of the spectral data could also determine a change in condition of the pump. Included in the BVPS-2 preventive maintenance program is a motor lube oil analysis that is performed every 48 weeks, and a complete overhaul of pump and motor that is performed every 516 weeks. The overhaul frequency is based on the expected condition of the pumps as a result of historical overhauls and was established to allow overhaul prior to the point of degradation resulting in questionable operational readiness.

Using the provisions of this relief request as an alternative to the requirements of Table ISTB-5221-1 provides reasonable assurance of pump operational readiness.

7. **Duration of Proposed Alternative**

The proposed alternative is requested for use during the fourth 10-year inservice test interval.

8. **Precedent**

A similar request was approved for the Beaver Valley Power Station, Unit No. 2 third 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing the similar alternative is referenced below.

Beaver Valley Power Station, Unit No. 2, Docket No. 50-412, Safety Evaluation of Relief Request PRR10 for the Third 10-Year Inservice Testing Program, dated June 30, 2011 (ADAMS Accession No. ML111751776).

PUMP RELIEF REQUEST 10

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. ASME Code Components Affected

2CHS*P21A, B and C	Charging Pumps, (Group A, Class 2)
2CHS*P22A and B	Boric Acid Transfer Pumps, (Group A, Class 3)
2RHS*P21A and B	Residual Heat Removal Pumps, (Group A, Class 2)
2SIS*P21A and B	Low Head Safety Injection Pumps, (Group B, Class 2)
2QSS*P21A and B	Quench Spray Pumps, (Group B, Class 2)
2RSS*P21A, B, C and D	Recirculation Spray Pumps, (Group B, Class 2)
2FWE*P22	Turbine-Driven Auxiliary Feedwater Pump, (Group B, Class 3)
2FWE*P23A and B	Motor-Driven Aux Feedwater Pumps, (Group B, Class 3)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. Applicable Code Requirement

ISTB-5121, "Group A Test Procedure," ISTB-5121(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," ISTB-5122(c) states:

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

ISTB-5123, "Comprehensive Test Procedure," ISTB-5123(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," ISTB-5221(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," ISTB-5222(c) states:

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

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

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

4. Reason for Request

There is difficulty in adjusting system throttle valves with sufficient precision to achieve an exact flow reference value during pump testing. Paragraphs ISTB-5121(b), ISTB-5122(c), ISTB-5123(b), ISTB-5221(b), ISTB-5222(c) and ISTB-5223(b) do not allow for a variance in flow rate from a fixed reference point for pump testing.

PUMP RELIEF REQUEST 10

5. Proposed Alternative and Basis for Use

When pump flow rate is required to be throttled for the pumps listed above, it will be adjusted by plant operators as close as practical to the reference flow value, but within a procedure flow limit of plus 2 percent or minus 1 percent of the reference value in accordance with ASME OM Code Case OMN-21, "Alternate Requirements for Adjusting Hydraulic Parameters to Specified Reference Points," updated January 29, 2013.

NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," Revision 2, Section 5.3, "Allowable Variance from Reference Points and Fixed-Resistance Systems," states in part 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.

ASME OM Code Case OMN-21 provides guidance for adjusting reference flow to within a specified tolerance during pump 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 +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.

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

6. Duration of Proposed Alternative

The proposed alternative is requested for use during the fourth 10-year inservice test interval.

7. Precedent

A similar request was approved for the Fort Calhoun Station, Unit No. 1, fifth 10-year inservice test interval. The Nuclear Regulatory Commission staff letter authorizing the alternative is referenced below.

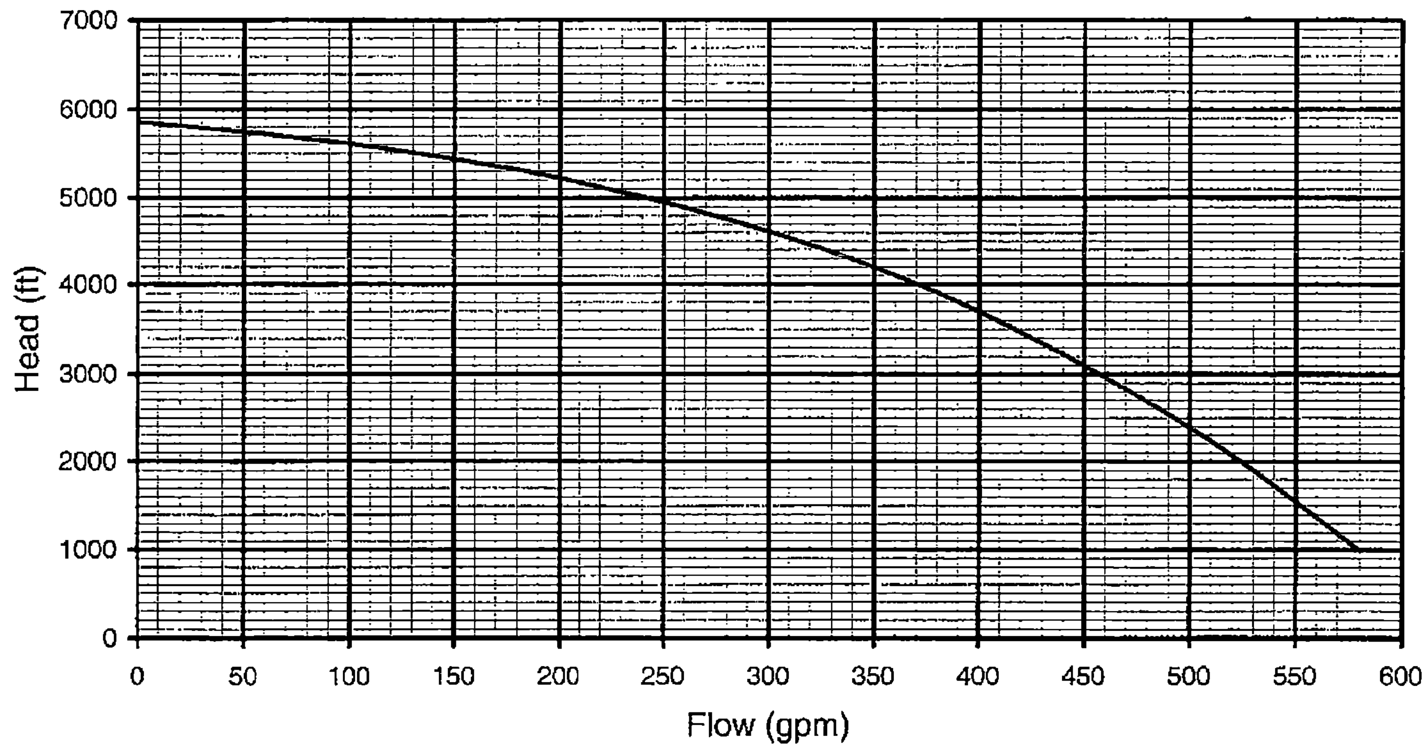
Fort Calhoun Station, Unit No. 1, Docket No. 50-285, Safety Evaluation of Request for Relief P-2 for the Fifth 10-Year Inservice Testing Program Interval, dated February 19, 2016

SECTION IV: PUMP MINIMUM OPERATING POINT (MOP) CURVES

Pump Name: Charging/High Head Safety Injection Pumps

Pump Number: 2CHS*P21A
2CHS*P21B
2CHS*P21C

[2CHS*P21A, B, C]
MOP CURVE

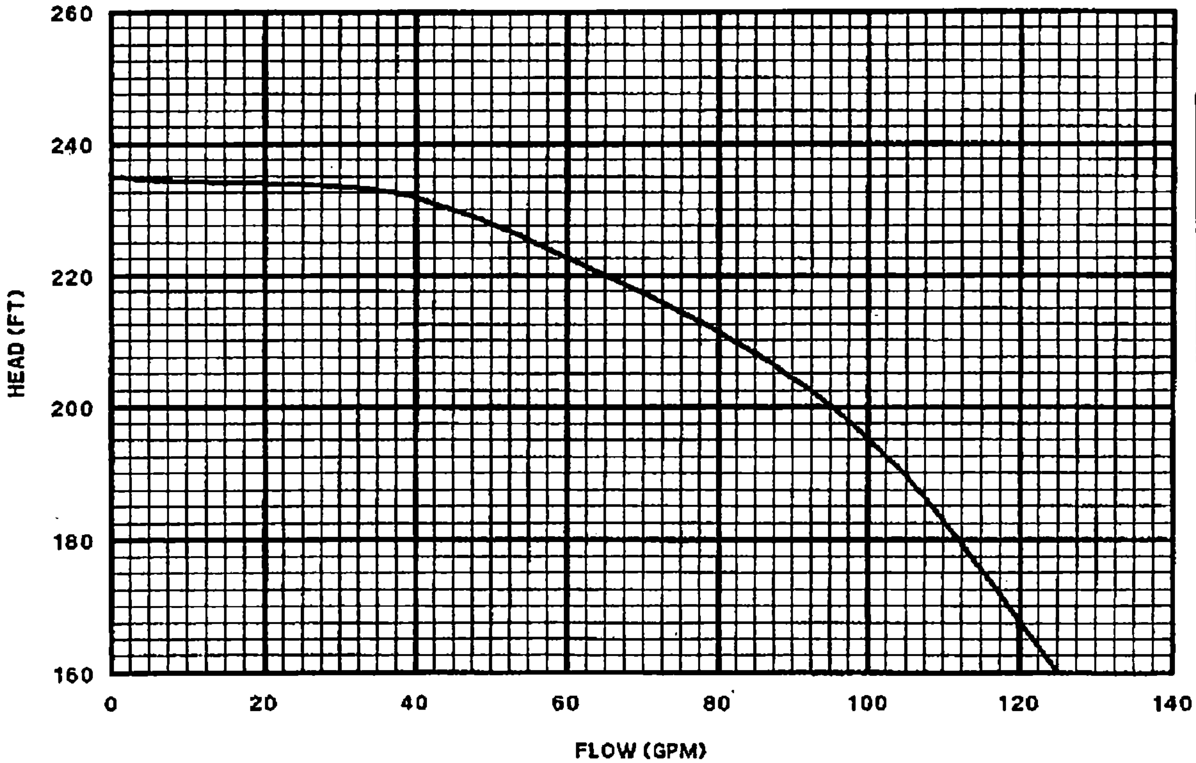


MOP Curve is based on Calculation 10080-N-794, Rev.1, Add.2 (10/26/06) and ECP 02-0247 (2R12) using the following curve formula: Head = (-0.000014399 x Q^3) + (-0.0024889 x Q^2) + (-2.095 x Q) + 5855

Pump Name: 22A Boric Acid Transfer Pump

Pump Number: 2CHS*P22A

2CHS*P22A
MOP CURVE



MOP CURVE DATA POINTS:

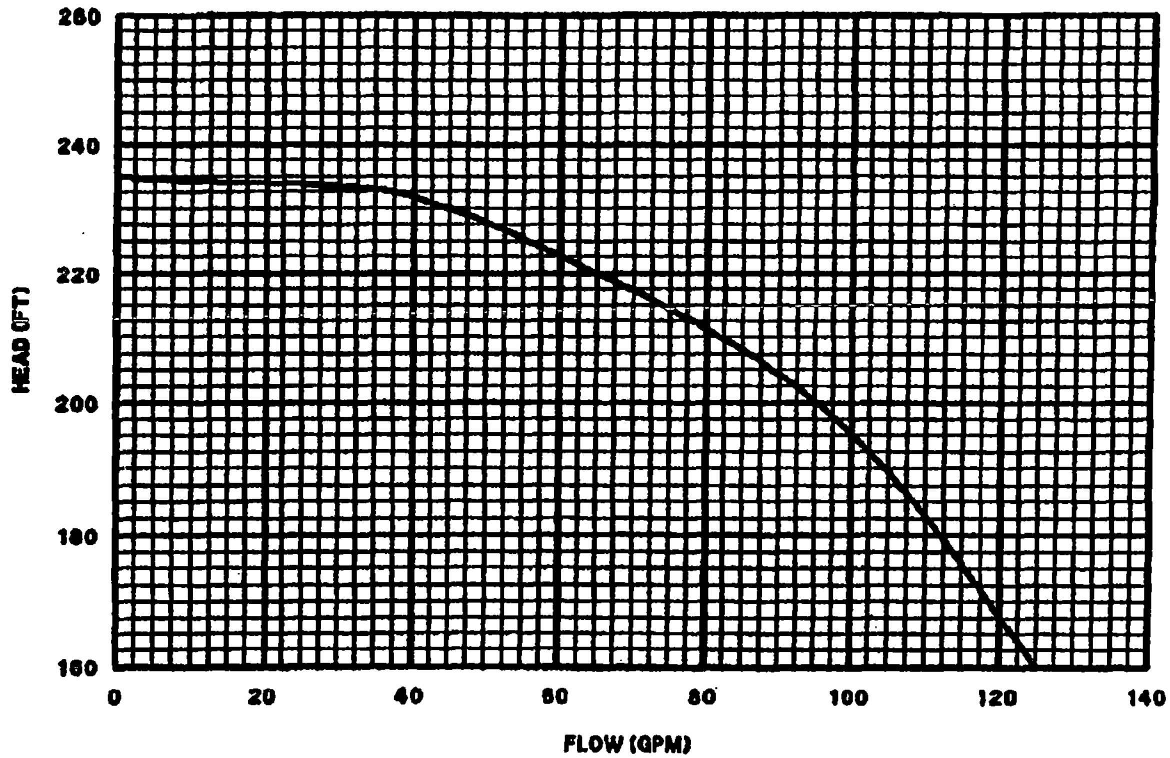
FLOW (GPM)	HEAD (FT.)
0	235
20	234
40	232
60	223
80	212
100	195
120	168
125	160

SUPPLIED BY WESTINGHOUSE PER
LETTER NO. BV2-SET-024 (2/3/87).

Pump Name: 22B Boric Acid Transfer Pump

Pump Number: 2CHS*P22B

2CHS*P22B
MOP CURVE



MOP CURVE DATA POINTS:

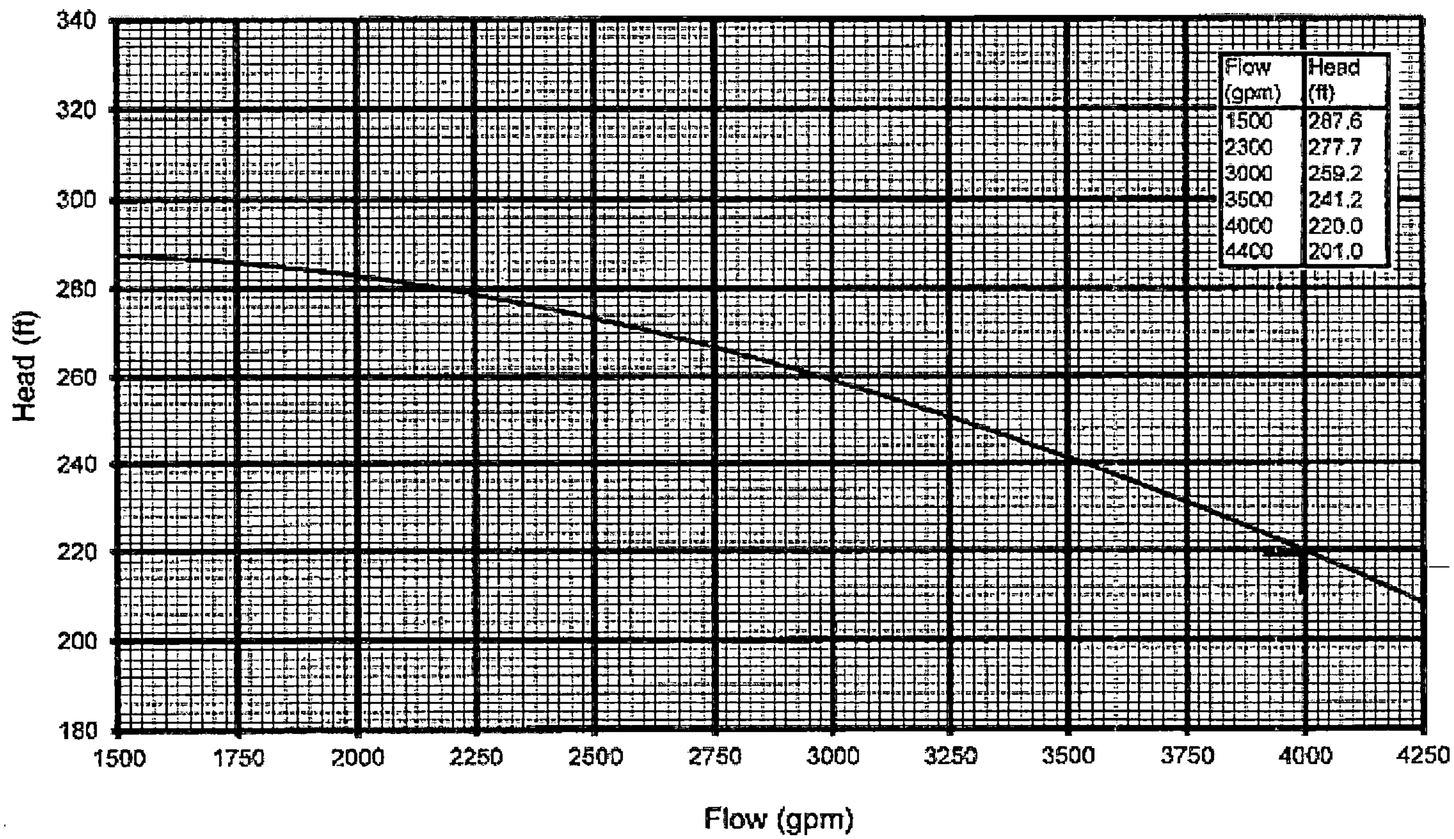
FLOW (GPM)	HEAD (FT.)
0	235
20	234
40	232
60	223
80	212
100	195
120	168
125	160

SUPPLIED BY WESTINGHOUSE PER
LETTER NO. BV2-SET-024 (2/3/87).

Pump Name: 21A Residual Heat Removal Pump

Pump Number: 2RHS*P21A

[2RHS*P21A] MOP Curve

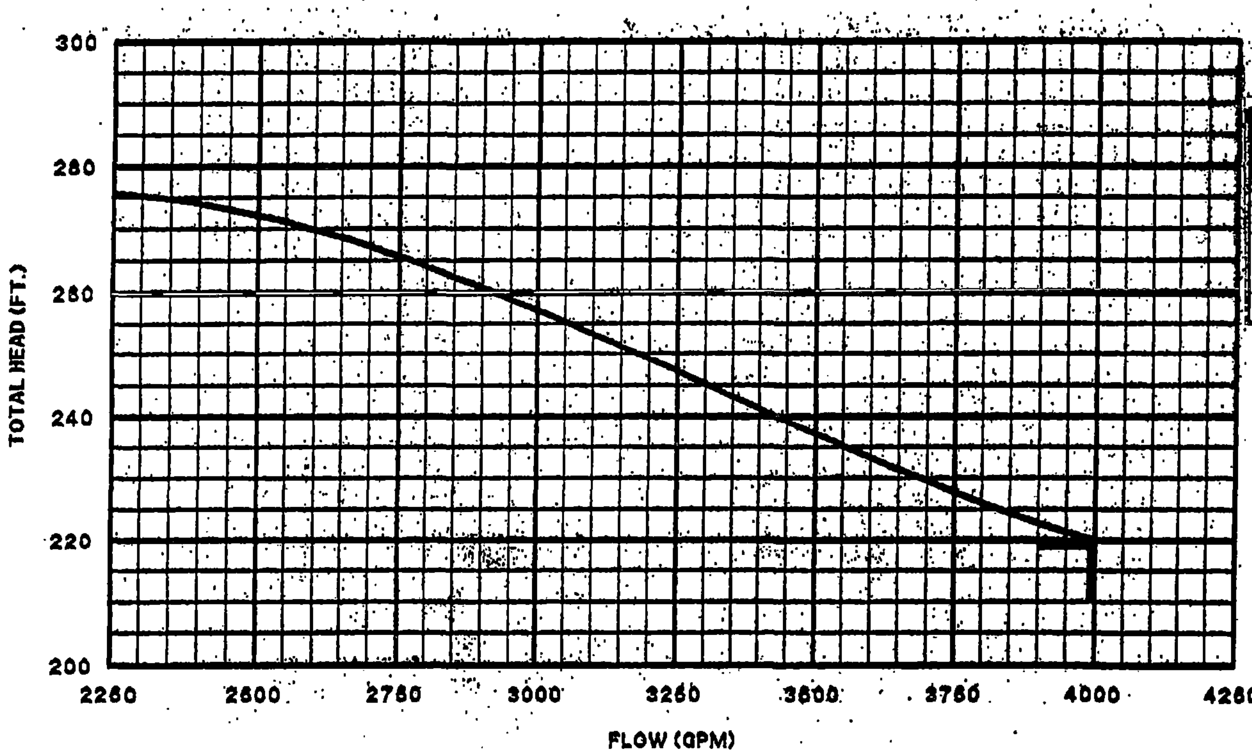


MOP Point is at 220 ft at 4000 gpm per Calc. BV2-SET-024 and EM 113379 (11/15/96). The MOP Curve is derived as 93.62% of the pump curve obtained on 5/9/17.

Pump Name: 21B Residual Heat Removal Pump

Pump Number: 2RHS*P21B

2RHS*P21B
MOP CURVE



MOP CURVE DATA POINTS:

FLOW (GPM)	HEAD (FT.)
2225	275.8
2551	271.0
3022	256.3
3529	236.2
4000	220.0

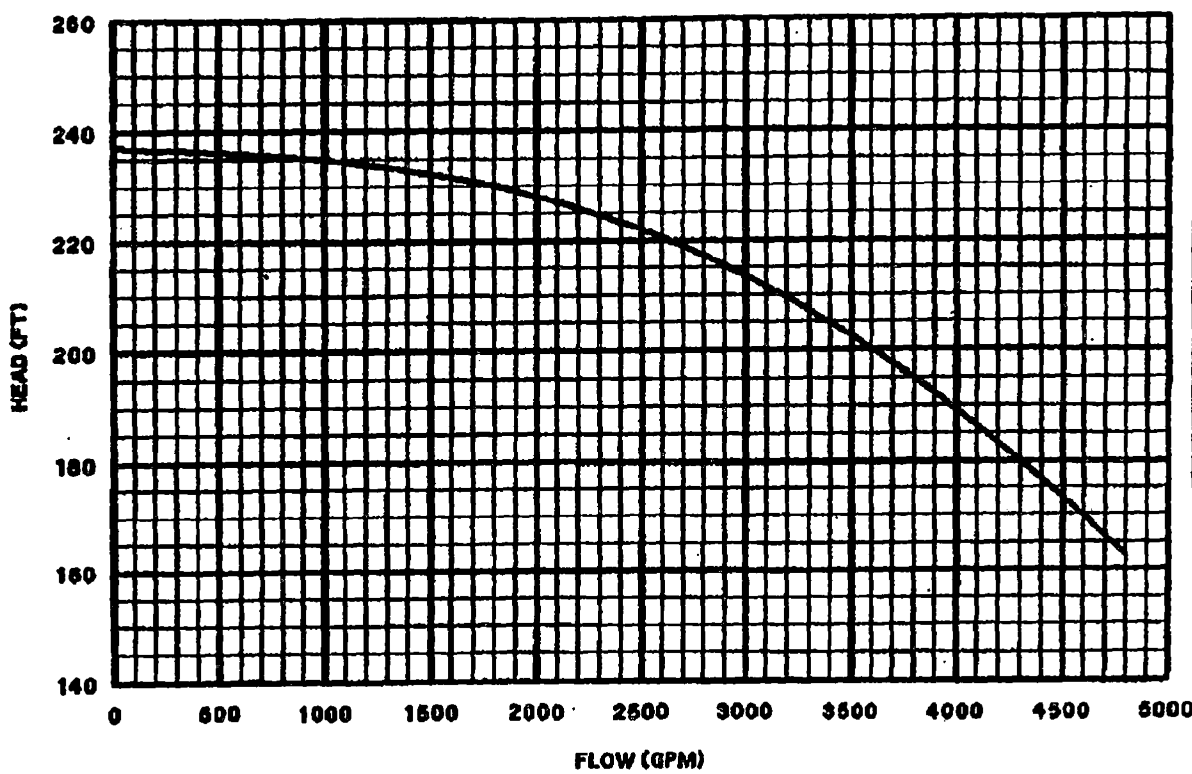
MOP CURVE IS DERIVED AS 90.88% OF THE PUMP PERFORMANCE CURVE OBTAINED ON 2/16/02.

MOP POINT IS AT 220 FT AT 4000 GPM PER CALC. NO. BV2-SET-024 AND EM 113379 (11/16/98).

Pump Name: 21A Low Head Safety Injection Pump

Pump Number: 2SIS*P21A

2SIS*P2 1A
MOP CURVE



MOP CURVE DATA POINTS:

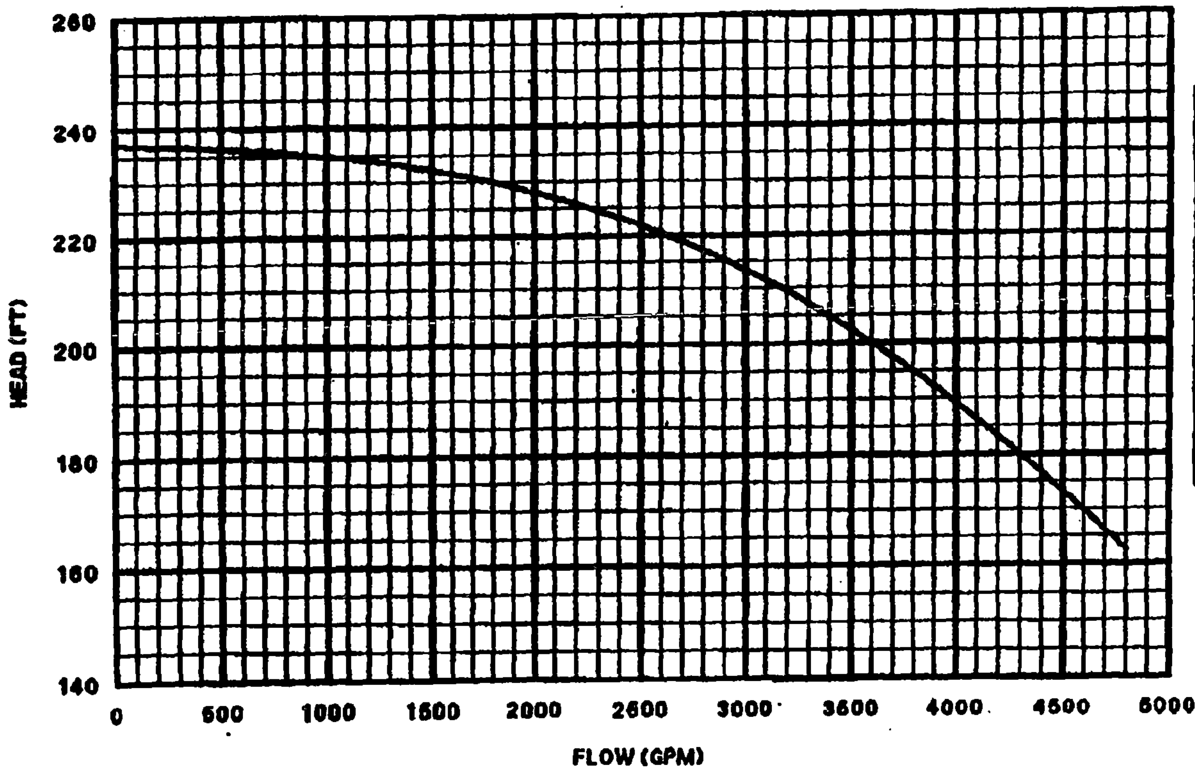
FLOW (GPM)	HEAD (FT.)
0	237.1
800	235.6
1600	231.6
2000	228.1
2400	223.3
2800	217.2
3200	209.4
3600	200.1
4000	189.2
4400	176.7
4800	162.6

SUPPLIED BY WESTINGHOUSE PER CALCULATION NO. PS-C-104 (5/10/93).

Pump Name: 21B Low Head Safety Injection Pump

Pump Number: 2SIS*P21B

2SIS*P21B
MOP CURVE



MOP CURVE DATA POINTS:

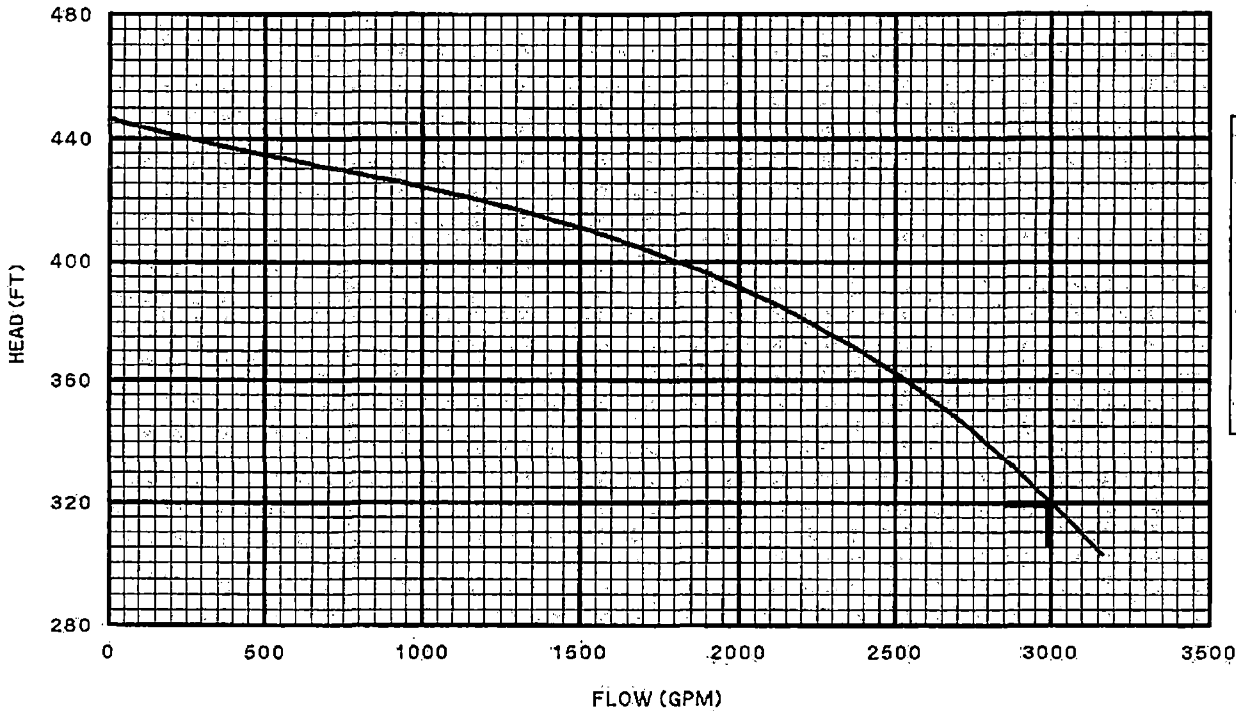
FLOW (GPM)	HEAD (FT.)
0	237.1
800	235.6
1600	231.6
2000	228.1
2400	223.3
2800	217.2
3200	209.4
3600	200.1
4000	189.2
4400	176.7
4800	162.6

SUPPLIED BY WESTINGHOUSE PER CALCULATION NO. PS-C-104 (5/10/93).

Pump Name: 21A Quench Spray Pump

Pump Number: 2QSS*P21A

2QSS*P21A
MOP CURVE



MOP CURVE DATA POINTS:

FLOW (GPM)	HEAD (FT.)
0	446.6
430	436.0
860	426.9
1290	416.7
1720	403.3
2150	384.1
2580	356.8
3000	320.0
3160	302.9

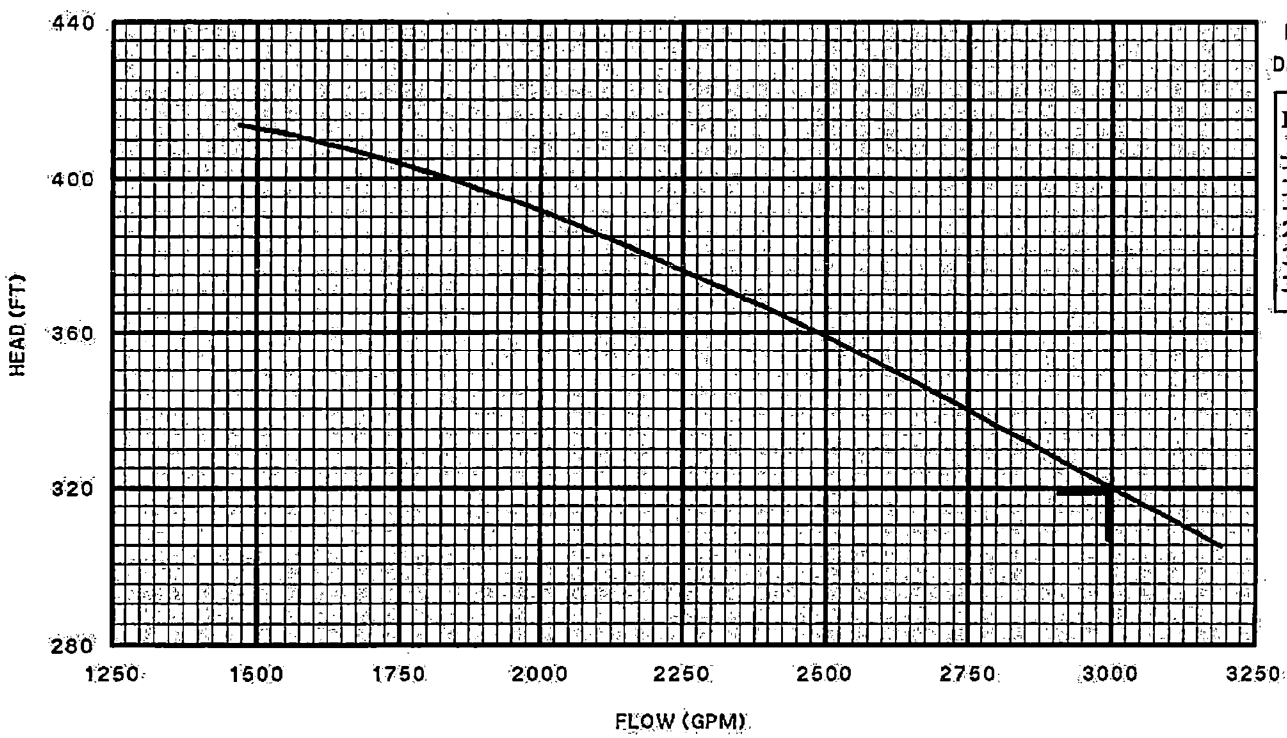
DERIVED AS 95.36% OF PUMP PERFORMANCE CURVE OBTAINED ON 3/12/87.

┐ MOP POINT IS AT 320 FT AT 3000 GPM PER CALC. 10080-N-813 (REV.1) (2/17/04).

Pump Name: 21B Quench Spray Pump

Pump Number: 2QSS*P21B

2QSS*P21B
MOP CURVE



MOP CURVE DATA POINTS:

FLOW (GPM)	HEAD (FT.)
1470	413.8
1997	391.6
2488	359.7
3000	320.0
3190	304.7

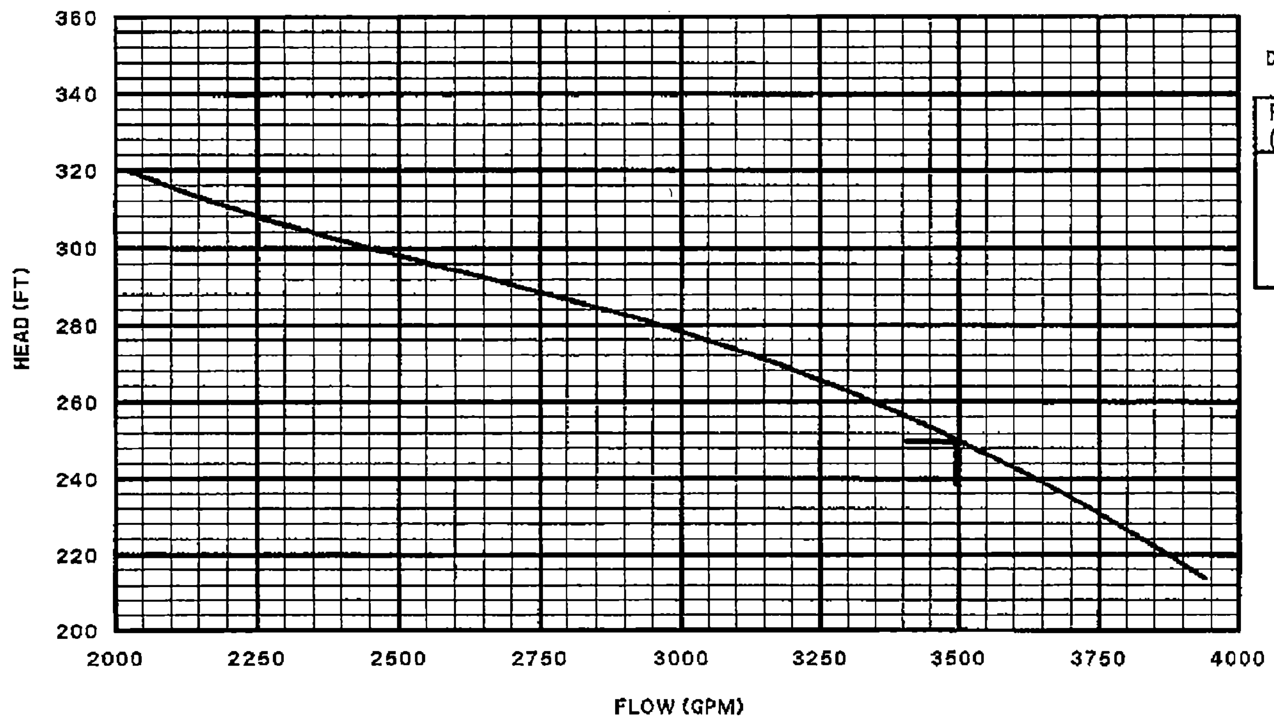
DERIVED AS 95.7% OF PUMP PERFORMANCE CURVE OBTAINED ON 5/11/98.

┐ MOP POINT IS AT 320 FT AT 3000 GPM PER CALC. 10080-N-813 (REV.1) (2/17/04).

Pump Name: 21A Recirculation Spray Pump

Pump Number: 2RSS*P21A

2RSS*P21A
MOP CURVE



MOP CURVE DATA POINTS:

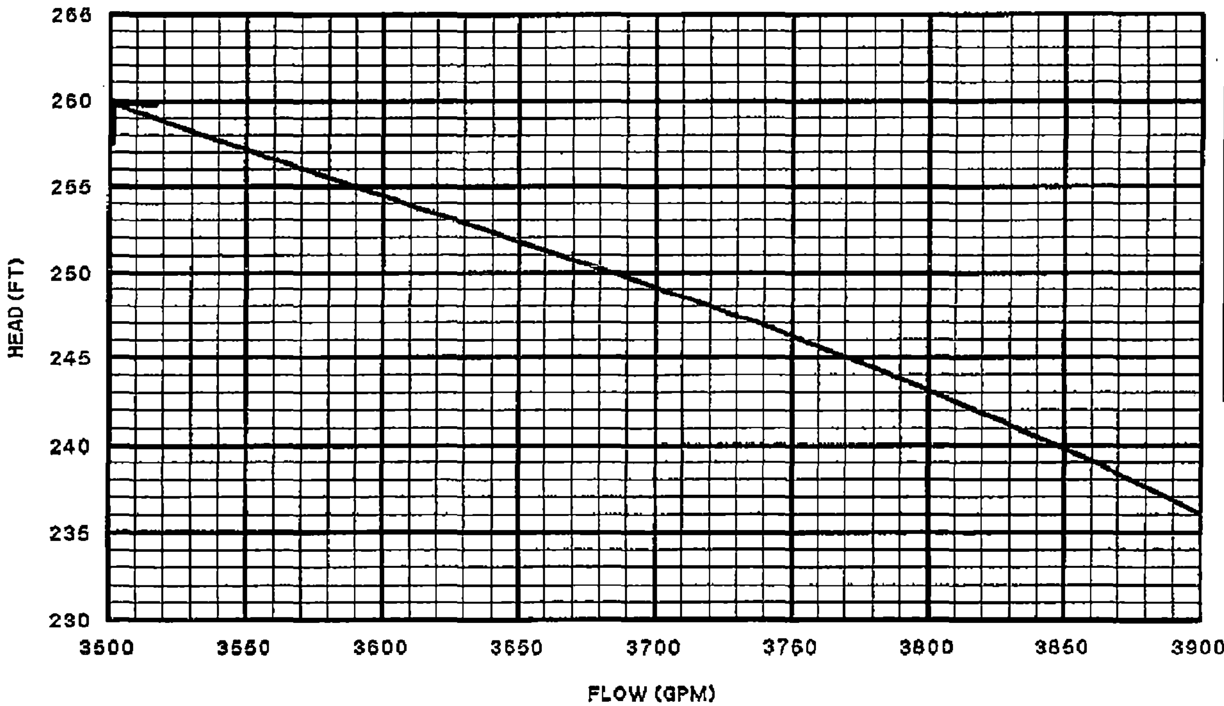
FLOW (GPM)	HEAD (FT.)
2025	320
2533	297
3002	278
3500	250
3940	214

MOP CURVE IS DERIVED AS 97.9% OF THE PUMP PERFORMANCE CURVE OBTAINED ON 4/17/95.

MOP POINT IS AT 250 FT AT 3500 GPM PER CALC. 12241-US(B)-190, REV.2 (11/15/03) IMPLEMENTED DURING 2R12 PER ECP 02-0214 (10/4/06).

Pump Name: 21B Recirculation Spray Pump **Pump Number:** 2RSS*P21B

2RSS*P2 1B
MOP CURVE



MOP CURVE DATA POINTS:

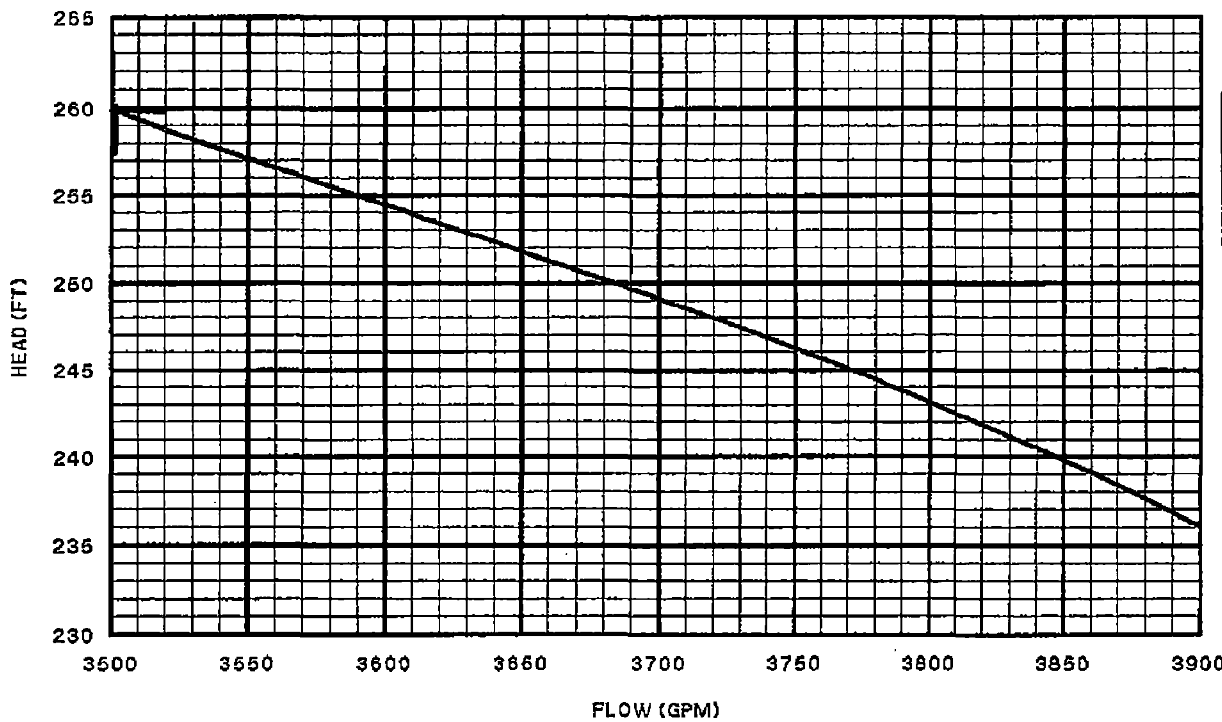
FLOW (GPM)	HEAD (FT.)
3500	260
3550	257
3600	254.5
3650	252
3700	249
3750	246.3
3800	243
3850	240
3900	236

MOP CURVE SUPPLIED BY ENG PER EM 63835(3/14/89).

MOP POINT IS AT 260 FT AT 3500 GPM PER CALC. 12241-US(B)-190, REV.2 (11/15/03) IMPLEMENTED DURING 2R12 PER ECP 02-0214 (10/4/06).

Pump Name: 21C Recirculation Spray Pump **Pump Number:** 2RSS*P21C

2RSS*P21C
MOP CURVE



MOP CURVE DATA POINTS:

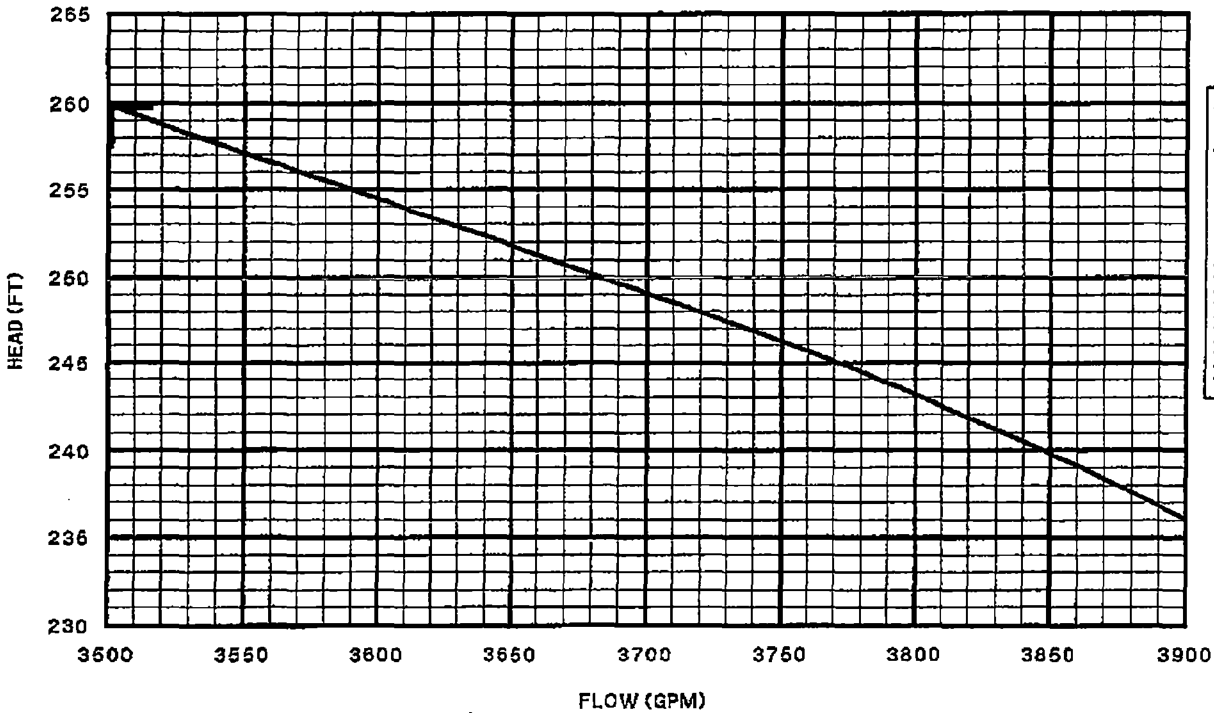
FLOW (GPM)	HEAD (FT.)
3500	260
3550	257
3600	254.5
3650	252
3700	249
3750	246.3
3800	243
3850	240
3900	236

MOP CURVE WAS SUPPLIED BY ENGINEERING PER EM 63835 (3/14/89).

MOP POINT IS AT 260 GPM AT 3500 GPM PER CALC. 12241-US(B)-190, REV.2 (11/15/03) IMPLEMENTED DURING 2R12 PER ECP 02-0214 (10/4/06).

Pump Name: 21D Recirculation Spray Pump
Pump Number: 2RSS*P21D

2RSS*P21D
MOP CURVE



MOP CURVE DATA POINTS:

FLOW (GPM)	HEAD (FT.)
3500	260
3550	257
3600	254.5
3650	252
3700	249
3750	246.3
3800	243
3850	240
3900	236

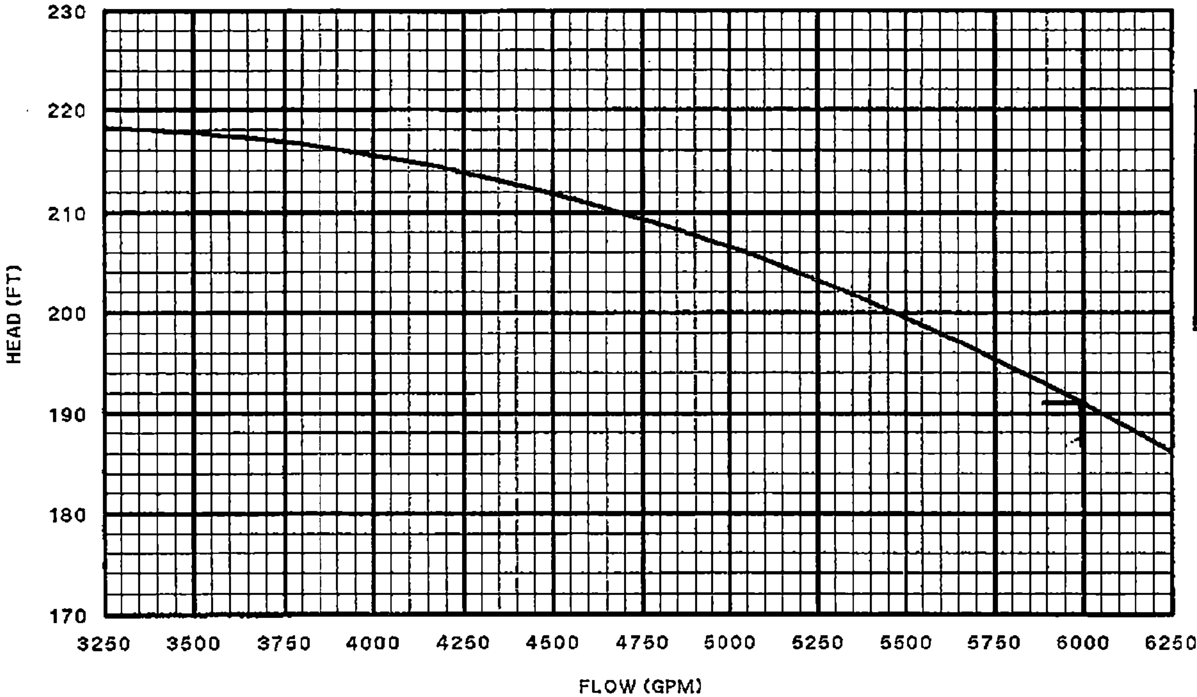
MOP CURVE WAS SUPPLIED BY ENGINEERING PER EM 63835 (3/14/89).

MOP POINT IS AT 260 FT AT 3500 GPM PER CALC. 12241-US(B)-190, REV.2 (11/15/03) IMPLEMENTED DURING 2R12 PER ECP 02-0214 (10/4/05).

Pump Name: 21A Component Cooling Water Pump

Pump Number: 2CCP*P21A

2CCP*P2 1A
MOP CURVE



MOP CURVE DATA POINTS:

FLOW (GPM)	HEAD (FT.)
2840	218.1
4334	213.3
4857	208.2
5230	203.5
6000	191.0
6500	180.8

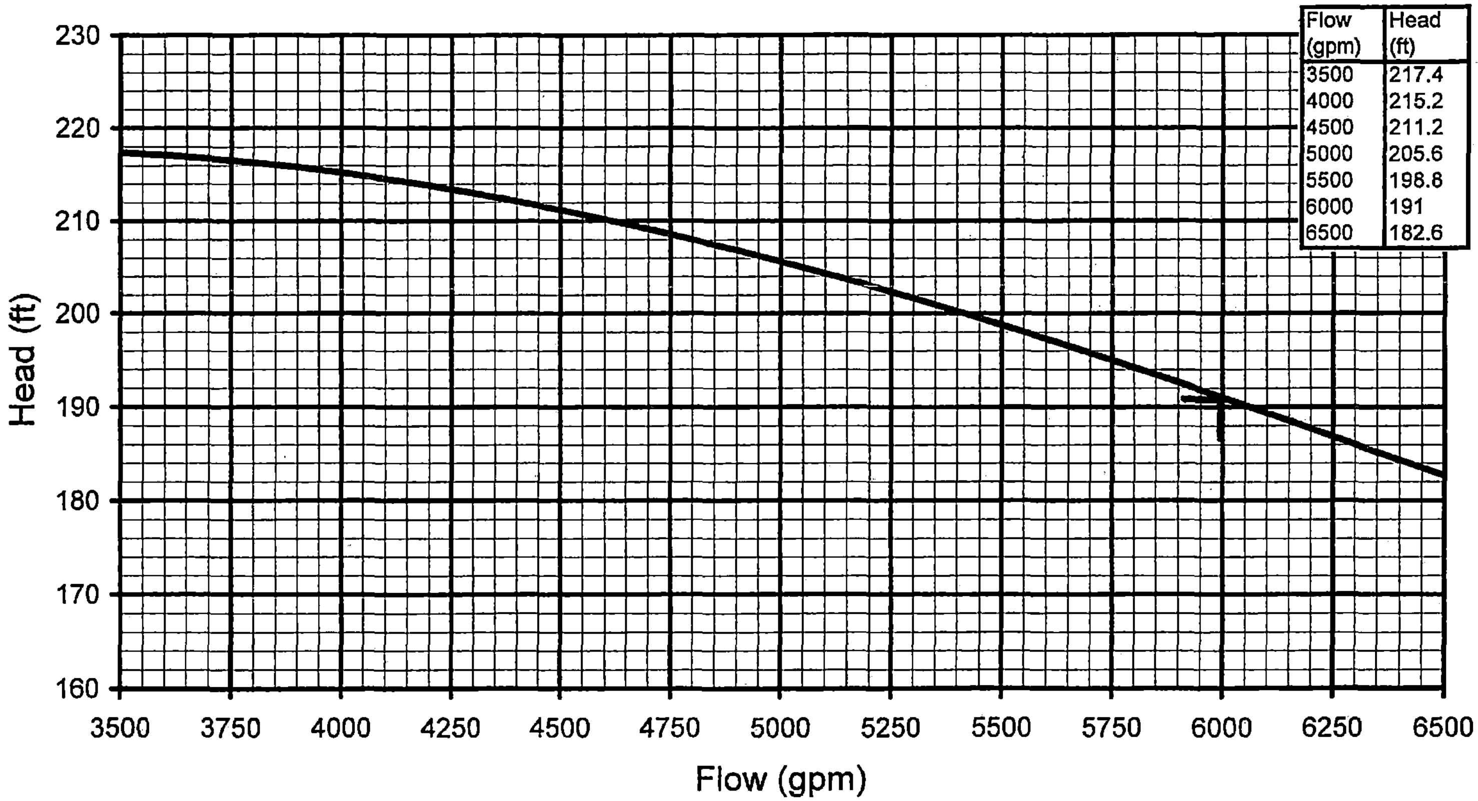
DERIVED AS 88.97% OF PUMP PERFORMANCE CURVE OBTAINED ON 1/7/99 & 3/24/99.

MOP POINT IS AT 191 FT AT 6000 GPM PER CALC. 10080-N-740 (1/26/96).

Pump Name: 21B Component Cooling Water Pump

Pump Number: 2CCP*P21B

[2CCP*P21B]
MOP Curve



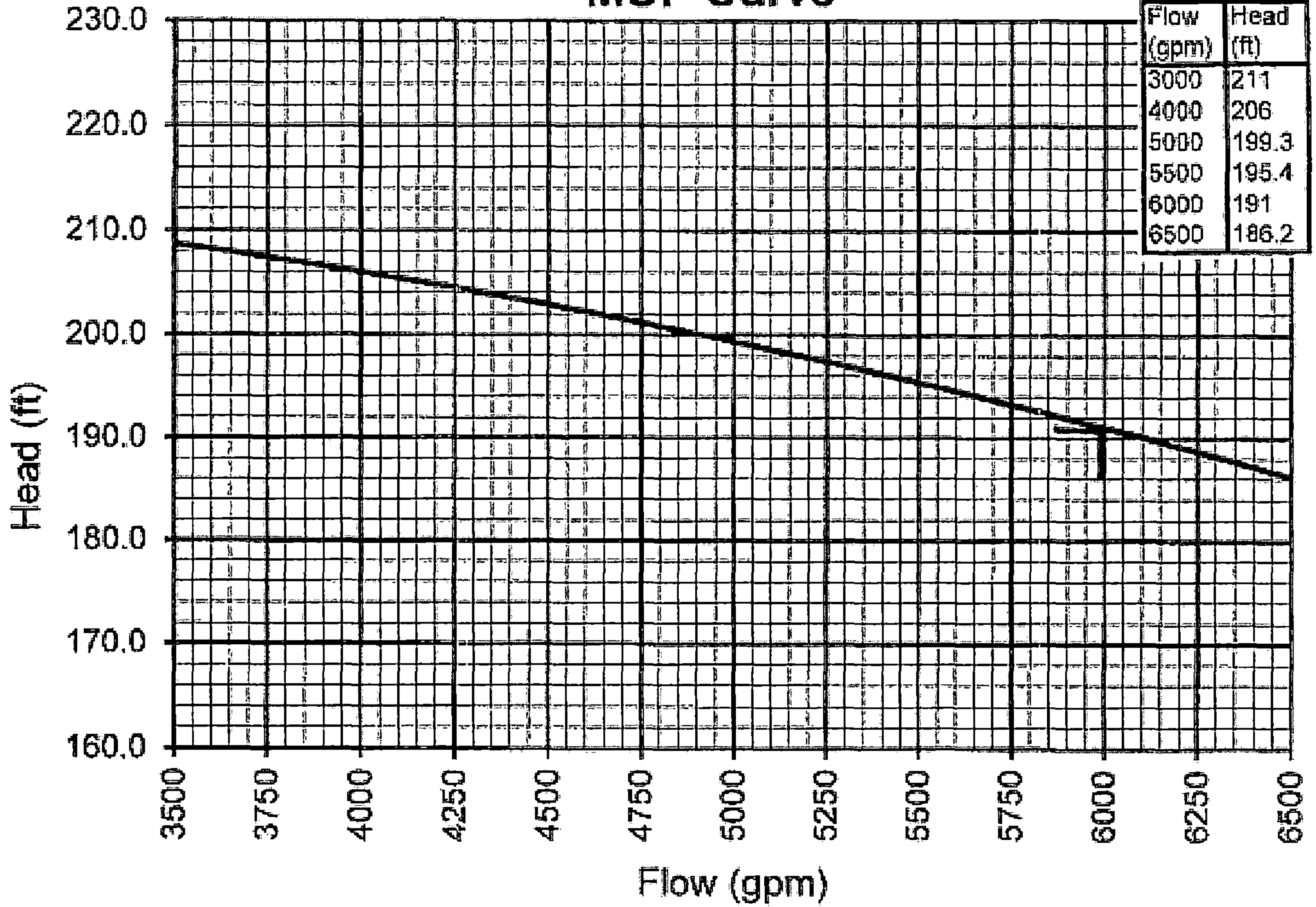
Flow (gpm)	Head (ft)
3500	217.4
4000	215.2
4500	211.2
5000	205.6
5500	198.8
6000	191
6500	182.6

The MOP is at 191 ft at 6000 gpm per Calc. 10080-N-740 (1/26/96). The MOP Curve is derived as 87.17% of the reference pump curve obtained on 8/26/05.

Pump Name: 21C Component Cooling Water Pump

Pump Number: 2CCP*P21C

[2CCP*P21C]
MOP Curve



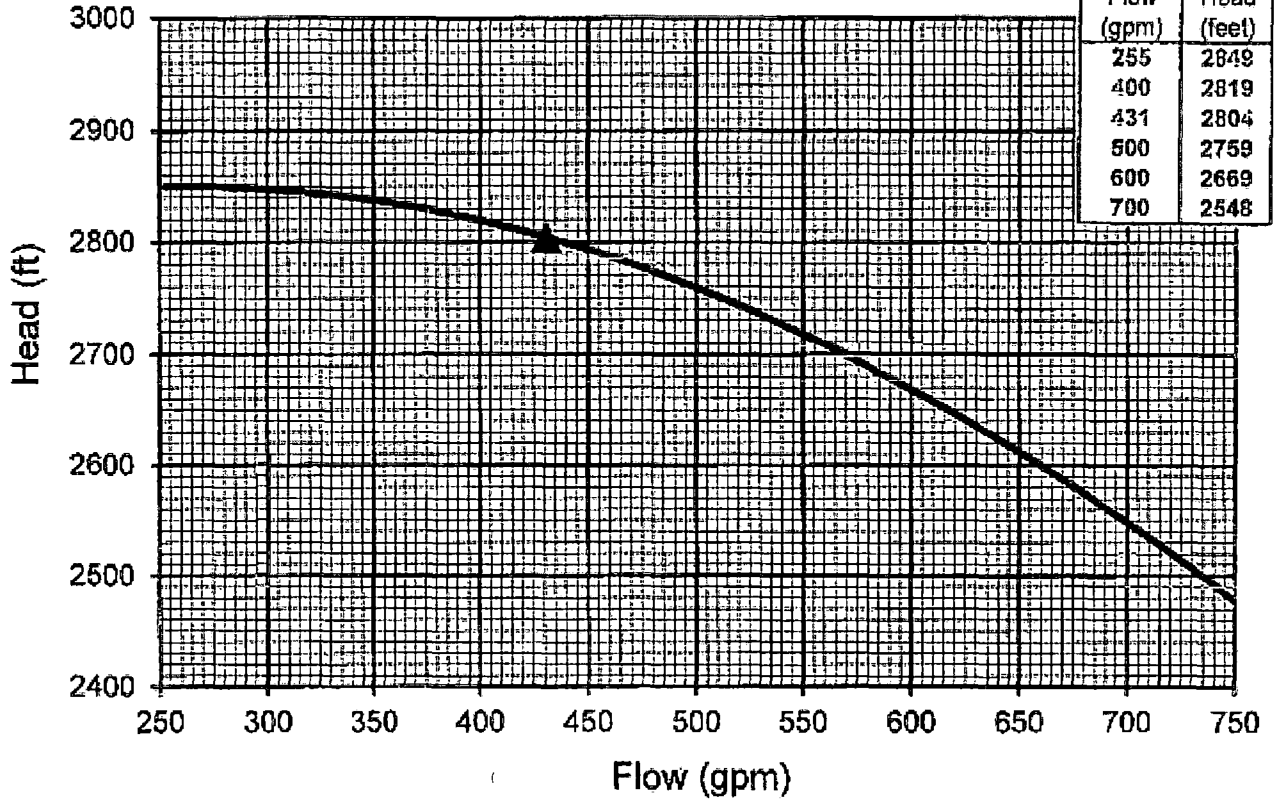
Flow (gpm)	Head (ft)
3000	211
4000	206
5000	199.3
5500	195.4
6000	191
6500	186.2

The MOP is at 191 ft at 6000 gpm per Calc. 10080-N-740 (1/26/96). The MOP Curve is derived as 86.54% of the reference pump curve obtained on 4/4/04.

Pump Name: Turbine Driven Auxiliary Feedwater Pump

Pump Number: 2FWE*P22

[2FWE*P22]
MOP Curve



Flow (gpm)	Head (feet)
255	2849
400	2819
431	2804
500	2759
600	2669
700	2548

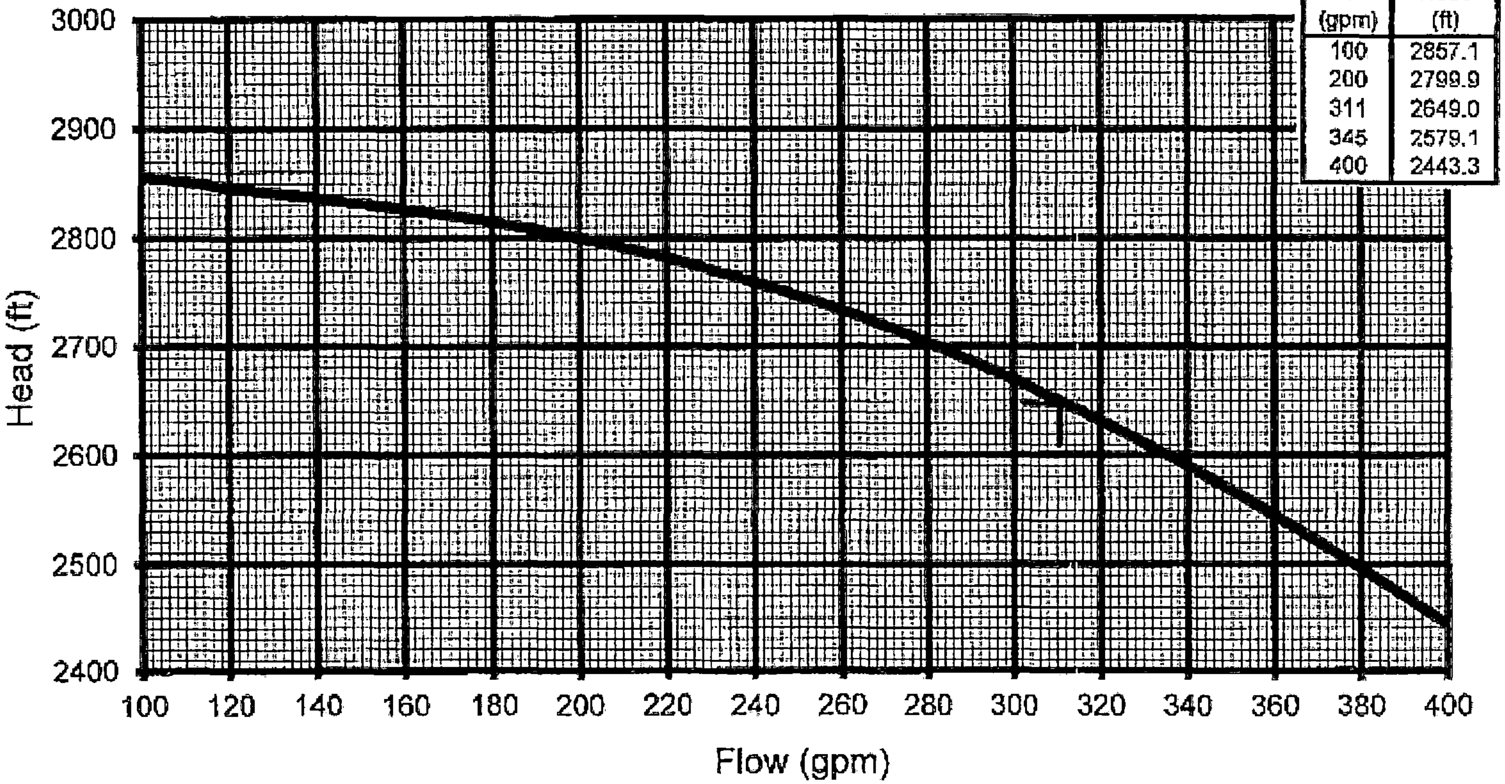
▲ MOP (2804 ft @ 431 gpm) — MOP Curve

New governor installed during 2R17 resulted in new pump speed at 4363 rpm (5/18/14).
MOP Point is at 2804 ft at 431 gpm per Calculation 10080-N-862, Rev.0 (7/31/09). MOP Curve is derived as 94.67% of the pump performance curve obtained on 5/14/08 and adjusted to 4363 rpm.

Pump Name: 23A Motor Driven Auxiliary Feedwater Pump

Pump Number: 2FWE*P23A

[2FWE*P23A]
MOP Curve



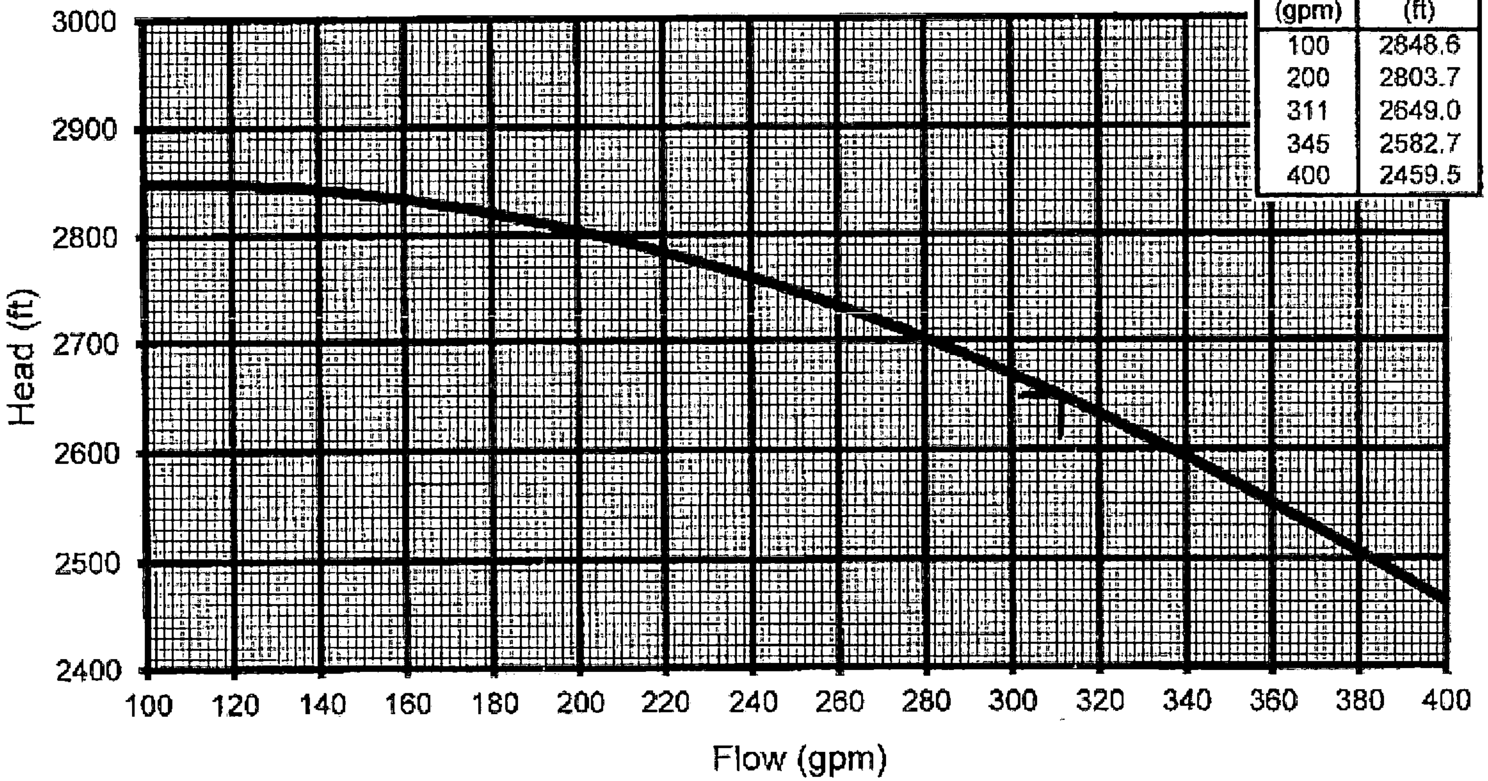
Flow (gpm)	Head (ft)
100	2857.1
200	2799.9
311	2649.0
345	2579.1
400	2443.3

MOP Point is at 2649 ft at 311 gpm per Calculation 10080-N-862, Rev. 0 (7/31/09), and is derived as 94.17% of the pump curve obtained on 10/22/12.

Pump Name: 23B Motor Driven Auxiliary Feedwater Pump

Pump Number: 2FWE*P23B

[2FWE*P23B]
MOP Curve

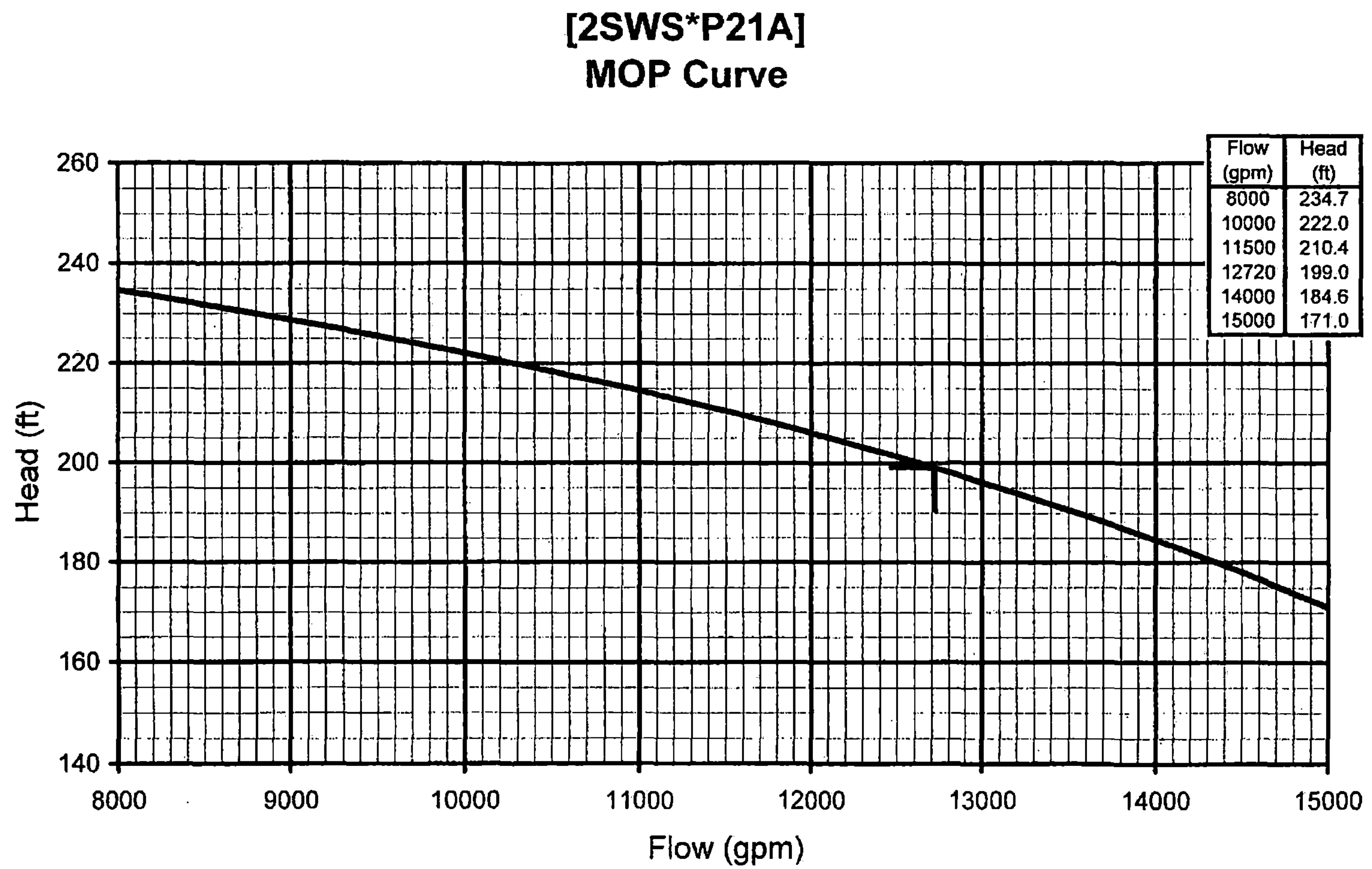


Flow (gpm)	Head (ft)
100	2848.6
200	2803.7
311	2649.0
345	2582.7
400	2459.5

MOP Point is at 2649 ft at 311 gpm per Calculation 10080-N-862, Rev. 0 (7/31/09), and is derived as 92.40% of the pump curve obtained on 10/22/12.

Pump Name: 21A Service Water Pump

Pump Number: 2SWS*P21A

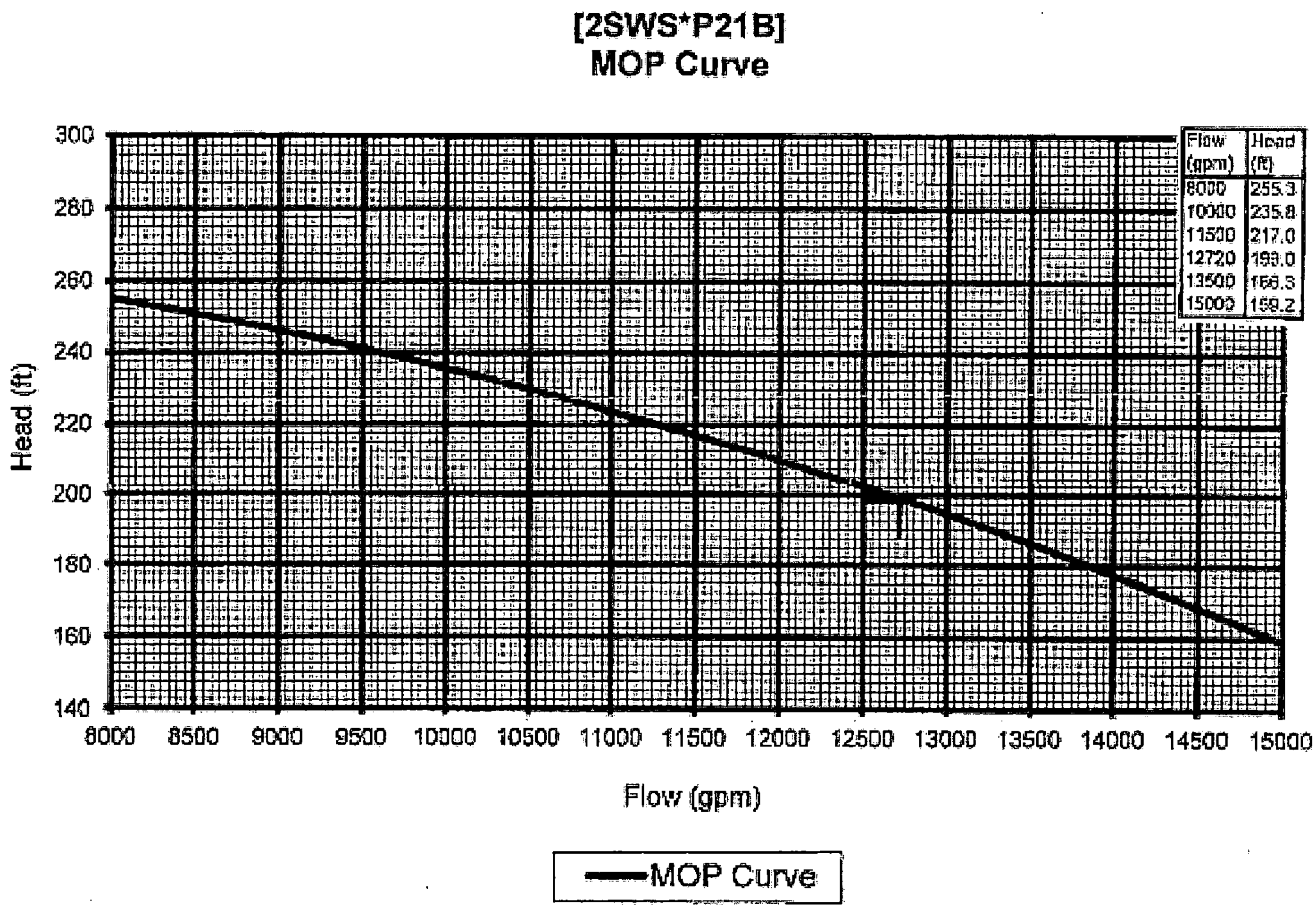


Flow (gpm)	Head (ft)
8000	234.7
10000	222.0
11500	210.4
12720	199.0
14000	184.6
15000	171.0

The MOP is at 199 ft at 12720 gpm per Calc. 10080-N-726-0 (7/25/95). The MOP Curve is derived as 83.26% of the manufacturer's pump curve validated on 11/12/05 & 11/16/12.

Pump Name: 21B Service Water Pump

Pump Number: 2SWS*P21B



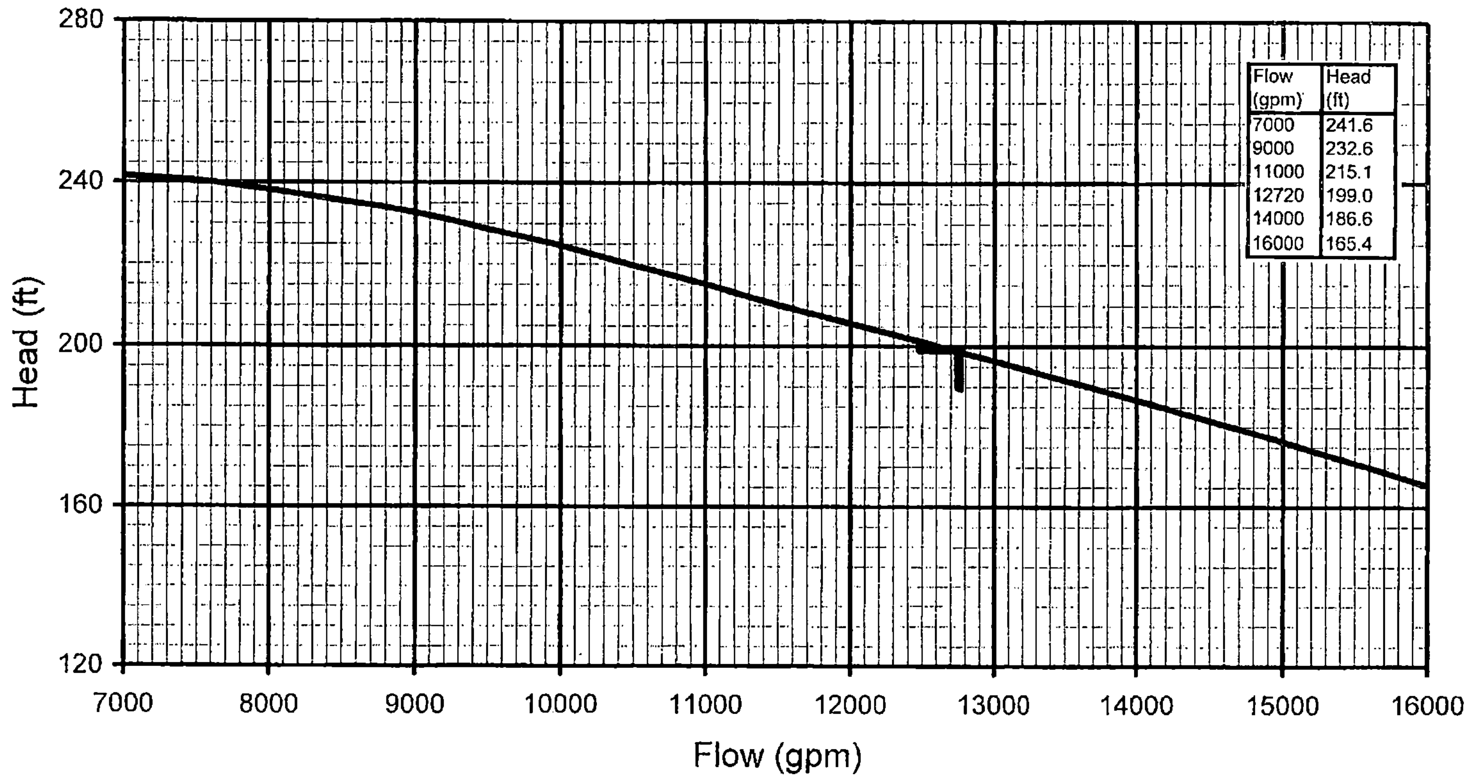
Flow (gpm)	Head (ft)
8000	255.3
10000	235.8
11500	217.0
12720	199.0
13500	186.3
15000	159.2

The MOP is at 199 ft at 12720 gpm per Calc. 10080-N-726-0 (7/25/95).
MOP Curve is derived as 89.4% of the tested pump curve on 3/25/16.

Pump Name: 21C Service Water Pump

Pump Number: 2SWS*P21C

[2SWS*P21C]
MOP Curve

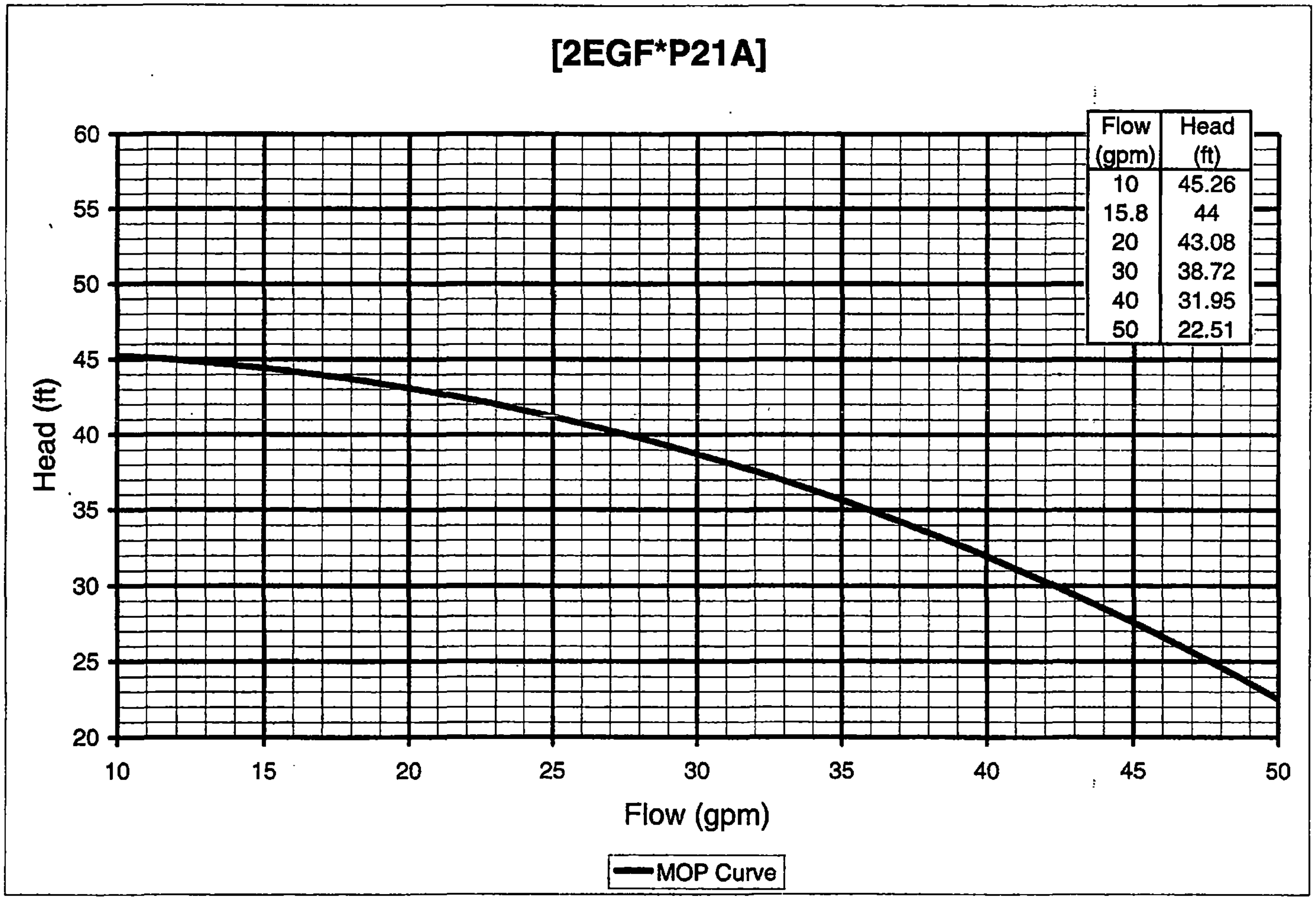


Flow (gpm)	Head (ft)
7000	241.6
9000	232.6
11000	215.1
12720	199.0
14000	186.6
16000	165.4

MOP is at 199 ft at 12720 gpm per Calc. 10080-N-726-0 (7/25/95). The MOP Curve is derived as 81.62% of the revised pump curve re-drawn on 8/23/13.

Pump Name: 21A Fuel Oil Transfer Pump

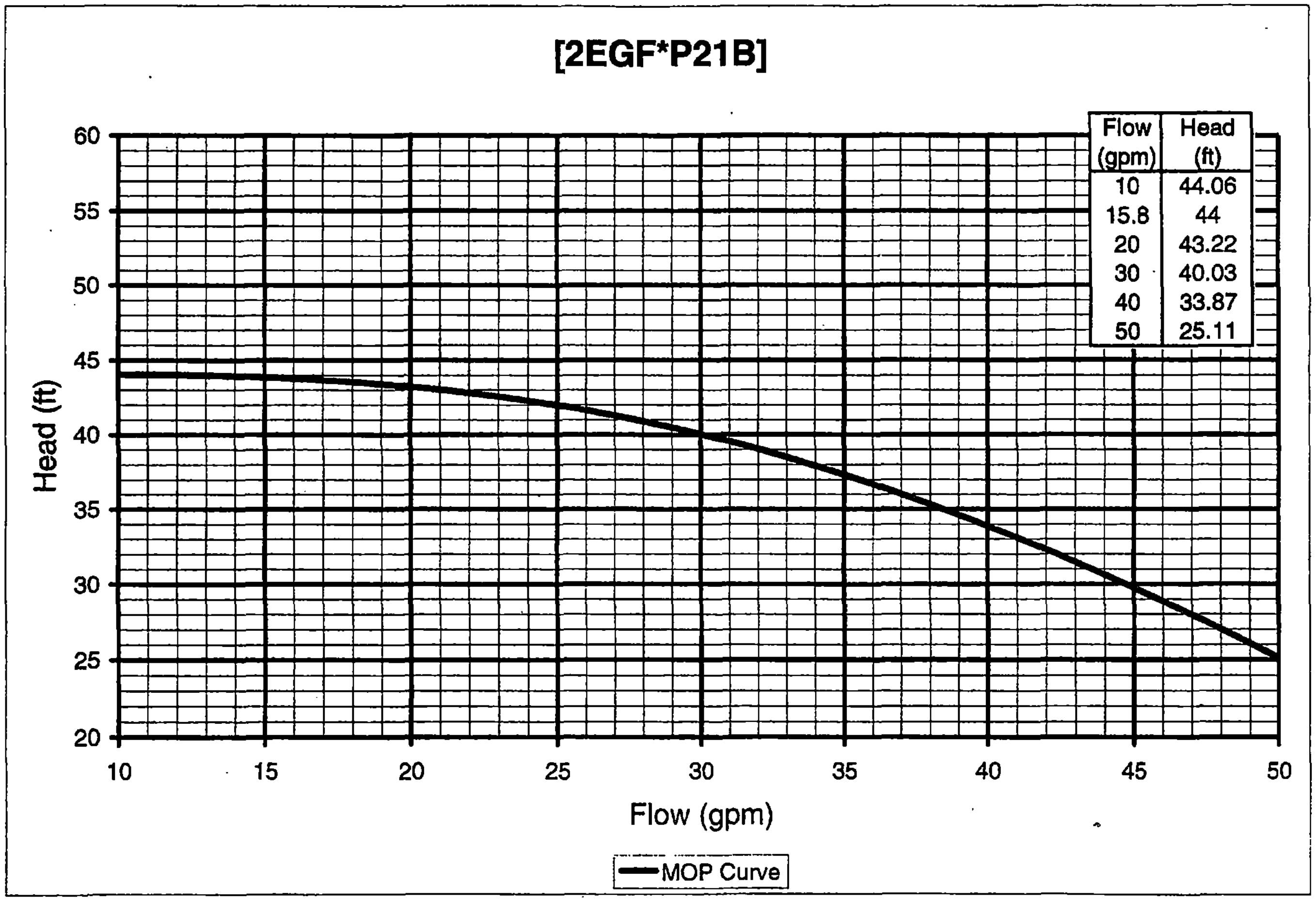
Pump Number: 2EGF*P21A



MOP Point is at 44 ft at 15.8 gpm per Calc. 12241-MT-224 (Rev.2, 5/2/03).
MOP Curve is based on Calc. 12241-MT-224 (Rev.2) and ECP-03-0248.

Pump Name: 21B Fuel Oil Transfer Pump

Pump Number: 2EGF*P21B

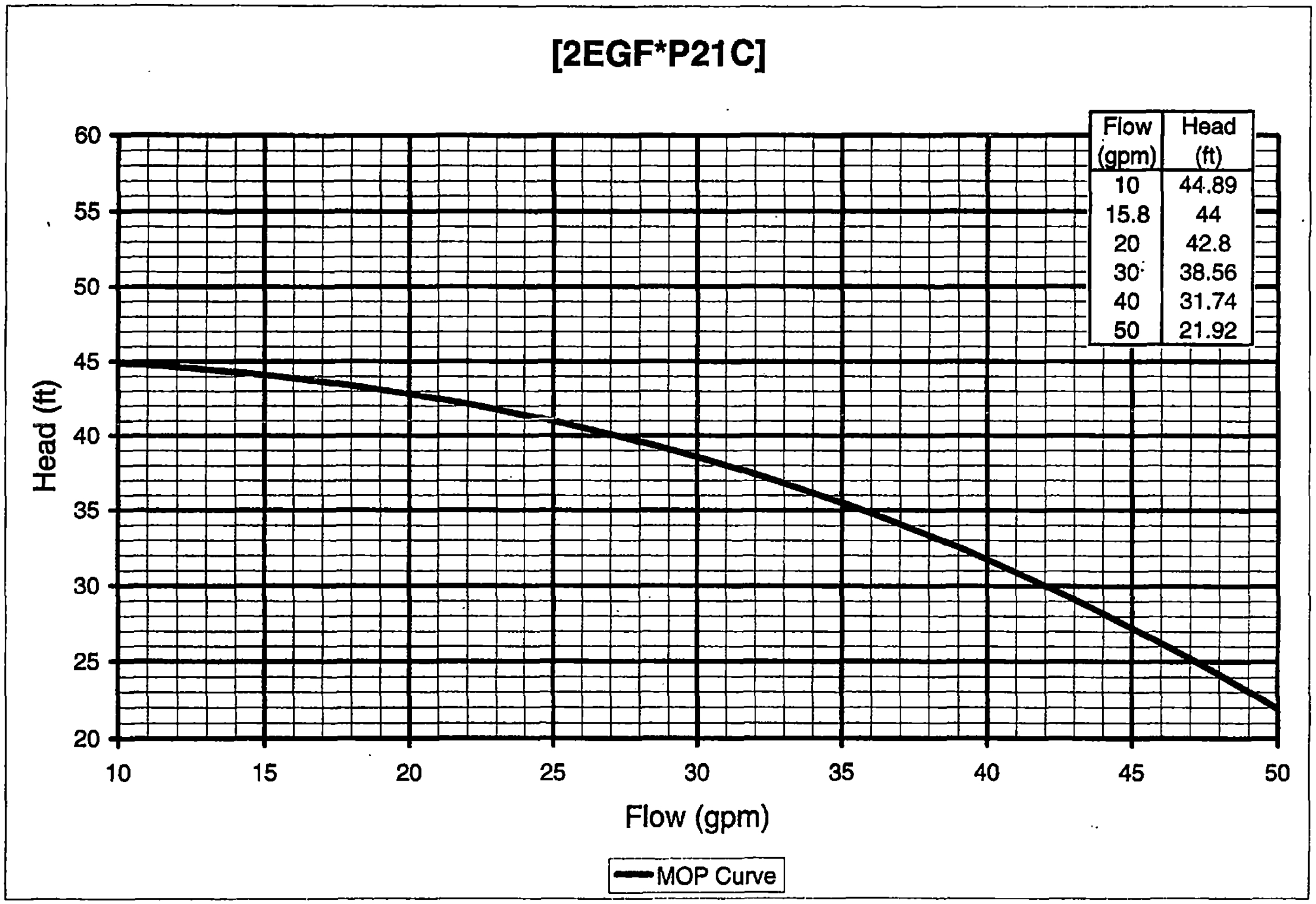


Flow (gpm)	Head (ft)
10	44.06
15.8	44
20	43.22
30	40.03
40	33.87
50	25.11

MOP Point is at 44 ft at 15.8 gpm per Calc. 12241-MT-224 (Rev.2, 5/2/03).
MOP Curve is based on Calc. 12241-MT-224 (Rev.2) and ECP-03-0248.

Pump Name: 21C Fuel Oil Transfer Pump

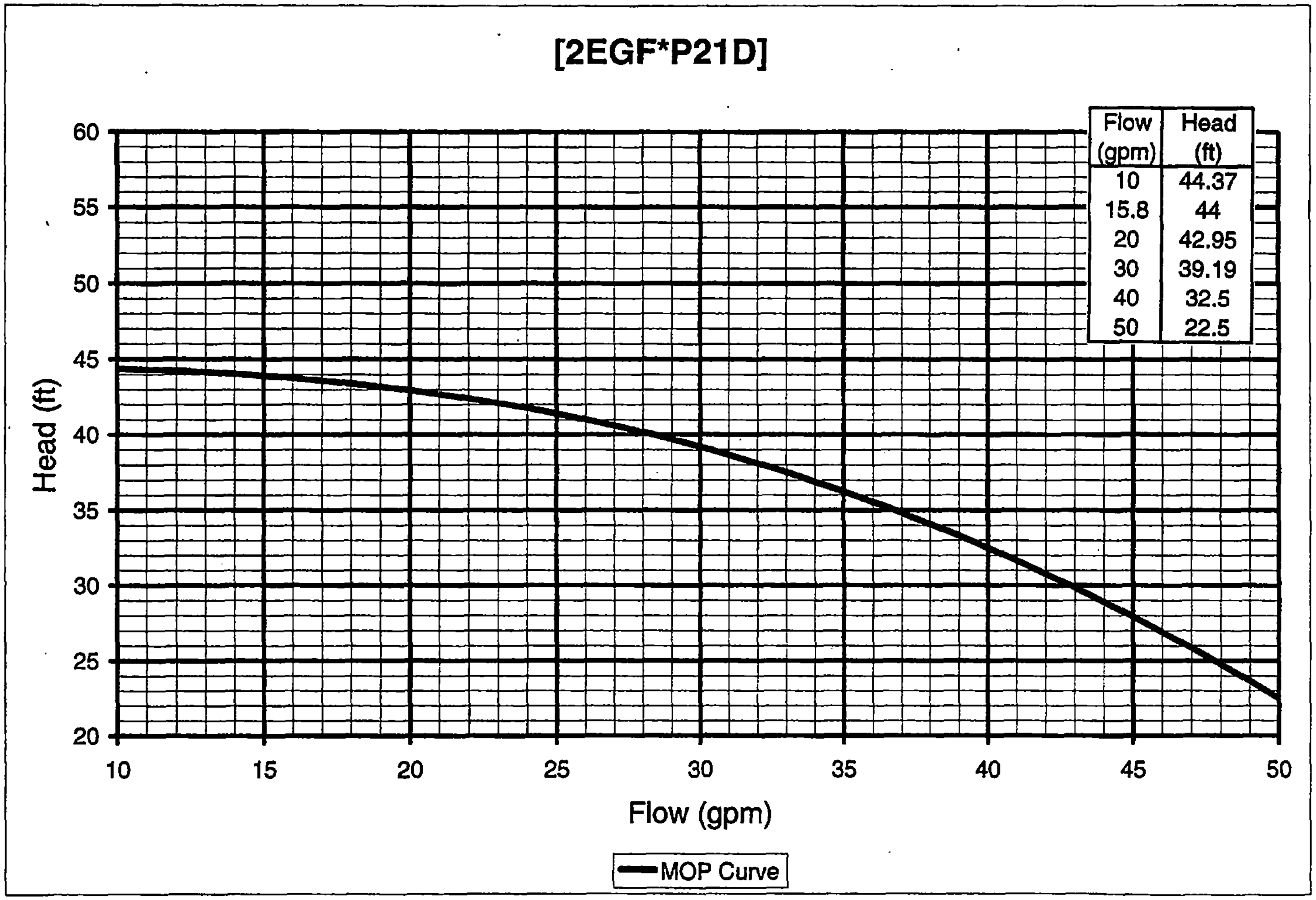
Pump Number: 2EGF*P21C



MOP Point is at 44 ft at 15.8 gpm per Calc. 12241-MT-224 (Rev.2, 5/2/03).
MOP Curve is based on Calc. 12241-MT-224 (Rev.2) and ECP-03-0248.

Pump Name: 21D Fuel Oil Transfer Pump

Pump Number: 2EGF*P21D



MOP Point is at 44 ft at 15.8 gpm per Calc. 12241-MT-224 (Rev.2, 5/2/03).
MOP Curve is based on Calc. 12241-MT-224 (Rev.2) and ECP-03-0248.

SECTION V: VALVE TESTING REQUIREMENTS

The Inservice Test (IST) Program for valves at Beaver Valley Power Station (BVPS), Unit 2, is based on the following:

- American Society of Mechanical Engineers (ASME) OM Code-2004 Edition, Code for Operation and Maintenance of Nuclear Plants, with Addenda through OMb-2006.
- Generic Letter No. 89-04, "Guidance on Developing Acceptable Inservice Testing Programs"
- NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants"
- US NRC Regulatory Guide 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code"
- ASME OM Code Case OMN-1, "Alternative Rules for Preservice and Inservice Testing of Active Electric Motor-Operated Valve Assemblies in Light-Water Reactor Power Plants"

The valves included in this program are all required to perform a specific function in shutting down a reactor to the safe shutdown condition, in maintaining the safe shutdown condition, or in mitigating the consequences of an accident. The pressure-relief devices covered are those for protecting systems or portions of systems which perform one or more of the three aforementioned functions at BVPS-2. BVPS-2 is licensed for a safe shutdown of cold shutdown.

Exemptions

The following valves are excluded from the requirements of Subsection ISTC, provided they are not required to perform a specific function as described in Paragraph ISTA-1100, "Scope".

- Valves used only for operating convenience such as vent, drain, instrument, and test valves.
- Valves used only for system control, such as pressure regulating valves.
- Valves used only for system or component maintenance.
- Skid-mounted valves provided they are tested as part of the major component and are justified by BVPS-1 to be adequately tested. NUREG-1482, Sections 3.4 and 4.1.10, "Skid-mounted Components [Valves] and Component Subassemblies" provide further discussion pertaining to skid-mounted components. Skid-Mounted valves are valves which are integral to or that support operation of major components, even though these pumps and valves may not be located on the skid. In general, these valves are supplied by the manufacturer of the major component. Examples include: steam admission and trip throttle valves for turbines, and solenoid operated pilot valves used to control air operated valves.
- External control and protection systems responsible for sensing plant conditions and providing signals for valve operation.
- Category A and B safety and relief valves are excluded from the requirements of Paragraphs ISTC-3700, "Valve Position Verification" and ISTC-3500, "Valve Testing Requirements".

Category A and B Valves

Category A valves are valves for which seat leakage in the closed position is limited to a specific maximum amount for fulfillment of their function. Category B valves are valves for which seat leakage in the closed position is inconsequential for fulfillment of their function. Active Category A and B valves shall be full-stroke exercised nominally every three months to the position required to fulfill their function unless such operation is not practicable during plant operation. If only limited operation is practicable during plant operation, the valves may be part-stroke exercised during plant operation and full-stroke exercised during cold shutdowns. If exercising is not practicable during plant operation, the valves may be limited to full-stroke exercising during cold shutdowns. If exercising is not practicable during plant operation and full-stroke during cold shutdowns is also not practicable, the valves may be limited to part-stroke exercising during cold shutdowns, and full-stroke exercising during refueling outages. If exercising is not practicable during plant operation or cold shutdowns, it may be limited to full-stroke exercising during refueling outages. Power-operated relief valves shall be tested once per fuel cycle per ISCT-3510. Exception is taken to part-stroke exercising motor-operated valves, unless specifically stated. This is necessary because the motor-operated valve circuitry prevents throttling of these valves. Under normal operation, all valves must travel to either the full open or shut position prior to reversing direction. In the case of frequent cold shutdowns, these valves need not be exercised more often than once every three months. However, during extended shutdowns, valves required to remain operable shall be tested every 3 months, if practicable. All valve exercising required to be performed during a refueling outage shall be completed prior to returning the plant to operation. For a valve in a system declared inoperable or not required to be operable, the exercising test schedule need not be followed. Within 3 months prior to placing the system in an operable status, the valves shall be exercised and the schedule resumed.

Stroke Time Limits and Testing Requirements for Category A and B Valves

The stroke time of all active power-operated valves shall be measured to at least the nearest second. Full-stroke time is the time interval from initiation of the actuating signal to the end of the actuating stroke. The time to full-stroke exercise each power-operated valve will be measured and compared to a reference value (baseline time) and an acceptable range and/or limiting stroke time as follows:

1. Motor-operated valves (MOVs) with reference stroke times greater than 10 seconds shall exhibit no more than a ± 15% change in stroke time when compared to the reference time. MOVs with reference stroke times less than or equal to 10 seconds shall exhibit no more than a ± 25% or ± 1 second change in stroke time, whichever is greater, when compared to the reference time.

NOTE:	As an alternative to the requirements of paragraph ISTC-5120 of the ASME OM Code-2004 Edition through OMb-2006 Addenda, Code Case OMN-1 "Alternative Rules for Preservice and Inservice Testing of Active Electric Motor-Operated Valve Assemblies in Light-Water Reactor Power Plants" provides an alternative to MOV stroke time testing. The licensee will meet the requirements of ASME OM Code Case OMN-1 which is conditionally approved for use by Regulatory Guide 1.192 (Rev. 1), "Operation and Maintenance Code Case Acceptability, ASME OM Code."

BVPS-2 shall adopt the alternative test requirements specified in ASME OM Code Case OMN-1 in lieu of stroke timing certain motor operated valves (MOVs) in accordance with the requirements specified in paragraph ISTC-5120 and in lieu of position indication testing in accordance with the requirements specified in paragraph ISTC-3700. The BVPS MOV Program satisfies the criteria specified in ASME OM Code Case OMN-1 and the conditional acceptance specified in Reg. Guide 1.192 (Rev. 1), "Operation and Maintenance Code Case Acceptability, ASME OM Code". Paragraph 3.6 of OMN-1 requires MOVs to be full stroke exercised (not timed) open and closed at least once per refueling cycle (18 months) with the maximum time between exercises to be not greater than 24 months. More frequent exercising (i.e., quarterly) may be required for MOVs with high-risk significance, adverse or harsh-environmental conditions, or abnormal characteristics (operational, design or maintenance conditions). MOVs that are ranked by PRA as high-safety significant that can be operated during plant operation will be exercised quarterly. Medium-risk MOVs would typically meet the requirements for a low-safety significant classification, however, they should be considered for quarterly exercising as a function of their enhanced safety importance. MOVs that are ranked by PRA as low-safety significant will be exercised once every 18 months or at refueling. Additionally, full stroke exercising is based on the practicality of exercising during power operation, cold shutdown, or refueling. Justification for extended full stroke exercising of ASME OM Code Case OMN-1 scoped MOVs beyond a quarterly frequency are provided in Sections VI and VII of the BVPS-2 IST Program. In addition, MOV's with plant safety analysis limits (i.e., for Containment Isolation, ESF, etc.) should be stroke time tested at the exercise frequency in order to verify these limits are met. Further guidance regarding the use of ASME OM Code Case OMN-1 is provided in NUREG-1482, Section 4.2.5, "Alternatives to Stroke-Time Testing". Refer to the following MOV Program administrative procedures: NOP-ER-3601, and NOBP-ER-3601A, B, C and D for further discussion regarding the implementation of Code Case OMN-1.

Implementation of ASME OM Code Case OMN-1 for diagnostic testing and stroke timing of MOVs at increased test intervals shall be performed using Corrective Maintenance Procedure (CMP) 1/2-CMP-E-75-021 for rising stem MOVs and 1/2CMP-75-Quarter Turn-1E for butterfly and ball valves.

2. All other power-operated valves (AOV, HYV, SOV, etc.) with reference stroke times greater than 10 seconds shall exhibit no more than a ± 25% change in stroke time when compared to the reference time. All other power-operated valves with reference stroke times less than or equal to 10 seconds shall exhibit no more than a ± 50% change in stroke time when compared to the reference time.

3. Valves that stroke in less than 2 seconds may be exempted from 1 and 2 above. In such cases the maximum limiting stroke time shall be 2.0 seconds.

4. The limiting value of full-stroke time is based on the following:

    a. The Technical Specification or License Requirements Manual value.

    b. Containment isolation or ESF response time requirements.

    c. The reference stroke time times 2 for valves with reference stroke times less than or equal to 10 seconds.

    d. The reference stroke time times 1.5 for valves with reference stroke times greater than 10 seconds.

e. The design basis time listed in the UFSAR or design time from vendor recommendations.

A limiting value of full-stroke time is the calculated maximum allowable valve stroke time limit established to assure that corrective action is taken on a degraded valve before it reaches the point where there is a high probability of failure to perform its safety function if called upon. If a design, Technical Specification, UFSAR, or accident analysis limit exists which is more limiting, then it shall be used as the limiting value of full-stroke time in lieu of the calculated value.

5. Since MOV's included in OMN-1 are not required to follow the stroke time requirements of ISTC-5120, stroke timing to the position(s) required to fulfill their function(s) will only be performed during diagnostic testing or for PMT except for those MOV's with plant safety analysis limits (i.e., for Containment Isolation, ESF, etc.). These MOV's should be stroke time tested at their exercise frequency in order to verify these limits are met. The stroke times during diagnostic testing or for PMT will only be compared to a reference value and a limiting value of full-stroke time contained in the applicable OST's, and will be used for trending purposes. Acceptable Range limits specified in ISTC-5122 are not required to be used.

Per ISTC-3530, the necessary valve disk movement shall be determined by exercising the valve while observing an appropriate indicator, such as indicating lights which signal the required change of disk position, or by observing other evidence, such as changes in system pressure, flow rate, level, or temperature, which reflect disk position. Control Room position indicating lights (or arrows for modulating valves) are used for valve stroke indication for all testing of power-operated valves with remote position indicators on the Control Board. In addition per ISTC-3700, valves with remote position indicators shall be observed locally at least once every 2 years (except where extended by OMN-1) to verify that valve operation is accurately indicated in the direction required to fulfill its safety function. In addition for active valves, remote position verification will also be performed in the non-safety direction. Where practicable, this local observation may be supplemented by other indications such as use of flow meters or other suitable instrumentation to verify disk position. However, these observations need not be concurrent. Where local observation is not possible other indications shall be used for verification that valve operation is accurately indicated.

Fail-Safe Testing for Category A and B Valves

Fail-safe valves are valves equipped with fail-safe actuators that are required to move to a position to fulfill the intended safety function upon a loss of actuating power (typically instrument air and/or electrical control power). All valves with fail-safe actuators (e.g., solenoid operated valves, air operated valves or air operated control valves) shall be tested by observing the operation of the actuator upon loss of valve actuating power. Solenoid operated valves (SOVs) are tested from the Control Room by their remote operating (control) switch. Placing the control switch to the fail-safe position de-energizes the solenoid thus positioning the valve in the fail-safe position. Air operated valves (AOVs) are tested from the Control Room by their remote operating (control) switch. Placing the control switch to the fail-safe position de-energizes the control power to the solenoid which vents air from the valve actuator thus positioning the valve in the fail-safe position. Air operated control valves may be tested in a similar fashion, or the valve actuating power (e.g., electrical or air supply) may be removed to position the valve in the fail-safe position.

Corrective Actions for Category A and B Valves

Corrective action shall be taken if necessary, using the following:

1. If a valve fails to exhibit the required change of valve disk position or exceeds its specified ASME OM Code limiting value of full-stroke time, then the valve shall be declared inoperable immediately. An evaluation of the valve's condition with respect to system operability and technical specifications shall be made as follows:

   a. If the inoperable valve is specifically identified in the technical specifications, then the applicable technical specification required action statements shall be followed.

   b. If the inoperable valve is in a system covered by a technical specification, an assessment of its condition shall be made to determine if it makes the system inoperable. If the condition of the valve renders the system inoperable, then the applicable system technical specification required action statements shall be followed.

   c. Nothing in the ASME OM Code shall be construed to supersede the requirements of any technical specification.

2. Valves with measured stroke times which do not meet the acceptance criteria specified in Paragraphs ISTC-5122 (MOVs), ISTC-5132 (AOVs), ISTC-5142 (HOVs), ISTC-5152 (SOVs), or ISTC-5114 (PORVs) (i.e., % change when compared to the baseline time) shall be immediately retested or declared inoperable as follows:

   a. If the valve is retested and the second set of data meets the acceptance criteria, the cause of the initial deviation shall be analyzed and the results documented in the test.

   b. If the valve is retested and the second set of data also does not meet the acceptance criteria, the data shall be analyzed within 96 hours to verify that the new stroke time represents acceptable valve operation, or the valve shall be declared inoperable. Valve operability based on analysis shall have the results of the analysis documented in the test.

3. Valves declared inoperable may be repaired, replaced, or the data may be analyzed to determine the cause of the deviation and the valve shown to be operating acceptably. Valve operability based on analysis shall have the results of the analysis documented in the test.

4. When a valve or its control system has been replaced, repaired or has undergone maintenance that could affect the valve's performance, a new reference value shall be determined or the previous value reconfirmed by an inservice test run prior to the time it is returned to service or immediately if not removed from service, to demonstrate that the performance parameter which could be affected by the replacement, repair or maintenance is within acceptable limits. Deviations between the previous and new reference values shall be identified and analyzed. Verification that the new values represent acceptable operation shall be documented in the test. Examples of maintenance that could affect valve performance parameters are adjustment of stem packing, limit switches, or control system valves, and removal of the bonnet, stem assembly, actuator, obturator, or control system components.

Manual Valves

Per ISTC-3540, manual valves within the IST program scope that perform an active safety function shall be exercised through a complete cycle at least once every 2 years. Exercise testing shall be considered acceptable if valve stem travel exhibits unrestricted movement with no abnormal resistance or binding through one complete cycle. If a valve fails to exhibit the required change of obturator position, the valve shall immediately declared inoperable.

The use of a valve persuader (cheater) for additional mechanical advantage will not invalidate the test, as it is recognized that larger valves may exhibit increased packing friction and/or increased friction associated with the disk to seat interface. In addition, a valve persuader may be used for personnel safety depending on a valve's service application (i.e. main steam).

Leak Testing

In addition, Category A valves shall be leak rate tested at least once every two years normally, but not necessarily, at refueling outages. The Category A valves that are tested in accordance with Option B of 10CFR50, Appendix J, Type C, are leak rate tested at the frequency specified in Option B of 10CFR50, Appendix J. For other than containment isolation valves with a leakage requirement based on other functions, shall be tested in accordance with ISTC-3630. Example of these other functions are RCS pressure isolation valves, certain owner defined system functions such as inventory preservation, system protection, or flooding protection. If the leak rate exceeds the allowable limit, the valves will be repaired or replaced. A retest demonstrating acceptable operation will be performed following any required corrective action before the valve is returned to service.

Category C Valves

Category C valves are valves which are self-actuating in response to some system characteristic, such as pressure (relief valves) or flow direction (check valves) for fulfillment of their function. Category C valves are divided into two groups; safety or relief valves and check valves.

Safety and Relief Valves

ASME Class 1, 2 and 3 safety and relief valves are tested in accordance with ASME OM Code Appendix I, “Inservice Testing of Pressure Relief Devices in Light-Water Reactor Nuclear Power Plants.” All Main Steam Safety Valves and ASME Class 1 safety and relief valves are tested at least once every 5 years, with at least 20% of the valves in each group (i.e., same manufacturer, type (size, model, style), system application and service media) included in the BVPS-2 IST Program tested within any 24 months. All ASME Class 2 and 3 safety and relief valves are tested at least once every 10 years, with at least 20% of the valves in each group included in the BVPS-2 IST Program tested within any 48 months. A test is defined as a seat tightness test and a set pressure test. A seat tightness test shall be based on a quantitative or qualitative acceptance criteria specified by the owner for gross determination of the as-found seat tightness of a safety or relief valve. Following the as found seat tightness test, a set pressure test shall be performed. If any safety or relief valve fails its set pressure test, additional valves shall be set pressure tested on the basis of 2 additional valves to be tested for each valve failure up to the total number of valves from the same group. If any of the additional valve(s) fail, then all remaining valves in the same group shall be set pressure tested. A failure is defined as when the as found set pressure (first test actuation) exceeds the greater of either the ±tolerance limit of the Owner-established set pressure acceptance criteria or ±3% of the valve nameplate set pressure. Any safety or relief valve which exceeds its set pressure or leakage test acceptance criteria shall be evaluated for cause and effect then repaired or replaced. The cause of failure shall be determined and corrected, and the valve shall successfully pass a retest before it is returned to service. Set point adjustment is an acceptable means of corrective action in lieu of repair or replacement. Class 1 thermal relief valves shall be tested in accordance with the requirements of paragraph I-1320 of Appendix I. Class 2 and 3 thermal relief valves shall be tested or replaced every 10 years in accordance with the requirements of paragraph I-1390 of Appendix I. A thermal relief valve is defined as a pressure relief device whose only overpressure protection function is to protect isolated components, systems, or portions of systems from fluid expansion caused by changes in fluid temperature.

Check Valves

Category C check valves shall be exercised nominally every 3 months, except as provided by ISTC-3522 and ISTC-5221. During operation at power, each check valve shall be exercised or examined in a manner that verifies obturator travel by using the methods in ISTC-5221. Each check valve exercise test shall include an open and closed test. Open and closed tests need only be performed at an interval when it is practicable to perform both tests. Test order (e.g. whether the open test precedes the closed test) shall be determined by BVPS. Open and close tests are not required to be performed at the same time if they are both performed within the same interval.

NOTE:	Bi-directional testing in the non-safety related direction can be performed anytime during the fuel cycle (once per 18 months). If testing cannot be performed during operation at power, a Valve Cold Shutdown Justification (VCSJ) or Valve Refueling Outage Justification (VROJ) is not required to support the deferral of testing.

If exercising is not practicable during operation at power, it shall be performed during cold shutdowns. If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages. Valves exercised at shutdowns shall be exercised during each shutdown, except as specified in ISTC-3522(e). Such exercise is not required if the interval since the previous exercise is less than 3 months. During extended shutdowns, valves that are required to perform their intended function shall be exercised every 3 months, if practicable. Per ISTC-3522(e), valve exercising shall commence within 48 hours of achieving cold shutdown and continue until all testing is complete or the plant is ready to return to operation at power. For extended outages, testing need not be commenced in 48 hours if all valves required to be tested during cold shutdown will be tested before or as part of plant startup. However, it is not the intent of Subsection ISTC-3522(e) to keep the plant in cold shutdown to complete cold shutdown testing. All valve testing required to be performed during a refueling outage shall be completed before returning the plant to operation at power.

Valves that operate in the course of plant operation at a frequency that would satisfy the exercising requirements of ISTC need not be additionally exercised, provided that the observations otherwise required for testing are made and analyzed during such operation and recorded in the plant record at intervals no greater than specified in ISTC-3510.

For a valve in a system declared inoperable or not required to be operable, the exercising test schedule need not be followed. Within 3 months before placing the system in an operable status, the valves shall be exercised and the schedule followed in accordance with requirements of ISTC.

Per ISTC-5221, check valve obturator movement shall be verified as follows:

Check Valve Flow Exercising

During exercise testing with flow, the necessary obturator movement shall be demonstrated by performing both an open and a close test. [ISTC-5221(a)]

1. Check valves that have a safety function in both the open and close directions shall be exercised by initiating flow and observing that the obturator has traveled to either the full open position or the position required to perform its intended function(s) and verify that on cessation or reversal of flow, the obturator has traveled to its seat.

2. Check valves that have a safety function in only the open direction shall be exercised by initiating flow and observing that the obturator has traveled to either the full open position or the position required to perform its intended function(s) and verify closure.

3. Check valves that have a safety function in only the close direction shall be exercised by initiating flow and observing that the obturator has traveled at least to the partially open position (normal or expected system flow), and verify that on cessation of reversal of flow, the obturator has traveled to the seat.

Observations shall be made by observing a direct indicator (e.g. position indicating device) or other positive means (e.g. changes in system pressure, flow rate, level, temperature, seat leakage testing, or non-intrusive testing results).

Check Valve Mechanical Exercising

If a mechanical exerciser is used to exercise a valve, the force or torque required to move the obturator and fulfill its safety function(s) shall meet the acceptance criteria specified by BVPS-2 [ISTC-5221(b)]. If practicable, the force or torque required to move the obturator and fulfill any non-safety function should be evaluated to detect abnormality or erratic action for corrective action. The following shall be considered when determining acceptance criteria for mechanical exercising:

1. Exercise test(s) shall detect a missing obturator, sticking (closed or open), binding (throughout obturator movement), and the loss of any weight(s). Both an open and close test may not be required.

2. Acceptance criteria shall consider the specific design, application, and historical performance. (A reference opening torque ±50% was used in a previous 10-year interval per OM-10, Paragraph 4.3.2.4(b).)

3. If impracticable to detect a missing obturator or the loss or movement of any weight(s) using a mechanical exerciser, other positive means may be used (e.g., seat leakage tests and visual observations to detect obturator loss and the loss or movement of external weight(s), respectively).

Check Valve Sample Disassembly and Inspection

Per ISTC-5221(c), "If the test methods in ISTC-5221(a) (flow exercising) and ISTC-5221(b) (mechanical exercising) are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly and inspection program shall be used to verify obturator movement. If maintenance is performed on one of these valves that could affect its performance, the post-maintenance testing shall be conducted in accordance with ISTC-5221(c)(4).

Check valves that will be disassembled and inspected shall be grouped by similar design, application, and service condition and require a periodic examination of one valve from each group each refueling outage. The details and bases of the sampling program shall be documented and recorded in the test plan. The following shall be considered when implementing a sample disassembly and inspection program:

1. Grouping of check valves for the sample disassembly and inspection program shall be technically justified and shall consider, as a minimum, valve manufacturer, design, service, size, materials of construction, and orientation. [ISTC-5221(c)(1)]

   Maintenance and modification history should be considered in the grouping process. Valve groupings should also consider potential flow instabilities, required degree of disassembly, and the need for tolerance or critical dimension checks.

2. During the disassembly process, the full stroke motion of the obturator shall be verified. Full stroke motion of the obturator shall be verified immediately prior to completing reassembly. Check valves that have their obturator disturbed before full stroke motion is verified shall be examined to determine if a condition exists that could prevent full opening or reclosure of the obturator. Examples of valves that could have their obturators disturbed prior to verifying full stroke motion include; spring loaded check valves or check valves with the obturator supported from the bonnet. [ISTC-5221(c)(2)]

3. At least one valve from each group shall be disassembled and inspected each refueling outage; and all valves in the group be disassembled and inspected at least once every 8 years. [ISTC-5221(c)(3)]

4. Before return to service, valves that were disassembled for examination or that received maintenance that could affect their performance, shall be exercised full- or part-stroke, if practicable, with flow in accordance with ISTC-3520. Those valves shall also be tested for other requirements (e.g., closure verification or leak rate testing) before returning them to service. [ISTC-5221(c)(4)]

Check Valve Condition Monitoring

As an alternative to the requirements of paragraphs ISTC-3510, ISTC-3520, ISTC-3530, ISTC-3550, and ISTC-5221, BVPS-1 may establish a Check Valve Condition Monitoring (CVCM) Program per ISTC-5222. The purpose of this program is to both (a) improve check valve performance and to (b) optimize testing, examination, and preventive maintenance activities in order to maintain the continued acceptable performance of a select group of check valves. BVPS-1 may implement this program on a valve or a group of similar valves basis.

Examples of candidates for (a) improved valve performance are check valves that:

- have an unusually high failure rate during inservice testing or operations
- cannot be exercised under normal operating conditions or during shutdown
- exhibit unusual, abnormal, or unexpected behavior during exercising or operation
- the Owner elects to monitor for improved valve performance

Examples of candidates for (b) optimization of testing, examination, and preventive maintenance activities are check valves with documented acceptable performance that:

- have had their performance improved under the Check Valve Condition Monitoring Program
- cannot be exercised or are not readily exercised during normal operating conditions or during shutdowns
- can only be disassembled and examined
- the Owner elects to optimize all the associated activities of the valve or valve group in a consolidated program.

The program shall be implemented in accordance with Appendix II, “Check Valve Condition Monitoring Program”, a site administrative procedure (NOBP-ER-3603A, “Check Valve Condition Monitoring Program”), and site implementing procedures which perform the specified tests identified in the individual Check Valve Condition Monitoring (CVCM) Program Plans.

If the Appendix II CVCM Program for a valve or group of valves is discontinued, then the requirements of ISTC-3510, ISTC-3520, ISTC-3530, ISTC-3550, and ISTC-5221 shall be implemented.

Corrective Actions for Category C Check Valves

If a check valve fails to exhibit the required change of disk position by any testing method above, then the check valve shall be declared inoperable immediately. An evaluation of the check valve's condition with respect to system operability and technical specifications shall be made as follows:

1. If the inoperable check valve is specifically identified in the technical specifications, then the applicable technical specification required action statements shall be followed.
2. If the inoperable check valve is in a system covered by a technical specification, an assessment of its condition shall be made to determine if it makes the system inoperable. If the condition of the check valve renders the system inoperable, then the applicable system technical specification required action statements shall be followed.
3. Corrective action (i.e., Order) shall be initiated immediately for the check valve's repair or replacement.

4. Nothing in the ASME OM Code shall be construed to supersede the requirements of any technical specification.

5. Check valves in a sample disassembly program that are not capable of full-stroke movement (i.e., due to binding) or have failed or have unacceptably degraded valve internals, shall have the cause of the failure analyzed and the condition corrected. Other check valves in the sample group that may also be affected by this failure mechanism shall be examined or tested during the same refueling outage to determine the condition of internal components and their ability to function.

Before returning the check valve to service after corrective action, a retest showing acceptable performance shall be run.

Category D Valves

Category D valves are valves which are actuated by an energy source capable of only one operation, such as rupture disks or explosively actuated valves. There are no ASME Class 1, 2, or 3 Category D valves in the Beaver Valley Power Station, Unit 2, IST Program.

Valve Inservice Test Requirements

All the inservice testing requirements for each different category of valve in the IST Program are summarized in Table ISTC-3500-1. This table lists the paragraphs of the ASME OM Code that apply to each different type of valve.

Table ISTC-3500-1

Valve Inservice Test Requirements

Category	Valve Function	Leakage Test Proc/ Frequency	Exercise Test Proc/ Frequency	Special Test Procedure[1]	Position Indication Verification and Frequency
A	Active	ISTC-3600	ISTC-3510	None	ISTC-3700
A	Passive	ISTC-3600	None	None	ISTC-3700
B	Active	None	ISTC-3510	None	ISTC-3700
B	Passive	None	None	None	ISTC-3700
C[3] (Safety/Relief)	Active	[Notes (2),(3)]	ISTC-5230 ISTC-5240	None	ISTC-3700
C[4] (Check)	Active	[Notes (3)]	ISTC-3510	None	ISTC-3700
D	Active	[Notes (3)]	None	ISTC-5250 ISTC-5260	None

Notes:

(1) Note additional requirements for fail-safe valves, ISTC-3560.

(2) Leak test as required for Appendix I

(3) When more than one distinguishing category characteristic is applicable, all requirements for each of the individual categories are applicable, although the duplication or repetition of common testing requirements is not necessary.

(4) If a "check" valve used for a pressure relief device is capacity certified, then it shall be classified as a pressure or vacuum relief device. If a check valve used to limit pressure is not capacity certified, then it shall be classified as a check valve.

Active valves are valves which are required to change obturator position to accomplish a specific function for accident mitigation or achieving/maintaining safe shutdown. Active may also refer to a particular valve position with respect to safety function.

Passive valves are valves which maintain obturator position and are not required to change obturator position to accomplish a required function. As stated in the table, passive valves are not required to be exercised. Therefore, relief is not required from exercising any passive valve and no testing requirement is listed in the Valve Tables except where leakage testing or remote position verification is required.

If a question on valve testability exists, the IST program should be the controlling document since each component is individually assessed for testability and inclusion in the IST Program. If a valve is specifically called out in the Tech. Specs. (i.e., specific valve number or uniquely specified by valve nomenclature) to be tested at one frequency and the IST Program endorses another frequency, then the more restrictive test frequency would be applicable.

Records and Reports

Records of the results of inservice tests and corrective actions as required by ISTC-9000 are maintained in computerized or in tabular form. Stroke times of valves will be reviewed for developing trends.

NOTE:	The following four sections of this document are the "Valve Cold Shutdown Justifications", "Valve Refueling Outage Justifications", "Valve Relief Requests" and "Valve Tables" sections.

Valve Cold Shutdown Justifications

The "Valve Cold Shutdown Justification" section contains the detailed technical description of conditions prohibiting the required testing of safety-related valves and an alternate test method to be performed during cold shutdowns. Since the radiation levels and air temperatures inside containment are higher than normal during power operation, this would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis while on-line. Therefore, surveillance testing that requires a reactor containment entry will be performed at cold shutdown and refueling. Per ISTC-3521(g) and ISTC-3522(e), valve exercising during cold shutdown shall commence within 48 hours of achieving cold shutdown, and continue until all testing is complete or the plant is ready to return to power. Attempts will be made to complete testing prior to entering Mode 4, however, completion will not be a Mode 4 requirement. The testing will resume where left off when next entering Mode 5, but need not be completed more often than once every 92 days. For planned or extended cold shutdowns, where ample time is available to complete testing on all valves identified for the cold shutdown test frequency, exceptions to the 48 hour requirement can be taken, provided all valves required to be tested during cold shutdown are tested prior to plant startup.

Valve Refueling Outage Justifications

The "Valve Refueling Outage Justifications" section contains the detailed technical description of conditions prohibiting the required testing of safety-related valves and an alternate test method to be performed during refueling outages.

Valve Relief Requests

The "Valve Relief Requests" section contains the detailed technical description of particular conditions and equipment installations prohibiting the testing of some of the characteristics of safety-related valves. An alternate test method and the frequency of revised testing is also included to meet the intent of 10CFR50.55a.

Valve Tables

The "Valve Tables" section is a table listing of all the valves in the IST Program, their system code class and category, whether they are active or passive, their size, valve type, actuator type, drawing number and coordinates, normal, safety and fail-safe positions, required test and frequency, specific cold shutdown justifications, refueling outage justifications and/or relief request reference numbers, test procedure numbers and remarks.

1. The valve class will be 1, 2 or 3, corresponding to the safety classifications.
2. The category of the valve will be A, B, C or D in accordance with the guidelines in ISTC-1300.
3. Whether the valve is Active or Passive will be identified in accordance with the guidelines in ISTA-2000.
4. The type of valve (i.e., globe, gate, butterfly, ball, check, safety, relief, etc.) will be specified. From the valve ID number given, the type of valve actuator can be determined from the following abbreviations:

   AOV - Air Operated Valve

   FCV - Flow Control Valve

   HCV - Hand Control Valve

   HYV - Hydraulic Operated Valve

   LCV - Level Control Valve

   MOD - Motor Operated Damper

   MOV - Motor Operated Valve

   PCV - Pressure Control Valve

   RV - Relief Valve

   SOV - Solenoid Operated Valve

   SV - Safety Valve

   DMP - Damper (Manual)

5. The drawing numbers and coordinates will be the ones used in the Operating Manuals.
6. The normal, safety and fail-safe positions will be listed using the following abbreviations:

   O - Open

   S - Shut

   A - Automatic

T - Throttled

LO - Locked Open

LS - Locked Shut

SS - Sealed Shut

The normal position applies to operation at power and in most cases will be the normal system arrangement (NSA) position listed in the applicable Operating Manual. The safety position is the position the valve is required to be in to fulfill its safety function. The fail-safe position is the position the valve is required to be in to fulfill its intended safety function upon a loss of actuating power.

7. The required test will be listed using the following abbreviations:

ST-O	Stroke Time Open in Safety Direction
ST-S	Stroke Time Shut in Safety Direction
FS-O	Fail-Safe Test in Open Safety Direction
FS-S	Fail-Safe Test in Shut Safety Direction
ET	Exercise Test (Full Stroke Exercise (not timed) Open and Shut) of OMN-1 (MOV) Valves
DIAG-ST-O	OMN-1 Diagnostic Test Open in Safety Direction
DIAG-ST-S	OMN-1 Diagnostic Test Shut in Safety Direction
CV-O	Stroke Check Valve Open in Safety Direction
CV-O-PR	Check Valve Verified Open using Pressure
CV-O-VAC	Check Valve Verified Open by removing Vacuum
CV-S	Stroke Check Valve Shut in Safety Direction
CV-S-LT	Stroke Check Valve Shut by Leak Test in Safety Direction
CV-S-PR	Check Valve Verified Shut using Pressure
CV-ME	Stroke Check Valve Open and Shut using a Mechanical Exerciser on the External Weight Arm
CV-BDT-O	Stroke Check Valve Open in non-Safety Direction
CV-BDT-S	Stroke Check Valve Shut in non-Safety Direction
CV-DIS	Disassemble & Inspect Check Valve in Both (Open and Shut) Directions
PMT	Post-Maintenance Test Following Disassembly and Inspection of a Check Valve
MAN	Full-Stroke Manual Valve in Both (Open and Shut) Directions
LM	Leakage Monitoring
LT	Leak Test
LJ-C or LTJ	Leak Test (10CFR50 Appendix J, Option B / Type-C)
SPT	Set point Test

RPV	Remote Position Verification (Required every 2 years or at the frequency requirements of OMN-1. Some valves may require RPV every 18 months per Tech Spec 3.3.3.3(16)). Required in both the open and closed directions for active valves and in the safety direction for passive valves. Where practicable, this local observation may also be supplemented to verify disk position.

8. The specific Valve Cold Shutdown Justification (VCSJ), Valve Refueling Outage Justification (VROJ) and/or Valve Relief Request (VRR) reference number(s) will be listed.

9. The required frequency, specific test procedure number, and any remarks will be listed using the abbreviations below:

NOTE: All IST test frequencies less than 2 years may be extended by a 25% grace period, if necessary, with up to a 6 month extension for test intervals ≥2 years in accordance with ASME OM Code Case OMN-20 as approved by Valve Relief Request No. 1 (VRR1). Conversely, an on-line PM activity may be scheduled sooner with grace applied for scheduling flexibility as long as its limit date is not exceeded (e.g., 9YR plus 10% grace vs. 10 YR limit date for diagnostic testing of an OMN-1 MOV). Test frequencies based on plant conditions (e.g., CSD or R) cannot be extended.

2OM	Operating Manual (Unit 2)
2BVT	Beaver Valley Test (Unit 2)
2OST	Operating Surveillance Test (Unit 2)
CMP	Corrective Maintenance Procedure
OMN-1	Diagnostic MOV testing per ASME OM Code Case OMN-1 using either 1/2CMP-E-75-021 (rising stem) or 1/2CMP-75-Quarter Turn-1E (rotating stem)
OMN-12	Diagnostic AOV testing per ASME OM Code Case OMN-12 using 1/2MI-75-Ultracheck A-1I
M	Monthly Frequency
Q	Quarterly Frequency
CSD	Cold Shutdown Frequency
R	Refueling Frequency
SP	Special Frequency
MO	Required every __ months
YR	Required every __ years
RFO	Required every __ refueling outages
NSO	During "Normal System Operation" (continuously, intermittently, but at a minimum of once each cycle when the valve operates during the course of plant operation per ISCT-3550)
CVCM	At the frequency specified in the Check Valve Condition Monitoring (CVCM) Program Plan(s).

SECTION VI: VALVE COLD SHUTDOWN JUSTIFICATIONS (VCSJ) AND INDEX

VCSJ	SYSTEM NO.	COMPONENT(S)
VCSJ26	30	2SWS*MOV107A, 2SWS*MOV107B, 2SWS*MOV107C, 2SWS*MOV107D
VCSJ27	30	2SWS*486, 2SWS*487, 2SWS*488
VCSJ28	33	2FPW*753
VCSJ29	34	2IAC*MOV130
VCSJ30	44C	2HVR*MOD23A, 2HVR*MOD23B, 2HVR*MOD25A, 2HVR*MOD25B

VALVE COLD SHUTDOWN JUSTIFICATION 1

Valve No(s): 2RCS*MOV535
2RCS*MOV536
2RCS*MOV537

Category: B **Class:** 1

System: 6 – Reactor Coolant

Function: These Pressurizer Power Operated Relief Valve (PORV) isolation (block) valves are required to open to unisolate their associated PORV. They are also required to close to isolate a leaking PORV if excessive leakage occurs or if a PORV would inadvertently jam or stick in the open position.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally open to support operation of their respective Power Operated Relief Valve (PORV). They are also required to close to isolate a leaking PORV if excessive leakage occurs or if a PORV would inadvertently jam or stick in the open position. Because of this, they are normally exercised open and closed as required quarterly by the ASME OM Code, Paragraph ISTC-3510, and as required once every 92 days by Technical Specification Surveillance SR 3.4.11.1, in order to ensure they can be opened and closed if needed in an accident. However, if a block valve is closed in accordance with the required actions of a limiting condition of operation (LCO) for Technical Specification 3.4.11, Surveillance SR 3.4.11.1 "Note" states that cycling the block valve every 92 days is not required to be performed. This is because opening the block valve in this condition would increase the risk of an unisolable leak from the reactor Coolant System (RCS) since the PORV is already inoperable. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Since these MOV's are ranked as high safety significant valves, they have additional exercising requirements per Paragraph 3.6.2 of OMN-1 and are required to be full-stroke exercised open and closed quarterly per 2OST-6.6 (PORV Isolation Valve Test). If they are not able to be exercised quarterly as described above, the valve(s) will be full-stroke exercised at least during cold shutdowns per 2OST-6.6 (PORV Isolation Valve Test) in accordance with OMN-1 Paragraph 3.6.1. In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since these valves do not have any plant safety analysis limits.

References: ISTC-3510 and ISTC-3521(c).

Technical specification 3.4.11 and Bases.

OMN-1 Paragraphs 3.6.1 and 3.6.2.

VALVE COLD SHUTDOWN JUSTIFICATION 2

Valve No(s): 2CHS*84
2CHS*136
2CHS*141

Category: C **Class:** 2,3

System: 7 - Chemical and Volume Control

Function: These emergency and alternate emergency boration line check valves must open to provide a flow path for 4% boric acid solution from the Boric Acid Tanks via the Boric Acid Transfer Pumps to the suction of the Charging Pumps.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: These check valves are normally closed during plant operation. Their safety position is open for emergency and alternate emergency boration. They can be full-stroke exercised in the open direction by initiating the maximum required accident condition flow in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3. However, testing in this manner at power, either by full or part-stroke exercising, would result in concentrated boric acid solution being injected in the reactor coolant system (RCS). This would cause an undesired negative reactivity addition resulting in a reduction in plant power. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns."

Alternate Test: Full-stroke exercised open during cold shutdowns per 2OST-7.13 (Emergency/Alternate Emergency Boration Flow path Check Valve Exercise Test).

NOTE: Bi-directional exercising in the non-safety related closed direction will be satisfied by a leak test of [2CHS*84] per 2OST-7.14 (Blender to VCT Check Valve Closure Test) and by a leak test of [2CHS*136 and 141] per 2BVT 1.47.11 (Safety Injection and Charging System Containment Penetration Integrity Test) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

References: ISTC-3510, ISTC-3522(b), ISTC-5221(a) and ISTC-5222.

NUREG-1482, Section 4.1.3.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program)

VALVE COLD SHUTDOWN JUSTIFICATION 3

Valve No(s): 2CHS*HCV142

Category: A **Class: 2**

System: 7 - Chemical and Volume Control

Function: This residual heat removal (RHR) system letdown flow control valve must close to provide containment isolation of penetration no. 28.

Test Requirement: Per ISTC-3560, "Fail-Safe Valves," valves with fail-safe actuators shall be tested by observing the operation of the actuator upon loss of valve actuating power in accordance with the exercising frequency specified in ISTC-3510, "Exercising Test Frequency," which states that Active Category A valves shall be tested nominally every 3 months.

Basis for CSJ: This valve is normally closed during plant operation. Its safety position is closed for containment isolation of penetration no. 28. Full-stroke exercising in the closed direction is performed quarterly as required by ISTC-3510. Fail-safe testing requires a local observation of the valve actuator following local isolation of its air supply. However, this valve is located inside the slightly sub-atmospheric containment which is not accessible during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. Therefore, fail-safe testing in the closed direction in conjunction with the quarterly stroke test cannot be performed during plant operation. Per ISTC-3560 and ISTC-3521(c), if the fail-safe exercising frequency is not practicable during operation at power, it may be limited to fail-safe testing during cold shutdowns.

Alternate Test: Full-stroke exercised and timed closed quarterly per 2OST-47.3L (Containment Penetration and ASME XI Valve Test). Fail-safe tested closed during cold shutdowns per 2OST-1.10F (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c) and ISTC-3560

VALVE COLD SHUTDOWN JUSTIFICATION 4

Valve No(s): 2CHS*472

Category: A/C **Class:** 2

System: 7 - Chemical and Volume Control

Function: This RCS fill header inside containment isolation check valve must close in order to provide containment isolation of Penetration No. 46. It must also be capable of opening sufficiently to relieve any built up pressure via downstream relief valve [2CHS*RV160] caused by thermal expansion of fluid within the isolated containment penetration following an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: Upstream RCS Fill Header Flow Control Valve [2CHS*FCV160] is a passive shut valve. Filling the RCS loops using the fill header is typically only done at the end of a refueling outage if any of the RCS loops were drained for maintenance. Therefore, this flow path does not see any flow during normal plant operation and this check valve is normally closed and in its safety position.

However, full stroke exercising in the open and closed directions can be verified by cycling the mechanical weight loaded swing arm of the check valve while isolated from the Charging System by [2CHS*FCV160]. Because this check valve is located inside the slightly sub-atmospheric containment, it is not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns."

Alternate Test: Full-stroke exercised open using a manual mechanical exerciser attached to its mechanical weight loaded swing arm in accordance with ISTC-5221(b) and the guidelines provided in NUREG-1482, Section 4.1.7, and closed by observation of its mechanical weight loaded swing arm during cold shutdowns per 2OST-1.10J (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3522(b) and ISTC-5221(b).

NUREG-1482, Section 4.1.7.

VALVE COLD SHUTDOWN JUSTIFICATION 5

Valve No(s): 2RHS*3
2RHS*4

Category: C **Class:** 2

System: 10 - Residual Heat Removal

Function: These Residual Heat Removal (RHR) Pump discharge check valves must open to support RHR system operation and must close to prevent reverse flow through the standby RHR Pump.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: During normal plant operation, the RHR System is isolated from the Reactor Coolant System (RCS) and these check valves are normally closed. Their safety position is open to support RHR system operation and closed to prevent reverse flow through the standby RHR Pump. They can be full-stroke exercised in the open direction by initiating the maximum required accident condition flow in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, when the RHR Pumps are in operation. However, during plant operation, the RHR system is isolated from the reactor coolant system (RCS) and the RHR Pumps are not required for operation. The RHR Pumps are only operated during cold shutdowns and refueling outages. Therefore, full stroke exercising in the open direction with flow can only be performed during cold shutdowns and refueling outages. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns." Full-stroke exercising in the closed direction requires closing of the discharge MOV of the idle standby RHR Pump cross-connecting the pump discharge headers, and verifying acceptable pump performance of the operating RHR Pump. Because these check valves are located inside the slightly sub-atmospheric containment, they are not accessible to verify closure testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns."

If the RHR system is in service in Mode 5 as the operable RCS loops per Technical Specification 3.4.7 or 3.4.8 as applicable, these check valves cannot be tested closed (because the pump discharge MOV must also be closed) without entering the required action statement which requires immediate restoration of the RCS loop made inoperable. Failure of the pump discharge MOV to re-open would cause a loss of one of the required RCS loops. Once the RHR system is not required to be in service as the operable RCS loops, Technical Specifications would permit the exercising of these valves.

VALVE COLD SHUTDOWN JUSTIFICATION 5

Basis for CSJ: (Cont.)

However, these valves can only be exercised if their associated RHR pump is not operating. Therefore, while the plant is in Mode 5 or 6, the RHR Pumps would have to be swapped in order to exercise all of the valves. Every effort will be made to minimize the number of pump cycles. Testing can also be performed when placing the RHR system into service during station shutdown, when removing the RHR system from service during station startup or when RHR is not required to be in operation, not more often than once per 92 days.

Alternate Test:

Full-stroke exercised open during cold shutdowns per 2OST-10.1 and 2OST-10.2 (RHR Pump Performance Tests). Full-stroke exercised closed per 2OST-10.3 and 2OST-10.4 (RHR System Valve Exercise Tests), as part of the cold shutdown valve population when placing the RHR system into service during station shutdown to cold shutdown, when removing the RHR system from service during station startup from cold shutdown or when RHR is not required to be in operation, not more often than once per 92 days.

References:

ISTC-3510, ISTC-3522(b), and ISTC-5221(a).

NUREG-1482,Section 4.1.3.

Technical Specifications 3.4.7 and 3.4.8.

VALVE COLD SHUTDOWN JUSTIFICATION 6

Valve No(s): 2RHS*FCV605A
2RHS*FCV605B

Category: B **Class:** 2

System: 10 - Residual Heat Removal

Function: These Residual Heat Removal (RHR) Heat Exchanger bypass flow control valves are normally throttled to control the amount of RHR flow bypassed around the RHR Heat Exchangers thus limiting reactor coolant system (RCS) cool down. They must close as cool down continues to ensure all RHR flow is through the RHR Heat Exchangers.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: During plant operation, the RHR system is isolated from the RCS and is not in service. When the RHR system is in service, these flow control valves are normally in a throttled position to control the amount of RHR flow bypassed around the RHR Heat Exchangers. Their safety position is closed and they are required to fail closed on a loss of power. Local observation is required to full-stroke exercise and to fail these valves in the closed position. Because these valves are located inside the slightly sub-atmospheric containment, they are not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

If the RHR system is in service in Mode 5 as the operable RCS loops per Technical Specification 3.4.7 or 3.4.8 as applicable, these valves cannot be tested without entering the required action statement which requires immediate restoration of the RCS loop made inoperable. Failure of any valve to re-close during testing at that time could cause a loss of one of the required RCS loops. Once the RHR system is not required to be in service as the operable RCS loops, Technical Specifications would permit the exercising of these valves. However, these valves can only be exercised if their associated RHR Pump is not operating. Therefore, while the plant is in Mode 5 or 6, the RHR Pumps would have to be swapped in order to exercise the valves.

Every effort will be made to minimize the number of pump cycles. Testing can also be performed when placing the RHR system into service during station shutdown, when removing the RHR system from service during station startup or when RHR is not required to be in operation, not more often than once per 92 days.

VALVE COLD SHUTDOWN JUSTIFICATION 6

Alternate Test: Full-stroke exercised and timed closed when placing the RHR system into service during station shutdown to cold shutdown, when removing the RHR system from service during station startup from cold shutdown or when RHR is not required to be in operation, not more often than once per 92 days, per 2OST-10.3 and 2OST-10.4 (RHR System Valve Exercise Tests), as part of the cold shutdown valve population. In addition, these valves will also be fail-safe tested closed per 2OST-10.3 and 2OST-10.4.

References: ISTC-3510, ISTC-3521(c), and ISTC-3560.

Technical Specification 3.4.7 and 3.4.8.

VALVE COLD SHUTDOWN JUSTIFICATION 7

Valve No(s): 2RHS*MOV701A
2RHS*MOV701B
2RHS*MOV702A
2RHS*MOV702B
2RHS*MOV720A
2RHS*MOV720B

Category: A **Class:** 1

System: 10 - Residual Heat Removal

Function: These reactor coolant system (RCS) to residual heat removal (RHR) system isolation valves must open to support RHR system operation in attaining cold shutdown conditions. They must close to protect the lower pressure RHR system from over-pressurization if RCS pressure rises above 700 psig while the RHR system is in service.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category A valves shall be tested nominally every 3 months.

Basis for CSJ: During normal plant operation, the RHR System is isolated from the RCS and these valves are closed and must be leak tight to isolate the lower pressure RHR system from the higher pressure RCS. Their safety positions are open to support RHR system operation during shutdown to cold shutdown conditions, and closed to protect the RHR system from over-pressurization. Full-stroke exercising during plant operation cannot be performed because they are interlocked closed to prevent over-pressurization of the RHR system piping from the higher pressure RCS. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

If the RHR system is in service in Mode 5 as the operable RCS loops per Technical Specification 3.4.7 or 3.4.8 as applicable, these valves cannot be tested without entering the required action statement which requires immediate restoration of the RCS loop made inoperable. Failure of any valve to re-open during testing at that time would cause a loss of one of the required RCS loops. Once the RHR system is not required to be in service as the operable RCS loops, Technical Specifications would permit the exercising of these valves. However, these valves can only be exercised if their associated RHR Pump is not operating. Therefore, while the plant is in Mode 5 or 6, the RHR Pumps would have to be swapped in order to exercise all of the valves.

Every effort will be made to minimize the number of pump cycles. Testing can also be performed when placing the RHR system into service during station shutdown, when removing the RHR system from service during station startup or when RHR is not required to be in operation, not more often than once per 92 days.

VALVE COLD SHUTDOWN JUSTIFICATION 7

Basis for CSJ: (Cont.)

In addition, the PRA Group has evaluated the demand failure rates for these high safety significant MOVs based on the risk associated with exercising them per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

Alternate Test:

Full-stroke exercised in accordance with ASME OM Code Case OMN-1; open when placing the RHR system into service during station shutdown to cold shutdown (per 2OM-10.4.A), shut when removing the RHR system from service during station startup from cold shutdown (per 2OM-10.4.C) or open and shut when RHR is not required to be in operation, not more often than once per 92 days, per 2OST-10.3 and 2OST-10.4 (RHR System Valve Exercise Tests), as part of the cold shutdown valve population. In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since these valves do not have any plant safety analysis limits.

References:

ISTC-3510 and ISTC-3521(c).

Technical Specification 3.4.7 and 3.4.8.

OMN-1 Paragraph 3.6.1.

VALVE COLD SHUTDOWN JUSTIFICATION 8

Valve No(s): 2RHS*HCV758A
2RHS*HCV758B

Category: B **Class:** 2

System: 10 - Residual Heat Removal

Function: These Residual Heat Removal (RHR) Heat Exchanger flow control valves are normally throttled to control the amount of RHR flow through the RHR Heat Exchangers thus limiting reactor coolant system (RCS) cool down. They must open as cool down continues to ensure all RHR flow is through the RHR Heat Exchangers.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: During plant operation, the RHR system is isolated from the RCS and is not in service. When the RHR system is in service, these flow control valves are normally in a throttled position to control the amount of RHR flow through the RHR Heat Exchangers. Their safety position is open and they are required to fail open on a loss of power. Local observation is required to full-stroke exercise and to fail these valves in the open position. Because these valves are located inside the slightly sub-atmospheric containment, they are not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

If the RHR system is in service in Mode 5 as the operable RCS loops per Technical Specification 3.4.7 or 3.4.8 as applicable, these valves cannot be tested without entering the required action statement which requires immediate restoration of the RCS loop made inoperable. Failure of any valve to re-open during testing at that time could cause a loss of one of the required RCS loops. Once the RHR system is not required to be in service as the operable RCS loops, Technical Specifications would permit the exercising of these valves. However, these valves can only be exercised if their associated RHR Pump is not operating. Therefore, while the plant is in Mode 5 or 6, the RHR Pumps would have to be swapped in order to exercise the valves. Every effort will be made to minimize the number of pump cycles.

Testing can also be performed when placing the RHR system into service during station shutdown, when removing the RHR system from service during station startup or when RHR is not required to be in operation, not more often than once per 92 days.

VALVE COLD SHUTDOWN JUSTIFICATION 8

Alternate Test: Full-stroke exercised and timed open when placing the RHR system into service during station shutdown to cold shutdown, when removing the RHR system from service during station startup from cold shutdown or when RHR is not required to be in operation, not more often than once per 92 days, per 2OST-10.3 and 2OST-10.4 (RHR System Valve Exercise Tests), as part of the cold shutdown valve population. In addition, these valves will also be fail-safe tested open per 2OST 10.3 and 2OST-10.4.

References: ISTC-3510, ISTC-3512(c) and ISTC-3560.

Technical Specification 3.4.7 and 3.4.8.

VALVE COLD SHUTDOWN JUSTIFICATION 9

Valve No(s): 2SIS*46
2SIS*47

Category: C **Class: 2**

System: 11 - Safety Injection

Function: These Recirculation Spray Pump discharge to Low Head Safety Injection (LHSI) Pump discharge check valves must open during the Recirculation Phase to provide a recirculation flow path from the containment sump via the C and D Recirculation Spray Pumps to the suction of the High Head Safety Injection (HHSI) Pumps.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: These check valves are normally closed. Their safety position is open during the Recirculation Phase. These check valves cannot be exercised with flow without injecting containment sump water via the Recirculation Spray (RSS) Pumps into the LHSI/HHSI Systems. Therefore, full-stroke exercising in the open direction can only be verified by cycling the mechanical weight loaded swing arms of each check valve. Exercising these weighted arm check valves in the open direction requires excessive forces due to the head of water present from the Refueling Water Storage Tank (RWST) against the check valve disks. However, per Analysis Calculation 10080-N-558, Engineering does not recommend applying the excessive forces required to cycle the check valves open. Therefore, in order to cycle these check valves open, the d/p created by the head of water from the RWST must either be equalized or removed. This must be done in order to ensure repeatability of breakaway torque test results for IST trending purposes. Setting up the conditions necessary to equalize or remove any d/p requires isolation of one train of the LHSI System, installation of a drain hose on a downstream vent valve in the LHSI System, and draining radioactive water to remove the d/p. Isolating one train of an Emergency Core Cooling System during plant operation would place the plant into a Technical Specification required action statement and would create excessive unavailability time if done at power. If tested quarterly, the amount of radioactive water drained from the system in order to bleed off pressure would create additional liquid waste for disposal which is not practicable. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns".

Alternate Test: Full-stroke exercised open using a manual mechanical exerciser attached to its mechanical weight loaded swing arm in accordance with ISTC-5221(b) and the guidelines provided in NUREG-1482, Section 4.1.7, and closed (bi-directional test) by observation of its mechanical weight loaded swing arm during cold shutdowns per 2OST-1.10J (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3522(b) and ISTC-5221(b).
Analysis Calculation 10080-N-558.
NUREG-1482, Section 4.1.7.

VALVE COLD SHUTDOWN JUSTIFICATION __10__

Valve No(s): 2SIS*MOV865A
2SIS*MOV865B
2SIS*MOV865C

Category: __B__ **Class:** __2__

System: 11 - Safety Injection

Function: These Safety Injection (SI) Accumulator discharge isolation valves must remain open to allow the SI Accumulators to discharge to the reactor coolant system (RCS) in the event of a loss of coolant accident (LOCA). They must close during a small break LOCA to prevent nitrogen from being injected into the RCS.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: During plant operation, these valves are de-energized open in their safety position with their shorting bars removed. They are required to remain open to allow the SI Accumulators to discharge to the reactor coolant system (RCS) in the event of a loss of coolant accident (LOCA). They are also required to close during a small break LOCA to prevent nitrogen from being injected into the RCS. Full-stroke exercising cannot be performed during plant operation because these valves are required to remain open with power removed from the Accumulator Isolation Valve operator control circuit per SR 3.5.1.5. In addition, NUREG-1482, Section 3.1.1, "Deferring Valve Testing to Each Cold Shutdown or Refueling Outage," Example (1) lists the SI Accumulator discharge valves in PWR's as one specific example of valves whose failure in a non-conservative position during the cycling test would cause a loss of system function. Therefore, these valves will not be stroked and timed during plant operation. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed open and closed when the SI Accumulators are isolated from the RCS on the way to cold shutdowns per 2OM-52.4.R.1.F (Station Shutdown from 100% Power to Mode 5), and recorded in 2OST-1.10H (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c) and Table ISTC-3500-1.

NUREG-1482, Section 3.1.1.

Technical Specification SR 3.5.1.5.

VALVE COLD SHUTDOWN JUSTIFICATION 11

Valve No(s): 2SIS*HCV868A
2SIS*HCV868B

Category: B **Class:** 2

System: 11 - Safety Injection

Function: These high head safety Injection (HHSI) discharge to cold leg injection hand control valves must open and close to provide a throttled emergency boration flow path when normal charging is lost.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally closed. Their safety position is throttled to provide an emergency boration flow path to the cold legs in the event that the normal charging path is lost. Full or part-stroke exercising in the open and closed directions cannot be performed during plant operation because flow is required to properly close these valves. Operation of the HHSI pumps to provide the flow necessary to stroke these valves closed cannot be performed during plant operation because this will inject relatively cold water into the RCS cold legs and cause thermal shock to system piping and components which will result in an increased probability of system and component failures. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed open and closed and fail-safe tested closed during cold shutdowns per 2OST-1.10H (Cold Shutdown Valve Exercise Test) or per 2OST-11.14B (HHSI Full Flow Test) if at refueling.

References: ISTC-3510, ISTC-3521(c) and ISTC-3560.

VALVE COLD SHUTDOWN JUSTIFICATION 12

Valve No(s): 2QSS*3
2QSS*4

Category: A/C **Class:** 2

System: 13 - Containment Depressurization (Quench Spray)

Function: These quench spray header inside containment isolation check valves must close to provide containment isolation of penetration nos. 63 and 64. They must open to provide a flow path from the RWST via the Quench Spray Pumps to the containment spray rings in order to depressurize the containment following a loss of coolant accident (LOCA).

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: These check valves are normally closed. Their safety positions are closed for containment isolation of penetration nos. 63 and 64, and open for the purpose of depressurizing the containment following a LOCA. These check valves cannot be exercised with flow without injecting water through the spray rings and spraying down containment. Therefore, full stroke exercising in the open and closed directions can only be verified by cycling the mechanical weight loaded swing arms of each check valve. Because these check valves are located inside the slightly sub-atmospheric containment, they are not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns."

Alternate Test: Full-stroke exercised open using a manual mechanical exerciser attached to its mechanical weight loaded swing arm in accordance with ISTC-5221(b) and the guidelines provided in NUREG-1482, Section 4.1.7, and closed by observation of its mechanical weight loaded swing arm during cold shutdowns per 2OST-1.10J (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3522(b) and ISTC-5221(b).
NUREG-1482, Section 4.1.7.

VALVE COLD SHUTDOWN JUSTIFICATION 13

Valve No(s): 2RSS*29
2RSS*30
2RSS*31
2RSS*32

Category: C **Class:** 2

System: 13 - Containment Depressurization (Recirculation Spray)

Function: These Recirculation Spray Pump discharge header to containment spray ring inside containment isolation check valves are required to close to prevent reverse flow to the opposite train of recirc spray through the spray rings. They are required to open to provide a flow path from the containment sump via the Recirculation Spray Pumps to the spray rings located in the top of the containment dome in order to depress and maintain the containment pressure sub-atmospheric following a loss of coolant accident (LOCA).

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: These check valves are normally closed. Their safety positions are open during RSS Pump operation following a LOCA, and closed to prevent reverse flow to the opposite train of recirc spray through the spray rings should a Recirculation Spray Pump not be running. Because the recirculation spray system (RSS) is maintained dry and the RSS Pumps can only be tested during refueling outages, these check valves cannot be exercised with flow during plant operation or during cold shutdown. Therefore, full stroke exercising in the open and closed directions can only be verified by cycling the mechanical weight loaded swing arms of each check valve. Because these check valves are located inside the slightly sub-atmospheric containment, they are not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns."

Alternate Test: Full-stroke exercised open using a manual mechanical exerciser attached to its mechanical weight loaded swing arm in accordance with ISTC-5221(b) and the guidelines provided in NUREG-1482, Section 4.1.7, and closed by observation of its mechanical weight loaded swing arm during cold shutdowns per 2OST-1.10J (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3522(b) and ISTC-5221(b).
NUREG-1482, Section 4.1.7.

VALVE COLD SHUTDOWN JUSTIFICATION __14__

Valve No(s): 2CCP*MOV112A
2CCP*MOV112B

Category: __B__ **Class:** __3__

System: 15 - Primary Component Cooling Water

Function: These primary component cooling water (CCP) supply to residual heat removal (RHR) heat exchanger isolation valves must open to supply cooling water to the RHR Heat Exchangers and Seal Coolers in order to achieve cold shutdown conditions following an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally closed during power operation. They are full-stroke exercised open during the quarterly CCP Pump Tests (2OST-15.1, 2 or 3), however, the quarterly testing frequency using these OST's is not practicable during cold shutdowns. During cold shutdowns, these valves are opened when placing the RHR System into service. Once the RHR System is in service, the safety position for these valves is to remain open in order to support cooling of the RHR Heat Exchangers and Seal Coolers.

If the RHR system is in service in Mode 5 as the operable RCS loops per Technical Specification 3.4.7 or 3.4.8 as applicable, these valves cannot be tested without entering the required action statement which requires immediate restoration of the RCS loop. Failure of any valve to re-open during testing at that time would cause a loss of one of the required RCS loops. Once the RHR system is not required to be in service as the operable RCS loops, Technical Specifications would permit the exercising of these valves. However, these valves can only be exercised if their associated RHR Pump is not operating. Therefore, while the plant is in Mode 5 or 6, the RHR Pumps would have to be swapped in order to exercise the valves. Every effort will be made to minimize the number of pump cycles. Testing can also be performed when placing the RHR system into service during station shutdown or when RHR is not required to be in operation, if more than 92 days will pass since they were last tested. They will also be full-stroke exercised when removing the RHR System from service during station startup if greater than 92 days will pass until the respective quarterly surveillance test is scheduled.

VALVE COLD SHUTDOWN JUSTIFICATION 14

Alternate Test: Since these MOV's are ranked as high safety significant valves, they have additional exercising requirements per Paragraph 3.6.2 of OMN-1 and are required to be full-stroke exercised quarterly per 2OST-15.1, 2OST-15.2 or 2OST-15.3 (CCP Pump Tests) during power operation. In addition, they are full-stroke exercised at cold shutdown in accordance with ASME OM Code Case OMN-1, Paragraph 3.6.1, when placing the RHR system into service during station shutdown to cold shutdown (open per 2OM-10.4.A), when removing the RHR system from service during station startup from cold shutdown (closed per 2OM-10.4.C) or open and closed when RHR is not required to be in operation, not more often than once per 92 days, per 2OST-10.3 and 2OST-10.4 (RHR System Valve Exercise Tests), as part of the cold shutdown valve population. In addition, stroke timing is not required (other than during diagnostic testing or for PMT) since these valves do not have any plant safety analysis limits

References: ISTC-3510.

Technical Specification 3.4.7 and 3.4.8.

OMN-1 Paragraphs 3.6.1 and 3.6.2

VALVE COLD SHUTDOWN JUSTIFICATION 15

Valve No(s): 2MSS*AOV101A
2MSS*AOV101B
2MSS*AOV101C

Category: B **Class:** 2

System: 21 - Main Steam

Function: These Main Steamline Isolation Valves (MSIV's) must close to prevent blowdown of the Steam Generators in the case of a high energy line break (HELB) accident, and to provide outside containment isolation of penetration no's. 73, 74 and 75.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally open during plant operation. Their safety position is closed for HELB isolation, and to provide outside containment isolation of penetration no's. 73, 74 and 75. They are also required to fail closed on a loss of control power. Full or part-stroke exercising in the closed direction cannot be performed during plant operation because this would cause a reactor trip with the possibility of a safety injection. For this reason, BVPS-2 Technical Specification Amendment No. 137 deleted the requirement to part-stroke exercise these valves. Therefore, per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed closed and fail-safe tested closed when going to or following cold shutdowns with Tavg ≥ 515F per 2OST-21.7 (MSIV Full Closure Test).

References: ISTC-3510, ISTC-3521(c) and ISTC-3560.

BVPS-2 Technical Specification 4.7.1.5 (Amendment No. 137).

CA 02-04450-19.

VALVE COLD SHUTDOWN JUSTIFICATION 16

Valve No(s): 2MSS*AOV102A
2MSS*AOV102B
2MSS*AOV102C

Category: B **Class:** 2

System: 21 – Main Steam

Function: These Main Steam Bypass Trip Valves must close to provide Containment isolation of penetration no's. 73, 74 and 75, and receive a steamline isolation signal to close in the event of a steamline break in any Steam Generator or its piping.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally maintained closed in their safety position with their air supply isolated during plant operation, buy may be opened during Main Steam System startup prior to normal plant operation. Their safety position is closed for Containment isolation of penetration no's. 73, 74 and 75. Since, each valve is a single isolation valve without redundancy, failure to reclose during a stroke test at power could result in a loss of containment integrity. NUREG-1482, Section 3.1.1., "Deferring Valve Testing to Each Cold Shutdown or Refueling Outage", lists as an example of valves to be specifically excluded from exercising (cycling) tests during plant operations: (2) All valves that would result in a loss of containment integrity if they failed to close during a cycling test. In addition, in order to test these valves on-line each quarter, the air supply must be restored and then removed from service when testing is complete. This places an added burden on the Operator for testing these valves each quarter. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed closed and fail-safe tested closed during cold shutdowns per 2OST-1.10K (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c) and ISTC-3560.

NUREG-1482, Section 3.1.1.

VALVE COLD SHUTDOWN JUSTIFICATION 17

Valve No(s): 2FWE*42A 2FWE*42B
2FWE*43A 2FWE*43B
2FWE*44A 2FWE*44B

Category: A/C **Class:** 2

System: 24 - Auxiliary Feedwater

Function: These auxiliary feedwater (AFW) system to Steam Generator header check valves must open to provide an auxiliary feedwater system flow path to the Steam Generators. They must close to provide header separation in the event of a line break in the upstream AFW system piping during an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: These check valves are normally closed during plant operation. Their safety positions are open for AFW system injection to the Steam Generators and closed to provide header separation in the event of a line break. Full-stroke exercising in the open and closed directions cannot be performed during plant operation because the test method requires the maximum required accident condition flow to the Steam Generators, in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, in order to verify both forward and reverse stroke exercising. However, this exercising cannot be performed during plant operation because this would require injecting relatively cold auxiliary feedwater into the Steam Generators which will cause a thermal shock to the auxiliary feedwater and main feedwater piping interface and result in an increased probability of system and component failure. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns."

Alternate Test: Full-stroke exercised open and closed during cold shutdowns per 2OST-24.6A(B) (Train A and B AFW System Check Valve Exercise and Flow Verification Test).

References: ISTC-3510, ISTC-3522(b) and ISTC-5221(a).
NUREG-1482, Section 4.1.3.

VALVE COLD SHUTDOWN JUSTIFICATION 18

Valve No(s): 2FWE*99
2FWE*100
2FWE*101

Category: C **Class:** 2

System: 24 - Auxiliary Feedwater

Function: These auxiliary feedwater (AFW) system to Steam Generator inside containment isolation check valves must close to provide containment isolation of penetration no's. 79, 80 and 83. They must open to provide an auxiliary feedwater system flow path to the Steam Generators during an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: These check valves are normally closed during plant operation. Their safety positions are closed for containment isolation of penetration no's. 79, 80 and 83, and open for AFW system injection to the Steam Generators. Full-stroke exercising in the open direction cannot be performed during plant operation because the test method requires the maximum required accident condition flow to the Steam Generators, in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3. However, exercising cannot be performed during plant operation because this would require injecting relatively cold auxiliary feedwater into the Steam Generators which will cause a thermal shock to the auxiliary feedwater and main feedwater piping interface and result in an increased probability of system and component failure. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns."

Alternate Test: Full-stroke exercised open during cold shutdowns per 2OST-24.6 A(B) (Train A and B AFW System Check Valve Exercise and Flow Verification Test). Full-stroke exercising in the closed direction is discussed in VROJ No. 46.

References: ISTC-3510, ISTC-3522(b) and ISTC-5221(a).
NUREG-1482, Section 4.1.3.

VALVE COLD SHUTDOWN JUSTIFICATION 19

Valve No(s): 2FWE*FCV122

Category: B/C **Class:** 3

System: 24 - Auxiliary Feedwater

Function: This Turbine-Driven Auxiliary Feedwater Pump (TDAFWP) discharge flow control/check valve has a dual function. This 3-way automatic recirculation control valve acts as both a manual automatic flow control valve in one direction and a check valve in the other direction. As a manual automatic flow control valve, it must open to provide approximately 30% recirculation flow for the TDAFWP to prevent pump damage in the event of isolation of an AFW discharge line to the Steam Generators. It must close in order to isolate this same recirculation flow path when full TDAFWP flow is being directed to the Steam Generators during an accident. As a check valve, it must open to provide a flow path from the TDAFWP to the Steam Generators. It must close to prevent reverse flow and feedwater intra-system recirculation through an idle TDAFWP.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves and Category C check valves shall be tested nominally every 3 months

Basis for CSJ: This 3-way automatic recirculation control valve acts as both a manual automatic flow control valve in one direction and a check valve in the other direction. It is normally closed as a check valve and normally open as manual automatic flow control valve during plant operation. As a manual automatic flow control valve, its safety position is open for TDAFWP recirculation and closed for isolation of this recirculation flow path. As a check valve, its safety position is open for AFW system injection to the Steam Generators and closed to prevent reverse flow through an idle TDAFWP. Full-stroke exercising in the open and closed directions cannot be performed during plant operation because the test method requires the maximum required accident condition flow to the Steam Generators, in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, in order to verify both forward and reverse stroke exercising of the check valve function and closure exercising of the flow control valve function. However, exercising cannot be performed during plant operation because this would require injecting relatively cold auxiliary feedwater into the Steam Generators which will cause a thermal shock to the auxiliary feedwater and main feedwater piping interface and result in an increased probability of system and component failure. ISTC-3521(c) and ISTC-3522(b) state, If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns.

VALVE COLD SHUTDOWN JUSTIFICATION 19

Alternate Test: The flow control valve function of this valve in the open direction will be full-stroke exercised open quarterly (although only required every 2 years) per 2OST-24.4 (TDAFWP Tests on Recirculation Flow). The check valve function of this valve in the closed direction will be full-stroke exercised during cold shutdowns per 2OST-24.6A or 6B (Train A and B AFW System Check Valve Exercise and Flow Verification Test). The flow control valve function of this valve and the check valve function of this valve in the open direction is discussed in VROJ No. 47.

References: ISTC-3510, ISTC-3521(c), ISTC-3522(b) and ISTC-5221(a).

NUREG-1482, Section 4.1.3.

VALVE COLD SHUTDOWN JUSTIFICATION 20

Valve No(s): 2FWE*FCV123A
2FWE*FCV123B

Category: B/C **Class:** 3

System: 24 - Auxiliary Feedwater

Function: These Motor-Driven Auxiliary Feedwater (AFW) Pump discharge flow control/check valves have a dual function. These 3-way automatic recirculation control valves act as both a manual automatic flow control valve in one direction and a check valve in the other direction. As a manual automatic flow control valve, they must open to provide approximately 30% recirculation flow for each AFW Pump to prevent pump damage in the event of isolation of an AFW discharge line to the Steam Generators. They must close in order to isolate this same recirculation flow path when full AFW Pump flow is being directed to the Steam Generators during an accident. As a check valve, they must open to provide a flow path from the AFW Pumps to the Steam Generators. They must close to prevent reverse flow and feedwater intra-system recirculation through an idle AFW Pump.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves and Category C check valves shall be tested nominally every 3 months.

Basis for CSJ: These 3-way automatic recirculation control valves act as both a manual automatic flow control valve in one direction and a check valve in the other direction. They are normally closed as check valves and normally open as manual automatic flow control valves during plant operation. As a manual automatic flow control valve, their safety positions are open for Motor-Driven AFW Pump recirculation and closed for isolation of this recirculation flow path. As a check valve, their safety positions are open for AFW system injection to the Steam Generators and closed to prevent reverse flow through an idle AFW Pump. Full-stroke exercising in the open and closed directions cannot be performed during plant operation because the test method requires the maximum required accident condition flow to the Steam Generators, in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, in order to verify both forward and reverse stroke exercising of the check valve function and closure exercising of the flow control valve function. However, exercising cannot be performed during plant operation because this would require injecting relatively cold auxiliary feedwater into the Steam Generators which will cause a thermal shock to the auxiliary feedwater and main feedwater piping interface and result in an increased probability of system and component failure. ISTC-3521(c) and ISTC-3522(b) state, If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns.

VALVE COLD SHUTDOWN JUSTIFICATION 20

Alternate Test: The flow control valve function of these valves in the open direction will be full-stroke exercised open quarterly (although only required every 2 years) per 2OST-24.2 and 2OST-24.3 Motor-Driven (AFW Pump Tests on Recirculation Flow) and at cold shutdown per 2OST-24.6A(6B) (Train A and B AFW System Check Valve Exercise and Flow Verification Test). The flow control valve function of these valves in the closed direction and the check valve function of these valves in the open and closed directions will be full-stroke exercised during cold shutdowns per 2OST-24.6A(6B) (Train A and B AFW System Check Valve Exercise and Flow Verification Test).

References: ISTC-3510, ISTC-3521(c), ISTC-3522(b) and ISTC-5221(a).

NUREG-1482, Section 4.1.3.

VALVE COLD SHUTDOWN JUSTIFICATION 21

Valve No(s): 2FWS*HYV157A
2FWS*HYV157B
2FWS*HYV157C

Category: B **Class:** 2

System: 24 - Main Feedwater

Function: The Steam Generator main feedwater isolation valves must close in the event of a high energy line break (HELB) or safety injection system actuation to prevent overfeeding the Steam Generators, and to provide outside containment isolation of penetration no's. 76, 77 and 78.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally open during plant operation providing feedwater flow to the Steam Generators. Their safety position is closed for Train "A" feedwater isolation to the Steam Generators, and to provide outside containment isolation of penetration no's. 76, 77 and 78. Full or part-stroke exercising in the closed direction cannot be performed during plant operation because this would isolate or reduce feedwater flow to the Steam Generators resulting in a plant shutdown. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed closed during cold shutdowns per 2OST-1.10A (Cold Shutdown Valve Exercise Test).

References: ISTC-3510 and ISTC-3521(c).

VALVE COLD SHUTDOWN JUSTIFICATION 22

Valve No(s): 2FWS*FCV478
2FWS*FCV488
2FWS*FCV498

Category: B **Class:** 3

System: 24 - Main Feedwater

Function: These Steam Generator main feedwater regulating valves must close in the event of a high energy line break (HELB) or safety injection system actuation to prevent overfeeding the Steam Generators.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally open during operation providing feedwater flow to the Steam Generators. Their safety position is closed for Train "B" feedwater isolation to the Steam Generators and they are also required to fail closed on a loss of control power. Full or part-stroke exercising in the closed direction cannot be performed during plant operation because this would isolate or reduce feedwater flow to the Steam Generators resulting in a plant shutdown. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed closed and fail-safe tested closed during cold shutdowns per 2OST-1.10A (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c) and ISTC-3560

VALVE COLD SHUTDOWN JUSTIFICATION 23

Valve No(s):	2BDG*AOV100A1	2BDG*AOV101A1	2BDG*AOV101A2
	2BDG*AOV100B1	2BDG*AOV101B1	2BDG*AOV101B2
	2BDG*AOV100C1	2BDG*AOV101C1	2BDG*AOV101C2

Category: B **Class:** 2

System: 25 – Steam Generator Blowdown

Function: These inside and outside containment Steam Generator blowdown isolation valves must close in the event of high energy line break (HELB) outside of containment. [2BDG*AOV100A1, B1 and C1] must also close for containment isolation of Penetration Nos. 39, 40 and 41.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally open in order to provide a flow path for the normal processing of blowdown from the secondary side of each Steam Generator. Their safety positions are closed in the event of HELB or for containment isolation of Penetration Nos. 39, 40 and 41. Since the three valves from each Steam Generator blowdown flow path are in series with one another, failure of one of them to re-open during stroke time testing in the closed direction would isolate the blowdown flow path. With blowdown isolated, the affected Steam Generator secondary chemistry would begin to deteriorate to a point, where if it exceeded administrative limits, the Unit would have to shut down. NUREG-1482, Section 3.1.1, "Deferring Valve Testing to Each Cold Shutdown or Refueling Outage," Example (1) states that all valves whose failure in a non-conservative position during the cycling test that would result in a loss of system function would typically be excluded from testing during plant operations. Per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: Full-stroke exercised and timed closed and fail-safe tested closed during cold shutdowns per 2OST-1.10C (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c) and ISTC-3560.

NUREG-1482, Section 3.1.1.

VALVE COLD SHUTDOWN JUSTIFICATION 24

Valve No(s): 2SWS*57
2SWS*58
2SWS*59

Category: C **Class:** 3

System: 30 - Service Water

Function: These Service Water (SWS) Pump discharge check valves must open to allow cooling water from the river to flow to station loads required during an accident. They must close to prevent reverse flow through an idle SWS Pump.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: These check valves are normally open during plant operation. Their safety positions are open to provide SWS cooling to station loads required during an accident, and closed to prevent reverse flow through an idle SWS Pump. Two SWS Pumps are required to be operable during plant operation. In order to full-stroke exercise these check valves in the closed direction, use of the idle SWS pump is required. Quarterly full-stroke exercising in the closed direction may not be possible if one SWS Pump is out of service for maintenance. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns."

Alternate Test: Full-stroke exercised closed quarterly, per 2OST-30.6A or 6B (Train A or B SWS Pump Tests). If not able to be tested quarterly, the valve(s) will be full-stroke exercised closed when the idle SWS Pump is returned to service, or at least during cold shutdowns per 2OST-30.6A or 6B (Train A or B SWS Pump Tests). Full-stroke exercising in the open direction is discussed in VROJ No. 48.

References: ISTC-3510 and ISTC-3522(b).

VALVE COLD SHUTDOWN JUSTIFICATION 25

Valve No(s): 2SWS*MOV102A
2SWS*MOV102B
2SWS*MOV102C1
2SWS*MOV102C2

Category: B **Class: 3**

System: 30 - Service Water

Function: These Service Water (SWS) Pump discharge valves must open to provide cooling water from the river to station loads required during an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally open during plant operation. Their safety position is open to provide SWS cooling to station loads required during an accident. Two SWS Pumps are required to be operable during plant operation. In order to full-stroke exercise these valves in the open direction, one operating pump at a time must be secured while the idle SWS pump is started. Quarterly full-stroke exercising in the open direction may not be possible if one SWS Pump is out of service for maintenance. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: These valves are capable of being full-stroke exercised quarterly per 2OST-30.6A or 6B (Train A or B SWS Pump Tests). However, since they are ranked as low safety significant valve's that do not have additional exercising requirements per Paragraph 3.6.2 of OMN-1, their exercise frequency may be extended to once every 18 months per OMN-1 Paragraph 3.6.1. If they are not able to be exercised on-line as described above, the valve(s) may be full-stroke exercised when the idle SWS Pump is returned to service, or at least during cold shutdowns per 2OST-30.6A or 6B (Train A or B SWS Pump Tests) in accordance with OMN-1 Paragraph 3.6.1. In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since these valves do not have any plant safety analysis limits.

References: ISTC-3510 and ISTC-3521(c).
OMN-1 Paragraphs 3.6.1 and 3.6.2.

VALVE COLD SHUTDOWN JUSTIFICATION 26

Valve No(s): 2SWS*MOV107A 2SWS*MOV107C
2SWS*MOV107B 2SWS*MOV107D

Category: B **Class:** 3

System: 30 - Service Water

Function: These service water (SWS) supply to Secondary Component Cooling Water (CCS) Heat Exchanger isolation valves must close on a CIA signal to isolate the non-safety related portions of the SWS system so that SWS cooling is available for safety related loads during an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves shall be tested nominally every 3 months.

Basis for CSJ: These valves are normally open during plant operation. Their safety position is closed to isolate the non-safety related portion of the SWS system. Full-stroke exercising in the closed direction cannot be performed during plant operation because closing these valves would reduce the SWS supply to the inservice turbine plant cooling loads including the CCS and chiller unit heat exchangers. This would reduce flow of cooling water to Train A or B cooling loads resulting in undesirable thermal transients, operational concerns of stability problems and a potential plant trip. Changes in oil temperature from the turbine generator lube oil system create vibration problems. Changes in the hydrogen gas cooler temperature could imply problems or mask real problems with the generator. Chiller unit heat exchanger flow disturbances often result in a trip of the chiller unit causing containment temperature risks of exceeding the Technical Specification limit.

In addition, isolation of these loads by closing [2SWS*MOV107A, B, C or D] during normal plant operation without also maximizing flow to other SWS cooling loads on the same train, would require the SWS pump operating on this train to be shutdown (in order to prevent damaging the pump by operating at less than the minimum continuous flow of 9100 gpm per DCP-1490). During normal plant operation, two Service Water System trains are required to be operable per Technical Specification 3.7.8. Shutting down the SWS pump operating on the SWS train being tested would result in the following:

(1) Loss of the redundant SWS subsystem due to no flow to the following safety-related cooling loads on that train. This is because the SWS subsystems cannot be cross-connected at these cooling loads in order to maintain train separation as required by GDC 44.

Emergency Diesel Generator Coolers
Charging Pump Coolers
Control Room cooling
Safeguards Area cooling
Rod Control Area cooling (not normally aligned)
Motor Control Center Room cooling
PASS Cooling (B Train only)

This would also require entry into the 72 hour Technical Specification 3.7.8 Required Action.

VALVE COLD SHUTDOWN JUSTIFICATION 26

Basis for CSJ: (Cont.)

(2) Maintenance Rule out-of-service time would be accumulated for the EDG and Charging Pump operating on that train until the SWS header being tested is restored to operable status.

(3) Partial draining of the SWS header being tested would occur due to gravity draining to the outfall. It is estimated that it would take approximately four hours to restore the header to a filled and vented condition.

(4) The removal of the above equipment from service would result in high PRA risk which has been evaluated to exceed current limits for performing such an activity without first obtaining management authorization.

Pre-test alignment of the SWS subsystems would be required to ensure enough flow for SWS pump operation on the train being tested as well as enabling as much cooling flow as possible to the station loads normally in service. This would involve extra-ordinary time consuming valve line-ups which are not desirable during normal plant operation. These valve line-ups are estimated to take more than one shift (eight hours) per train to perform, both before and after the test.

Since both SWS subsystems must be maintained operable during normal operation, closing [2SWS*MOV107A, B, C or D] is only possible during cold shutdowns when one train of SWS can be isolated, because both trains of SWS are no longer required by Technical Specifications. Per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns".

Alternate Test:

These valves may be full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns per 2OST-1.10D (Cold Shutdown Valve Exercise Test). However, since they are ranked as low safety significant valve's that do not have additional exercising requirements per Paragraph 3.6.2 of OMN-1, their exercise frequency may be extended to refueling per OMN-1 Paragraph 3.6.1. In addition, these MOV's should be stroke time tested when exercised closed since they have an ESF plant safety analysis limit.

References:

ISTC-3510 and ISTC-3521(c).

DCP-1490.

Technical Specification 3.7.8.

OMN-1 Paragraphs 3.6.1 and 3.6.2.

LRM Table 3.3.2-1.

VALVE COLD SHUTDOWN JUSTIFICATION __27__

Valve No(s): 2SWS*486
2SWS*487
2SWS*488

Category: __C__ **Class:** __3__

System: 30 - Service Water

Function: These Service Water (SWS) Pump vacuum breaker check valves must open to prevent a vacuum from occurring which could damage the SWS Pump seals and piping when the pumps are shut down or tripped. They must close during SWS Pump operation to prevent loss of SWS cooling to station loads required during an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: These check valves are normally closed during plant operation. Their safety positions are open to protect the SWS Pump seals and piping during pump shutdown or trip, and closed to ensure adequate SWS cooling to station loads required during an accident. Two SWS Pumps are required to be operable during plant operation. In order to full-stroke exercise these check valves in the open direction, use of the idle SWS is required. Quarterly full-stroke exercising in the open direction may not be possible if one SWS Pump is out of service for maintenance. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns."

Alternate Test: Full-stroke exercised closed quarterly per 2OST-30.2, 2OST-30.3 and 2OST-30.6A or 6B (SWS Pump Tests). Full-stroke exercised open quarterly, per 2OST-30.6A or 6B (Train A or B SWS Pump Tests). If not able to be tested open each quarter, the valve(s) will be full-stroke exercised open when the idle SWS Pump is returned to service, or at least during cold shutdowns per 2OST-30.6A or 6B (Train A or B SWS Pump Test).

References: ISTC-3510 and ISTC-3522(b).

VALVE COLD SHUTDOWN JUSTIFICATION 28

Valve No(s): 2FPW*753

Category: A/C **Class:** 2

System: 33 - Fire Protection

Function: This fire protection deluge header inside containment isolation check valve to the Residual Heat Removal Pumps and cable penetration area must be closed to provide containment isolation of penetration no. 101.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category C check valves shall be exercised nominally every 3 months.

Basis for CSJ: This check valves is normally closed and would only be opened in the event of a fire in containment. Its safety position is closed for containment isolation of penetration no. 101. Full-stroke exercising in the closed direction can only be verified by cycling the mechanical weight loaded swing arm of the check valve open and then closed or by leak testing. Because this check valve is located inside the slightly subatmospheric containment, it is not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns."

Alternate Test: Full-stroke exercised open using a manual mechanical exerciser attached to its mechanical weight loaded swing arm in accordance with ISTC-5221(b) and the guidelines provided in NUREG-1482, Section 4.1.7, and closed by observation of its mechanical weight loaded swing arm during cold shutdowns per 2OST-1.10J (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3522(b) and ISTC-5221(b).

NUREG-1482, Section 4.1.7.

VALVE COLD SHUTDOWN JUSTIFICATION 29

Valve No(s): 2IAC*MOV130

Category: A **Class:** 2

System: 34 - Compressed Air

Function: This Containment Instrument Air isolation valve is normally open to permit flow of instrument air into Containment in order to support normal operation of the Containment Instrument Air System. It is also required to close for Containment isolation of penetration no. 59.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category A valves shall be exercised nominally every 3 months.

Basis for CSJ: This valve is normally open to support operation of components inside Containment that are supplied by the Containment Instrument Air System. It must close for Containment isolation of penetration no. 59. Although there is no equipment inside Containment which requires instrument air for safe shutdown of that equipment, if this valve were to fail to re-open after being tested in the closed direction, certain air-operated valves inside Containment would move to their fail-safe positions. This would eventually cause a loss of letdown and excess letdown flow, with RCS pump seal injection flow still in service, Pressurizer level would slowly increase so that a plant shutdown would be needed to control level. NUREG-1482, Section 3.1.1, "Deferring Valve Testing to Each Cold Shutdown or Refueling Outage", Example (1) states that all valves that would cause a loss of system function if they were to fail in the non-conservative position during the cycling test is justification for deferral to cold shutdown. Therefore, this valve will not be tested during plant operation. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns".

Alternate Test: This valve may be full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns per 2OST-1.10H (Cold Shutdown Valve Exercise Test). However, since it is ranked as a low safety significant valve that does not have additional exercising requirements per Paragraph 3.6.2 of OMN-1, its exercise frequency may be extended to refueling per OMN-1 Paragraph 3.6.1. In addition, this MOV should be stroke time tested when exercised closed since it has both ESF and Containment Isolation plant safety analysis limits.

References: ISTC-3510 and ISTC-3521(c).

NUREG-1482, Section 3.1.1.

OMN-1 Paragraphs 3.6.1 and 3.6.2.

LRM Tables 3.3.2-1 and 3.6.1-1.

VALVE COLD SHUTDOWN JUSTIFICATION 30

Valve No(s): 2HVR*MOD23A
2HVR*MOD23B
2HVR*MOD25A
2HVR*MOD25B

Category: A **Class:** 2

System: 44C - Containment Area Ventilation

Function: These containment purge and exhaust inside and outside containment isolation dampers must close to provide containment isolation of penetration no's. 90 and 91. They must also close if radiation levels in containment rise to the high set point during refueling operations.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category A valves shall be tested nominally every 3 months.

Basis for CSJ: These motor operated dampers (MOD's) are normally locked shut during plant operation and opened during refueling operations. Their safety position is closed for containment isolation of penetration no's. 90 and 91. Full or part-stroke exercising in the closed direction cannot be performed during plant operation because the Containment Penetration Table requires the MOD's to be locked shut during plant operation. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns."

Alternate Test: These dampers may be full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns per 2OST-1.10B (Cold Shutdown Valve Exercise Test). However, since they are ranked as low safety significant valves that do not have additional exercising requirements per Paragraph 3.6.2 of OMN-1, their exercise frequency may be extended to refueling per OMN-1 Paragraph 3.6.1. In addition per LRM Table 3.6.1-1, plant safety analysis limits are only applicable when required by TS 3.9.3, therefore, stroke timing when exercising closed per 2OST-1.10B is typically not required unless for PMT or when required during diagnostic testing.

References: ISTC-3510 and ISTC-3521(c).
LRM Table 3.6.1-1 and TS 3.9.3.
OMN-1 Paragraphs 3.6.1 and 3.6.2.

SECTION VII: VALVE REFUELING OUTAGE JUSTIFICATIONS (VROJ) AND INDEX

VROJ	SYSTEM NO.	COMPONENT(S)
VROJ1	6	2RCS*68
VROJ2	6	2RCS*72
VROJ3	6	2RCS*SOV200A, 2RCS*SOV200B, 2RCS*SOV201A, 2RCS*SOV201B, 2RCS*HCV250A, 2RCS*HCV250B
VROJ4	7	2CHS*22, 2CHS*23, 2CHS*24
VROJ5	7	2CHS*31
VROJ6	7	2CHS*97
VROJ7	7	2CHS*LCV115C, 2CHS*LCV115E
VROJ8	7	2CHS*AOV200A, 2CHS*AOV200B, 2CHS*AOV200C
VROJ9	7	2CHS*AOV204
VROJ10	7	2CHS*MOV289
VROJ11	7	2CHS*MOV308A, 2CHS*MOV308B, 2CHS*MOV308C
VROJ12	7	2CHS*MOV310
VROJ13	7	2CHS*MOV378, 2CHS*MOV381
VROJ14	7	2CHS*LCV460A, 2CHS*LCV460B
VROJ15	7	2CHS*473
VROJ16	7	2CHS*474, 2CHS*475, 2CHS*476
VROJ17	7	2CHS*MOV8130A, 2CHS*MOV8130B, 2CHS*MOV8131A, 2CHS*MOV8131B, 2CHS*MOV8132A, 2CHS*MOV8132B, 2CHS*MOV8133A, 2CHS*MOV8133B
VROJ18	11	2SIS*6, 2SIS*7
VROJ19	11	2SIS*27
VROJ20	11	2SIS*42
VROJ21	11	2SIS*83, 2SIS*84, 2SIS*94, 2SIS*95
VROJ22	11	2SIS*107, 2SIS*108, 2SIS*109
VROJ23	11	2SIS*122, 2SIS*123, 2SIS*124, 2SIS*125, 2SIS*126, 2SIS*127
VROJ24	11	2SIS*128, 2SIS*129
VROJ25	11	2SIS*130
VROJ26	11	2SIS*132, 2SIS*133
VROJ27	11	2SIS*134, 2SIS*135, 2SIS*136, 2SIS*137, 2SIS*138, 2SIS*139

VROJ	SYSTEM NO.	COMPONENT(S)
VROJ28	11	2SIS*141, 2SIS*142, 2SIS*145, 2SIS*147, 2SIS*148, 2SIS*151
VROJ29	11	2SIS*545, 2SIS*546
VROJ30	11	2SIS*547
VROJ31	11	2SIS*548, 2SIS*550, 2SIS*552
VROJ32	11	2SIS*894, 2SIS*895
VROJ33	11	2SIS*MOV836
VROJ34	11	2SIS*MOV869A, 2SIS*MOV869B
VROJ35	11	2SIS*MOV8889
VROJ36	12	2CVS*93
VROJ37	13	2RSS*MOV154C, 2RSS*MOV154D
VROJ38	15	2CCP*4, 2CCP*5, 2CCP*6
VROJ39	15	2CCP*AOV107A, 2CCP*AOV107B, 2CCP*AOV107C
VROJ40	15	2CCP*MOV150-1, 2CCP*MOV150-2, 2CCP*MOV151-1, 2CCP*MOV151-2, 2CCP*MOV156-1, 2CCP*MOV156-2, 2CCP*MOV157-1, 2CCP*MOV157-2
VROJ41	15	2CCP*289, 2CCP*290, 2CCP*291
VROJ42	15	2CCP*352
VROJ43	21	2MSS*18, 2MSS*19, 2MSS*20, 2MSS*196, 2MSS*199, 2MSS*352
VROJ44	21	2SVS*80, 2SVS*81, 2SVS*82
VROJ45	24	2FWS*28, 2FWS*29, 2FWS*30
VROJ46	24	2FWE*99, 2FWE*100, , 2FWE*101
VROJ47	24	2FWE*FCV122
VROJ48	30	2SWS*57, 2SWS*58, 2SWS*59
VROJ49	30	2SWS*106, 2SWS*107
VROJ50	30	2SWS*111, 2SWS*112
VROJ51	30	2SWS*MOV103A, 2SWS*MOV103B, 2SWS*MOV106A, 2SWS*MOV106B
VROJ52	33	2FPW*761
VROJ53	34	2IAC*22

VALVE REFUELING OUTAGE JUSTIFICATION 1

Valve No(s): 2RCS*68

Category: A/C **Class:** 2

System: 6 - Reactor Coolant

Function: This inside containment isolation check valve on the nitrogen supply to the Pressurizer Relief Tank [2RCS-TK22] must close to provide containment isolation of penetration no. 49.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally closed and is only opened during nitrogen makeup to the Pressurizer Relief Tank. Its safety position is closed for containment isolation of penetration no. 49. Full stroke exercising in the closed direction can only be verified by cycling the mechanical weight loaded swing arm of the check valve open and then closed or by leak testing. Because this check valve is located inside the slightly sub-atmospheric containment, it is not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns." Because this check valve is normally isolated by upstream and downstream isolation valves, a d/p across the check valve is created due to thermal expansion when the cooler nitrogen gas is subjected to higher containment temperatures. Therefore, in order to cycle this check valve open so that it can be verified to close, trapped d/p must first be equalized or removed. A rather involved clearance is needed to isolate this check valve so that trapped d/p can be equalized or removed. This clearance also involves isolating nitrogen supply to the Volume Control Tank (VCT), Hydrogen Analyzers, Primary Drains Tanks, Pressure Relief Tank (PRT), Auxiliary Boiler, and hot water heating. Therefore, testing at cold shutdown is not practicable. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed by observation of its external weight arm during refueling outages per 2OST-1.10J (Cold Shutdown Valve Test).

NOTE: Bi-directional exercising in the non-safety related open direction will be satisfied by demonstrating the ability to provide nitrogen makeup to the PRT during station shutdown per 2OM-52.4.R.2.F (Refueling Station Shutdown – Mode 5 Activities).

References: ISTC-3510, ISTC-3522(b) and ISTC-3522(c).

VALVE REFUELING OUTAGE JUSTIFICATION 2

Valve No(s): 2RCS*72

Category: A/C **Class:** 2

System: 6 - Reactor Coolant

Function: This inside containment isolation check valve on the primary grade water supply to the Pressurizer Relief Tank [2RCS-TK22] must close to provide containment isolation of penetration no. 45.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally closed and is only opened during primary grade water makeup to the Pressurizer Relief Tank. Its safety position is closed for containment isolation of penetration no. 45. Full stroke exercising in the closed direction can only be verified by cycling the mechanical weight loaded swing arm of the check valve open and then closed or by leak testing. Because this check valve is located inside the slightly subatmospheric containment, it is not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns." Because this check valve is normally isolated by upstream and downstream isolation valves, a d/p across the check valve is created due to thermal expansion when the cooler fluid is subjected to higher containment temperatures. Therefore, in order to cycle this check valve open so that it can be verified to close, trapped d/p must first be equalized or removed. This involves installing a hose and draining the containment penetration, which is considered to be a hardship that is not practicable during cold shutdowns. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed by observation of its external weight arm during refueling outages per 2OST-1.10J (Cold Shutdown Valve Test).

NOTE: Bi-directional exercising in the non-safety related open direction will be satisfied by demonstrating the ability to provide nitrogen makeup to the PRT during station shutdown per 2OM-52.4.R.2.F (Refueling Station Shutdown – Mode 5 Activities).

References: ISTC-3510, ISTC-3522(b) and ISTC-3522(c).

VALVE REFUELING OUTAGE JUSTIFICATION 3

Valve No(s):	2RCS*SOV200A	2RCS*SOV200B
	2RCS*SOV201A	2RCS*SOV201B
	2RCS*HCV250A	2RCS*HCV250B

Category: B **Class:** 1, 2

System: 6 - Reactor Coolant

Function: These reactor vessel head vent valves must open to vent non-condensable gasses and provide reactor coolant system (RCS) letdown capability from the reactor vessel head to the Pressurizer Relief Tank (PRT). They must close to minimize RCS pressure boundary leakage.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally closed during plant operation. Their safety positions are closed to minimize RCS pressure boundary leakage, and open to vent the RCS in an emergency to assure that core cooling during natural circulation will not be inhibited by buildup of non-condensable gases. [2RCS*HCV250A and B] are also required to fail closed on a loss of control power. Periodic full or part-stroke exercising in the open and closed directions during normal plant operation could degrade the system by repeatedly challenging the downstream valves due to a phenomenon known as "burping". This phenomenon has been previously described in ASME Report, "Spurious Opening of Hydraulic-Assisted, Pilot-Operated Valves - An Investigation of the Phenomenon." The phenomenon involves a rapid pressure surge buildup at the valve inlet caused by opening the upstream valve in a series double isolation arrangement or by closing a valve in a parallel redundant flow path isolation arrangement. The pressure surge is sufficient enough to lift the valve plug until a corresponding pressure increase in a control chamber above the pilot and disc can create enough downward differential pressure to close the valve. In addition, per EM 103665 (dated August 4, 1992), Westinghouse does not recommend stroking the HCV's while isolated from the RCS by the SOV's during normal plant conditions (SOV's are required to remain closed to minimize RCS pressure boundary leakage) unless the trapped pressure between the HCV's and SOV's is first relieved by very slowly opening the HCV's. However, this goes against INPO's good practice of not pre-exercising power operated valves prior to stroking and timing them. In addition, if the SOV's are leaking sufficiently, there is the potential for exceeding the design pressure limit of the PRT because there is no pressure indication in this piping. Although these valves have been cycled in the past (in December 1996) under special conditions (determined acceptable by DLCO Calculation No. 10080-DLC(P)-900-XD, Rev. 0) so as to enable troubleshooting while the plant was at approximately 400F and 1200 psig, Westinghouse does not recommend "operating" the system to vent the reactor vessel during startup from a refueling outage at pressures exceeding 415 psig (Reference: Letter DLW-89-667, dated June 14, 1989). In addition, per letters PSE-SSA-4743 (dated February 5, 1985) and PT-SSAD-6813 (dated March 30, 1987), Westinghouse does not recommend that the reactor vessel

VALVE REFUELING OUTAGE JUSTIFICATION _3_

Basis for ROJ: (Cont.) head vent system valves be "tested" at full operating temperature and pressure (620F and 2250 psia), but rather at low temperature and pressure (200F and 300 psia). Based on the above, full or part-stroke exercising in the open and closed directions cannot be performed during normal plant operation. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns." In addition, the system conditions recommended for "testing" these valves may not always be obtainable during each cold shutdown. Stroke testing, if attempted at cold shutdown, could extend the length of a plant shutdown due to extensive preparatory work in establishing the proper RCS conditions. ISTC-3521(e) states, "If exercising is not practicable during operation at power or during cold shutdowns, it may be limited to full-stroke exercising during refueling outages."

Alternate Test: Full-stroke exercised and timed open and closed and fail-safe tested closed during cold shutdown if proper RCS conditions exist, or at least during refueling outages per 2OST-6.9 (Reactor Vessel Head Vent System Test.

References: ISTC-3510, ISTC-3521(c), ISTC-3521(e) and ISTC-3560.

EM 103665.

DLCO Calculation No. 10080-DLC(P)-900-XD, Rev. 0.

Westinghouse Letters DLW-89-667, PSE-SSA-4743 and PT-SSAD-6813.

VALVE REFUELING OUTAGE JUSTIFICATION 4

Valve No(s): 2CHS*22
2CHS*23
2CHS*24

Category: C **Class:** 2

System: 7 - Chemical and Volume Control

Function: These Charging Pump discharge check valves must open to provide a flow path from the Charging Pumps to the Reactor Coolant System (RCS) loops for high head safety injection (HHSI). They must close to prevent reverse flow through an idle Charging Pump.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally open when their associated Charging Pump is in service. Their safety positions are open for HHSI and closed to prevent reverse flow through an idle Charging Pump. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the Charging Pumps will not develop the required flow. Full-stroke exercising in the open direction cannot be performed via the HHSI hot or cold legs injection flow paths because injection of relatively cold water into the RCS during normal plant operation will cause a thermal shock on the injection nozzles resulting in an increased probability of system failure. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns." However, during cold shutdowns, full flow exercising in the open direction cannot be performed because this could result in low-temperature over-pressurization of the RCS. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Exercising the non-running Charging Pump discharge check valve(s) in the closed direction is normally done during quarterly pump testing by virtue of pump delta-p being greater than the system minimum operating point (MOP) curve for the operating pump. The quarterly pump test, however, can only be performed at lower flow rates on a flat portion of the pump curve. Therefore, a large change in flow is required to cause the delta-p to drop below the MOP curve. This quarterly test provides assurance that the check valves are closed, preventing gross leakage. Verification that Charging Pump delta-p does not degrade below the system MOP curve at a substantial flow condition, verifies the adjacent pumps' discharge check valves are adequately closed and capable of fulfilling their function in the closed direction by ensuring the performance of the operating pump exceeds minimum system requirements. Therefore, in order to ensure acceptable check valve closure of the non-running pumps' discharge check valves, a functional test at substantial flow conditions will be

VALVE REFUELING OUTAGE JUSTIFICATION 4

Basis for ROJ: (Cont.) performed. However, as stated in the first paragraph above, full-flow testing can only be performed during a refueling outage. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed quarterly per 2OST-7.4, 2OST-7.5 and 2OST-7.6 (Charging Pump Tests). Full-stroke exercised open and closed during refueling outages per 2OST-11.14B (HHSI Full-Flow Test).

References: ISTC-3510, ISTC-3522(b), ISTC-3522(c) and ISTC-5221(a).

NUREG-1482, Section 4.1.3.

CR 01-0807 and CA 01-0807-01.

VALVE REFUELING OUTAGE JUSTIFICATION 5

Valve No(s): 2CHS*31

Category: A/C **Class:** 2

System: 7 - Chemical and Volume Control

Function: This charging header inside containment isolation check valve must close to provide containment isolation of penetration no. 15.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally open when the charging system is in service. Its safety position is closed for containment isolation of penetration no. 15. Exercising in the closed direction can only be verified by cycling the mechanical weight loaded swing arm of the check valve open and then closed or by leak testing. Because this check valve is located inside the slightly subatmospheric containment, it is not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns." In addition, exercising in the closed direction may not be possible during cold shutdown if the charging system is in service to support operation of a Reactor Coolant Pump (RCP). Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to exercise this check valve, the charging system and RCP's would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing because stopping the RCP's could extend the cold shutdown period and would be burdensome to the licensee. In addition, there could be a head of water creating a d/p against the check valve disk due to elevation differences between downstream piping and the reactor coolant system (RCS). Therefore, in order to cycle this check valve open so that it can be verified to close, the d/p may have to be equalized or removed which is considered to be an additional hardship that is not practicable during cold shutdowns. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open quarterly with flow per 2OST-7.4,5 or 6 (Charging Pump Tests). Full-stroke exercised closed by observation of its mechanical weight loaded swing arm during refueling outages per 2BVT-1.47.11 (Safety Injection and Charging System Containment Penetration Integrity Test).

References: ISTC-3510, ISTC-3522(b) and ISTC-3522(c).

NUREG-1482, Section 3.1.1.4.

VALVE REFUELING OUTAGE JUSTIFICATION 6

Valve No(s): 2CHS*97

Category: C **Class:** 2

System: 7-Chemical and Volume Control

Function: This Chemical Mixing Tank outlet check valve is required to close during an upstream non-Q class pipe break in order to prevent loss of Refueling Water Storage Tank (RWST) inventory that would otherwise be available to supply the Charging Pumps during a large break LOCA event.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally open while the Zinc Addition Skid is in service during plant operations. Its safety position is closed for isolation of upstream non-Q class piping. The Zinc Addition Skid is normally in service during plant operations and would have to be shutdown in order to test this check valve quarterly. In addition, full-stroke exercising in the closed direction can only be performed by leak testing because no other practical means is available to verify check valve closure. This involves the installation and removal of special test equipment in order to perform the leakage testing. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outages for Check Valves Verified Closed by Leak Testing", it is acceptable to verify that check valves are capable of closing by performing leak rate testing at each refueling outage, if no other practical means is available. Per ISTC-3522(c), "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages".

Alternate Test: Full-stroke exercised closed by leakage testing during refueling outages per 2OST-11.14C (Chem Tank Outlet Check Valve Reverse Flow Test).

NOTE: Bi-directional exercising in the non-safety related open direction is satisfied during normal system operation of the Zinc Addition System per ISTC-3550.

References: ISTC-3510, ISTC-3522(c) and ISTC-3550.

NUREG-1482, Section 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 7

Valve No(s): 2CHS*LCV115C
2CHS*LCV115E

Category: B **Class:** 2

System: 7 - Chemical and Volume Control

Function: These Volume Control Tank (VCT) outlet isolation valves must close on a safety injection signal to ensure the suction of the charging / high head safety injection (HHSI) system is switched from the VCT to the Refueling Water Storage Tank (RWST).

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally open when the charging system is in service. Their safety position is closed to ensure the suction of the Charging Pumps is switched from the VCT to the RWST following a safety injection signal. Full or part-stroke exercising in the closed direction cannot be performed during plant operation without isolating the VCT from the Charging Pumps or potentially damaging the Charging Pumps due to inadequate suction flow. This would also result in loss of or limited pressurizer level control, normal reactor coolant system makeup, and loss of or limited seal injection flow to the Reactor Coolant Pump (RCP) seals resulting in seal damage. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns." In addition, full or part-stroke exercising in the closed direction may not be possible during cold shutdown if the charging system is in service to support operation of a RCP. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to stroke these valves, the charging system and RCP's would have to be shutdown. Per NUREG-1482, Rev.1, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages."

In addition, the PRA Group has evaluated the demand failure rates for these high safety significant MOVs based on the risk associated with exercising them per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

VALVE REFUELING OUTAGE JUSTIFICATION 7

Alternate Test: Full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns when the charging system and the RCP's are secured, or at least during refueling outages per 2OST-1.10F (Cold Shutdown Valve Exercise Test). In addition, these MOV's should be stroke time tested when exercised closed since they have an ESF plant safety analysis limit.

References: ISTC-3510, ISTC-3521(c) and ISTC-3521(e)

NUREG-1482, Section 3.1.1.4.

OMN-1 Paragraph 3.6.1.

LRM Table 3.3.2-1.

VALVE REFUELING OUTAGE JUSTIFICATION 8

Valve No(s): 2CHS*AOV200A
2CHS*AOV200B
2CHS*AOV200C

Category: A **Class:** 2

System: 7 - Chemical and Volume Control

Function: These letdown orifice inside containment isolation valves must close to secure letdown flow and limit inventory loss from the reactor coolant system (RCS) on receipt of a CIA. They must also close to provide inside containment isolation of Penetration No. 28.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally open when the charging system is in service to provide a flow path for letdown flow from the RCS. Their safety position is closed for containment isolation of Penetration No. 28, and also for letdown isolation. When these valves are stroke time tested closed and then re-opened, a crud burst occurs which collects on downstream Letdown Filter [2CHS-FLT22] requiring it to be changed. In order to change [2CHS-FLT22], it must first be bypassed for approximately 3 days in order to allow it to radiologically decay, but this still results in excess dose if stroke timing is done on-line each quarter. Per ISTC-3521(c), if exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns. However, while [2CHS-FLT22] is bypassed, any remaining debris in the letdown line can migrate through the Volume Control Tank and Charging Pumps and ultimately collect in the Seal Injection Filters for the Reactor Coolant Pumps (RCPs). If the Seal Injection Filters become clogged, this can reduce seal injection water to the RCP seals, resulting in seal damage. In order to stroke these valves and minimize the adverse consequences of the crud burst, they should be stroked when a planned RCS crud burst is initiated during refueling outages. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke during refueling outages".

Alternate Test: Full-stroke exercised and timed closed and fail-safe tested closed during refueling outages per 2OST-1.10F (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c), ISTC-3521(e) and ISTC-3560.

VALVE REFUELING OUTAGE JUSTIFICATION _9_

Valve No(s): 2CHS*AOV204

Category: _A_ **Class: _2_**

System: 7 - Chemical and Volume Control

Function: This Non-Regen Heat Exchanger inlet and letdown isolation outside containment isolation valve must close to secure letdown flow and limit inventory loss from the reactor coolant system (RCS) on receipt of a CIA. It must also close to provide containment isolation of penetration no. 28.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: This valve is normally open when the charging system is in service to provide a flow path for letdown flow from the RCS. Its safety position is closed for containment isolation of penetration no. 28, and also for letdown isolation. Full or part-stroke exercising in the closed direction cannot be performed during plant operation because this will result in a thermal shock to the Regenerative Heat Exchanger and associated component piping resulting in an increased probability of system and component failures. In addition, failure of this valve in the closed position could lead to a loss of pressurizer level control and require a plant shutdown. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns." In addition, full or part-stroke exercising in the closed direction may not be possible during cold shutdown if the charging system is in service to support operation of a Reactor Coolant Pump (RCP). A failure of this valve in the closed position could lead to the shutdown of a Charging Pump and unnecessary shutdown of a RCP. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to stroke this valve, the charging system and RCP's would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages."

Alternate Test: Full-stroke exercised and timed closed and fail-safe tested closed during cold shutdowns when the charging system and the RCP's are secured, or at least during refueling outages per 2OST-1.10F (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c), ISTC-3521(e) and ISTC-3560.

NUREG-1482, Section 3.1.1.4.

VALVE REFUELING OUTAGE JUSTIFICATION 10

Valve No(s): 2CHS*MOV289

Category: A **Class:** 2

System: 7 - Chemical and Volume Control

Function: This normal charging header makeup and outside containment isolation valve must close on a safety injection signal to ensure that flow from the high head safety injection (HHSI) system is switched from normal charging to the safety injection system. It must also close to provide containment isolation of penetration no. 15.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: This valve is normally open when the charging system is in service to provide a flow path for normal charging to the RCS. Its safety position is closed for containment isolation of penetration no. 15, and also for normal charging isolation. Full-stroke exercising in the closed direction cannot be performed during plant operation because this will result in a thermal shock to the Regenerative Heat Exchanger and associated component piping resulting in an increased probability of system and component failures. In addition, failure of this valve in the closed position could lead to a loss of pressurizer level control and require a plant shutdown. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns." In addition, full-stroke exercising in the closed direction may not be possible during cold shutdown if the charging system is in service to support operation of a Reactor Coolant Pump (RCP). A failure of this valve in the closed position could lead to the shutdown of a Charging Pump and unnecessary shutdown of a RCP. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to stroke this valve, the charging system and RCP's would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages."

In addition, the PRA Group has evaluated the demand failure rates for this high safety significant MOV based on the risk associated with exercising it per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

VALVE REFUELING OUTAGE JUSTIFICATION 10

Alternate Test: Full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns when the charging system and the RCP's are secured, or at least during refueling outages per 2OST-1.10F (Cold Shutdown Valve Exercise Test). In addition, this MOV should be stroke time tested when exercised closed since it has both ESF and Containment Isolation plant safety analysis limits.

References: ISTC-3510, ISTC-3521(c) and ISTC-3521(e).

NUREG-1482, Section 3.1.1.4.

OMN-1 Paragraph 3.6.1.

LRM Tables 3.3.2-1 and 3.6.1-1.

VALVE REFUELING OUTAGE JUSTIFICATION 11

Valve No(s): 2CHS*MOV308A
2CHS*MOV308B
2CHS*MOV308C

Category: A **Class:** 2

System: 7 - Chemical and Volume Control

Function: These Reactor Coolant Pump (RCP) seal water supply outside containment isolation valves must close to provide containment isolation of penetration no's. 35, 36 and 37.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally open when the charging system is in service to provide seal injection flow to the RCP seals. Their safety position is closed for containment isolation of penetration no's. 35, 36 and 37. Full-stroke exercising in the closed direction cannot be performed during plant operation because this would secure seal injection water to the RCP seals, resulting in seal damage. In addition, failure of these valves in the closed position will result in a plant shutdown. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns." In addition, full-stroke exercising in the closed direction may not be possible during cold shutdown if the charging system is in service to support operation of a RCP. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to stroke these valves, the charging system and RCP's would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages."

Alternate Test: These valves may be full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns when the reactor coolant pumps are secured, or at least during refueling outages per 2OST-1.10F (Cold Shutdown Valve Exercise Test). However, since they are ranked as low safety significant valves that do not have additional exercising requirements per Paragraph 3.6.2 of OMN-1, their exercise frequency may be extended to refueling per OMN-1 Paragraph 3.6.1. In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since these valves do not have any plant safety analysis limits.

References: ISTC-3510, ISTC-3521(c) and ISTC-3521(e).

NUREG-1482, Section 3.1.1.4.

OMN-1 Paragraphs 3.6.1 and 3.6.2.

VALVE REFUELING OUTAGE JUSTIFICATION 12

Valve No(s): 2CHS*MOV310

Category: B **Class:** 2

System: 7 - Chemical and Volume Control

Function: This Regenerative Heat Exchanger outlet isolation and normal charging system makeup valve must close on a safety injection signal to ensure that flow from the high head safety injection (HHSI) system is switched from normal charging to the safety injection system.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for ROJ: This valve is normally open when the charging system is in service to provide a flow path for normal charging to the RCS. Its safety position is closed for isolation of normal charging. Full-stroke exercising in the closed direction cannot be performed during plant operation because this will result in a thermal shock to the Regenerative Heat Exchanger and associated component piping resulting in an increased probability of system and component failures. In addition, failure of this valve in the closed position could lead to a loss of pressurizer level control and require a plant shutdown. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns." In addition, full-stroke exercising in the closed direction may not be possible during cold shutdown if the charging system is in service to support operation of a Reactor Coolant Pump (RCP). A failure of this valve in the closed position could lead to the shutdown of a Charging Pump and unnecessary shutdown of a RCP. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to stroke this valve, the charging system and RCP's would both have to be shutdown. Per NUREG-1482, Rev.1, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages."

In addition, the PRA Group has evaluated the demand failure rates for this high safety significant MOV based on the risk associated with exercising it per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

VALVE REFUELING OUTAGE JUSTIFICATION 12

Alternate Test: Full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns when the charging system and the RCP's are secured, or at least during refueling outages per 2OST-1.10F (Cold Shutdown Valve Exercise Test). In addition, this MOV should be stroke time tested when exercised closed since it has an ESF plant safety analysis limits.

References: ISTC-3510, ISTC-3521(c) and ISTC-3521(e).

NUREG-1482, Section 3.1.1.4.

OMN-1 Paragraph 3.6.1.

LRM Table 3.3.2-1.

VALVE REFUELING OUTAGE JUSTIFICATION 13

Valve No(s): 2CHS*MOV378
2CHS*MOV381

Category: A **Class:** 2

System: 7 - Chemical and Volume Control

Function: These Reactor Coolant Pump (RCP) seal water return inside and outside containment isolation valves must close to provide containment isolation of penetration no. 19.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally open when the charging system is in service to provide seal water return from the RCP's. Their safety position is closed for containment isolation of penetration no. 19. Full-stroke exercising in the closed direction cannot be performed during plant operation because this would secure seal water return from the RCP's, resulting in seal damage. In addition, failure of these valves in the closed position will result in a plant shutdown. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns." In addition, full-stroke exercising in the closed direction may not be possible during cold shutdown if the charging system is in service to support operation of a RCP. Shutting down the charging system during RCP operation while in cold shutdown would secure seal water return from the RCP's, resulting in seal damage. In order to stroke these valves, the charging system and RCP's would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages."

In addition, the PRA Group has evaluated the demand failure rates for these high safety significant MOVs based on the risk associated with exercising them per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

Alternate Test: Full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns when the charging system and the RCP's are secured, or at least during refueling outages per 2OST-1.10F (Cold Shutdown Valve Exercise Test). In addition, this MOV should be stroke time tested when exercised closed since it has both ESF and Containment Isolation plant safety analysis limits.

VALVE REFUELING OUTAGE JUSTIFICATION 13

References:

ISTC-3510, ISTC-3521(c) and ISTC-3521(e).

NUREG-1482, Section 3.1.1.4.

OMN-1 Paragraph 3.6.1.

LRM Tables 3.3.2-1 and 3.6.1-1.

VALVE REFUELING OUTAGE JUSTIFICATION 14

Valve No(s): 2CHS*LCV460A
2CHS*LCV460B

Category: B **Class:** 1

System: 7 - Chemical and Volume Control

Function: These Regenerative Heat Exchanger inlet letdown isolation valves must close to secure letdown flow and limit inventory loss from the reactor coolant system (RCS) on receipt of a low level signal derived from the pressurizer level control system.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally open when the charging system is in service to provide a flow path for letdown flow from the RCS. Their safety position is closed for letdown isolation. Full or part-stroke exercising in the closed direction cannot be performed during plant operation because this will result in a thermal shock to the Regenerative Heat Exchanger and associated component piping resulting in an increased probability of system and component failures. In addition, failure of this valve in the closed position could lead to a loss of pressurizer level control and require a plant shutdown. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns." In addition, full or part-stroke exercising in the closed direction may not be possible during cold shutdown if the charging system is in service to support operation of a Reactor Coolant Pump (RCP). A failure of this valve in the closed position could lead to the shutdown of a Charging Pump and unnecessary shutdown of a RCP. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to stroke these valves, the charging system and RCP's would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages."

Alternate Test: Full-stroke exercised and timed closed and fail-safe tested closed during cold shutdowns when the charging system and the RCP's are secured, or at least during refueling outages per 2OST-1.10F (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c), ISTC-3521(e) and ISTC-3560.
NUREG-1482, Section 3.1.1.4.

VALVE REFUELING OUTAGE JUSTIFICATION 15

Valve No(s): 2CHS*473

Category: A/C **Class:** 2

System: 7 - Chemical and Volume Control

Function: This seal water return inside containment isolation thermal relief check valve must close to provide containment isolation of penetration no. 19. It must also open to allow excess pressure trapped in the containment penetration due to thermal expansion to be equalized with the pressure inside the seal return line, inside containment.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally closed when the charging system is in service returning seal injection flow from the Reactor Coolant Pumps (RCP's). Its safety position is closed for containment isolation of penetration no. 19, however, it will momentarily open if required to relieve pressure trapped in the isolated containment penetration due to thermal expansion. Full stroke in the open and closed directions can only be verified by cycling the mechanical weight loaded swing arm of the check valve. Because this check valve is located inside the slightly subatmospheric containment, it is not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns." In addition, full stroke exercising in the open and closed directions may not be possible during cold shutdown if the charging system is in service to support operation of a RCP. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to full stroke exercise these check valves, the charging system and RCP's would both have to be shutdown in order to remove any d/p across the check valve. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected check valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

VALVE REFUELING OUTAGE JUSTIFICATION 15

Alternate Test: Full-stroke exercised open using a manual mechanical exerciser attached to its mechanical weight loaded swing arm in accordance with ISTC-5221(b) and the guidelines provided in NUREG-1482, Section 4.1.7, and closed by observation of its mechanical weight loaded swing arm during cold shutdowns when the charging system and the RCP's are secured, or at least during refueling outages per 2OST-1.10J (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3522(b), ISTC-3522(c) and ISTC-5221(b)

NUREG-1482, Sections 3.1.1.4 and 4.1.7.

VALVE REFUELING OUTAGE JUSTIFICATION 16

Valve No(s): 2CHS*474
2CHS*475
2CHS*476

Category: A/C **Class:** 2

System: 7 - Chemical and Volume Control

Function: These Reactor Coolant Pump seal water supply inside containment isolation check valves must close to provide containment isolation of penetration no's. 35, 36 and 37.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally open when the charging system is in service to supply seal injection flow to the Reactor Coolant Pump (RCP) seals. Their safety positions are closed for containment isolation of penetration no's. 35, 36 and 37. Full stroke exercising in the closed direction can only be verified by cycling the mechanical weight loaded swing arms of these check valves open and then closed or by leak testing. Because these check valves are located inside the slightly sub-atmospheric containment, they are not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns." In addition, full stroke exercising in the closed direction may not be possible during cold shutdown if the charging system is in service to support operation of a RCP. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to full or part-stroke exercise these check valves, the charging system and RCP's would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing because stopping the RCP's could extend the cold shutdown period and would be burdensome to the licensee. In addition, there could be a head of water creating a d/p against the check valve disks due to elevation differences with downstream piping. Therefore, in order to cycle these check valves open so that they can be verified to close, the d/p may have to be equalized or removed which is considered to be an additional hardship that is not practicable during cold shutdowns. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

VALVE REFUELING OUTAGE JUSTIFICATION 16

Alternate Test: Full-stroke exercised closed by observation of its external weight arm during refueling outages per 2BVT 1.47.11 (Safety Injection and Charging System Containment Penetration Integrity Test).

NOTE: Bi-directional exercising to the non-safety related open position is satisfied by normal system operation of a RCP per ISTC-3550.

References: ISTC-3510, ISTC-3522(b), ISTC-3522(c) and ISTC-3550.

NUREG-1482, Section 3.1.1.4.

VALVE REFUELING OUTAGE JUSTIFICATION 17

Valve No(s):	2CHS*MOV8130A	2CHS*MOV8132A
	2CHS*MOV8130B	2CHS*MOV8132B
	2CHS*MOV8131A	2CHS*MOV8133A
	2CHS*MOV8131B	2CHS*MOV8133B

Category: B **Class:** 2

System: 7 - Chemical and Volume Control

Function: These Charging Pump suction and discharge isolation valves must close to provide isolation and separation of the high head safety injection (HHSI) flow trains during the long term recirculation phase of safety injection.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for ROJ: The suction valves are normally de-energized and locked open for Appendix R and the discharge valves are normally de-energized and locked open per technical specifications. Their safety positions are closed for safety injection train separation during cold leg recirculation, however, only one valve in the suction line and one valve in the discharge line are required to close for train separation during this scenario. Full-stroke exercising in the closed direction cannot be performed during plant operation because the valves are required to be de-energized and locked open for Appendix R or per technical specifications. In addition, failure of these valves in the closed position under certain Charging Pump operating configurations could result in damage to a Charging Pump, loss of pressurizer level control, loss of normal reactor coolant system makeup or loss of seal injection flow to the Reactor Coolant Pump (RCP) seals resulting in seal damage. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns." In addition, full-stroke exercising in the closed direction may not be possible during cold shutdown if the charging system is in service to support operation of a RCP. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to stroke these valves without the potential risk in damage to a Charging Pump or RCP seals, the charging system and RCP's would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages."

VALVE REFUELING OUTAGE JUSTIFICATION 17

Alternate Test: These valves may be full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns when the charging system and the RCP's are secured, or at least during refueling outages per 2OST-1.10F (Cold Shutdown Valve Exercise Test). However, since they are ranked as low safety significant valve's that do not have additional exercising requirements per Paragraph 3.6.2 of OMN-1, their exercise frequency may be extended to refueling per OMN-1 Paragraph 3.6.1. In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since these valves do not have any plant safety analysis limits.

References: ISTC-3510, ISTC-3521(c) and ISTC-3521(e).

NUREG-1482, Section 3.1.1.4.

OMN-1 Paragraphs 3.6.1 and 3.6.2.

VALVE REFUELING OUTAGE JUSTIFICATION 18

Valve No(s): 2SIS*6
2SIS*7

Category: A/C **Class:** 2

System: 11 - Safety Injection

Function: These Low Head Safety Injection (LHSI) Pump discharge check valves must open to provide a flow path from the LHSI Pumps to the Reactor Coolant System (RCS) loops for LHSI. They must close to prevent reverse flow through an idle LHSI Pump back to the Refueling Water Storage Tank (RWST).

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation. Their safety positions are open for LHSI and closed to prevent reverse flow through an idle LHSI Pump. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the LHSI Pumps will not develop enough head to overcome RCS pressure. During cold shutdowns, full stroke exercising in the open direction cannot be performed because flow testing would require injection to the RCS where there is not sufficient volume to receive the additional inventory. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed quarterly per 2OST-11.1 and 2OST-11.2 (LHSI Pump Tests). Full-stroke exercised open during refueling outages per 2OST-11.14A (LHSI Full Flow Test).

References: ISTC-3510, ISTC-3522(c) and ISTC-5221(a).
NUREG-1482, Section 4.1.3.

VALVE REFUELING OUTAGE JUSTIFICATION 19

Valve No(s): 2SIS*27

Category: A/C **Class:** 2

System: 11 - Safety Injection

Function: This High Head Safety Injection (HHSI) Pump suction check valve from the Refueling Water Storage Tank (RWST) must open to provide a flow path from the RWST to the suction of the HHSI Pumps during an accident. It must close when the RWST is empty to prevent reverse flow of containment sump water from entering the RWST.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally closed during plant operation. Its safety position is open for HHSI and closed during transfer to recirc to prevent reverse flow to the RWST. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the Charging Pumps will not develop the required flow. During cold shutdowns, full flow exercising in the open direction cannot be performed because this could result in low-temperature overpressurization of the RCS. Full stroke exercising in the closed direction can only be performed by leak testing because no other practical means is available to verify check valve closure. This involves the installation and removal of special test equipment in order to perform the leakage testing. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak rate testing at each refueling outage, if no other practical means is available. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open during refueling outages per 2OST-11.14B (HHSI Full Flow Test). Full-stroke exercised closed by leakage testing during refueling outages per 2BVT 1.47.11 (Safety Injection and Charging System Containment Penetration Integrity Test).

References: ISTC-3510, ISTC-3522(c) and ISTC-5221(a)

NUREG-1482, Sections 4.1.3 and 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 20

Valve No(s): 2SIS*42

Category: A/C **Class:** 2

System: 11 - Safety Injection

Function: This inside containment isolation check valve on the makeup water supply header to the Safety Injection Accumulators must close to provide containment isolation of penetration no. 20.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally closed and is only opened when the Hydro Test Pump is supplying makeup water from the RWST to the Safety Injection Accumulators. Its safety position is closed for containment isolation of penetration no. 20. Full stroke exercising in the closed direction can only be verified by cycling the mechanical weight loaded swing arm of the check valve open and then closed or by leak testing. Because this check valve is located inside the slightly subatmospheric containment, it is not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns." In addition, because downstream MOV's which isolate this fill header from each Safety Injection Accumulator may not be leak tight, and because the Accumulators may still be pressurized to approximately 600 psig during cold shutdown, full stroke exercising in the closed direction may not be possible during cold shutdown if backleakage through the MOV's is present. Therefore, in order to cycle this check valve open so that it can be verified to close, trapped d/p may have to be equalized or removed which is considered to be an additional hardship that is not practicable during cold shutdowns. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed by observation of its external weight arm during refueling outages per 2OST-1.10J (Cold Shutdown Valve Test).

NOTE: Bi-directional exercising in the non-safety related open direction will be satisfied by demonstrating the ability to provide makeup to the Safety Injection Accumulator per 2OM-11.4.D (Makeup To Safety Injection Accumulator).

References: ISTC-3510, ISTC-3522(b) and ISTC-3522(c).

VALVE REFUELING OUTAGE JUSTIFICATION 21

Valve No(s): 2SIS*83
2SIS*84
2SIS*94
2SIS*95

Category: A/C **Class:** 2

System: 11 - Safety Injection

Function: These high head safety injection (HHSI) inside containment isolation check valves must close to provide containment isolation of penetration no's. 7, 17, 34 and 113. They must open for HHSI hot leg and cold leg recirculation.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed. Their safety positions are closed for containment isolation of penetration no's. 7, 17, 34 and 113, and open for HHSI hot leg and cold leg recirculation. During plant operation when the reactor coolant system (RCS) is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the Charging Pumps will not develop the required flow. In addition, they also cannot be full stroke exercised with flow in the open direction during plant operation due to the potential for thermal shock on the injection nozzles from a cold water injection. Therefore, full stroke exercising in the open and closed directions can only be verified by cycling the mechanical weight loaded swing arms of the check valves. However, because these check valves are located inside the slightly sub-atmospheric containment, they are not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns." In addition, because downstream check valves which isolate the HHSI system from the RCS may not be leak tight, and because the RCS may still be pressurized during cold shutdown, full stroke exercising by cycling the mechanical weight loaded swing arms in the open and closed directions may not be possible during cold shutdown if back-leakage through the downstream check valves is present. In addition, there could also be a head of water creating a d/p against the check valve disks due to elevation differences between downstream piping and the reactor coolant system (RCS). Therefore, in order to cycle the mechanical weight loaded swing arms of these check valves, the d/p may have to be equalized or removed to ensure repeatability of breakaway torque test results for IST trending purposes which is considered to be an additional hardship that is not practicable during cold shutdowns.

VALVE REFUELING OUTAGE JUSTIFICATION 21

Basis for ROJ: (Cont.)

In addition, full stroke exercising in the open direction with flow cannot be performed during cold shutdown because flow testing could result in low-temperature over-pressurization of the RCS. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test:

Full-stroke exercised open with flow during refueling outages per 2OST-11.14B (HHSI Full Flow Test). Full-stroke exercised closed by observation of its mechanical weight loaded swing arm upon cessation of flow during refueling outages per 2OST-11.14B (HHSI Full Flow Test).

References:

ISTC-3510, ISTC-3522(b), ISTC-3522(c) and ISTC-5221(a).

NUREG-1482, Section 4.1.3.

VALVE REFUELING OUTAGE JUSTIFICATION 22

Valve No(s): 2SIS*107
2SIS*108
2SIS*109

Category: A/C **Class:** 1

System: 11 - Safety Injection

Function: These low head safety injection (LHSI) header check valves must open to provide a flow path from the LHSI Pumps to the reactor coolant system (RCS) cold legs during a safety injection.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation and are pressure isolation valves (PIV's) that isolate the LHSI piping from the higher pressure RCS. Their safety position is open for LHSI. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the LHSI Pumps will not develop enough head to overcome RCS pressure. During cold shutdowns, full stroke exercising in the open direction cannot be performed because flow testing would require injection to the RCS where there is not sufficient volume to receive the additional inventory. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages." Full stroke exercising in the closed direction can only be performed by leak testing because no other practical means is available to verify check valve closure. This involves the installation and removal of special test equipment in order to perform the leakage testing. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak rate testing at each refueling outage, if no other practical means is available. ISTC-3522(c) states, "If exercising is not practicable during plant operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open per 2OST-11.14A (LHSI Full Flow Test) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. Full-stroke exercised closed by leakage testing during refueling outages per 2OST-11.16A (Leakage Testing RCS PIV's).

References: ISTC-3510, ISTC-3522(c), ISTC-5221(a) ad ISTC-5222.

NUREG-1482, Section 4.1.3.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 23

Valve No(s): 2SIS*122
2SIS*123
2SIS*124
2SIS*125
2SIS*126
2SIS*127

Category: C **Class: 1**

System: 11 - Safety Injection

Function: These high head safety injection (HHSI) header check valves must open to provide a flow path from the HHSI Pumps to the reactor coolant system (RCS) hot legs during a safety injection. The valves also serve as Class 1 to Class 2 RCS boundary barrier valves.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation. Their safety position is open for HHSI. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the HHSI Pumps will not develop the required flow. During cold shutdowns, full stroke exercising in the open direction cannot be performed because this could result in low-temperature overpressurization of the RCS. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open during refueling outages per 2OST-11.14B (HHSI Full Flow Test).

NOTE: Bi-directional exercising in the non-safety related closed direction will be satisfied in conjunction with leakage testing of [2SIS*128 and 129] per 2OST-11.16 (Leakage Testing RCS PIV's) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program

References: ISTC-3510, ISTC-3522(c) and ISTC-5221(a).

NUREG-1482, Section 4.1.3.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 24

Valve No(s): 2SIS*128
2SIS*129

Category: A/C **Class:** 1

System: 11 - Safety Injection

Function: These low head safety injection (LHSI) header check valves must open to provide a flow path from the LHSI Pumps to the reactor coolant system (RCS) hot legs during a safety injection. The valves also serve as Class 1 to Class 2 RCS boundary barrier valves and function as pressure isolation valve (PIV's) that isolate the LHSI piping from the higher pressure RCS.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation and are pressure isolation valve (PIV's) that isolate the LHSI piping from the higher pressure RCS. Their safety position is open for LHSI. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the LHSI Pumps will not develop enough head to overcome RCS pressure. During cold shutdowns, full -stroke exercising in the open direction cannot be performed because flow testing would require injection to the RCS where there is not sufficient volume to receive the additional inventory. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages." Full stroke exercising in the closed direction can only be performed by leak testing because no other practical means is available to verify check valve closure. This involves the installation and removal of special test equipment in order to perform the leakage testing. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak rate testing at each refueling outage, if no other practical means is available. ISTC-3522(c) states, "If exercising is not practicable during plant operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open per 2OST-11.14A (LHSI Full Flow Test) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. Full-stroke exercised closed by leakage testing during refueling outages per 2OST-11.16 (Leakage Testing RCS PIV's).

References: ISTC-3510, ISTC-3522(c) and ISTC-5221(a).

NUREG-1482, Section 4.1.3.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION _25_

Valve No(s): 2SIS*130

Category: _A/C_ **Class:** _2_

System: 11 - Safety Injection

Function: This low head safety injection (LHSI) inside containment isolation check valve must close to provide containment isolation of penetration no. 61. It must open for LHSI hot leg recirculation. The valve also serves as a pressure isolation valve (PIV).

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally closed to provide reactor coolant system (RCS) pressure boundary isolation as a pressure isolation valve (PIV). Its safety position is closed for containment isolation of penetration no. 61, and open for LHSI hot leg recirculation. During plant operation when the RCS is at normal operating pressure, full stroke exercising this check valve in the open direction with flow cannot be performed because the Low Head Safety Injection Pumps cannot develop enough head to overcome RCS pressure. Therefore, full stroke exercising in the open and closed directions can only be verified by cycling the mechanical weight loaded swing arm of the check valve. However, because this check valve is located inside the slightly sub-atmospheric containment, it is not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed cold shutdowns." In addition, because downstream check valves which isolate the LHSI system from the RCS may not be leak tight, and because the RCS may still be pressurized (up to 360 psig – RHR limit) during cold shutdown, full stroke exercising by cycling the mechanical weight loaded swing arms in the open and closed directions may not be possible during cold shutdown if back leakage through the downstream check valves is present. In addition, there could also be a head of water creating a d/p against the check valve disk due to elevation differences between downstream piping and the reactor coolant system (RCS). Therefore, in order to cycle the mechanical weight loaded swing arm of the check valve, the d/p may have to be equalized or removed to ensure repeatability of breakaway torque test results for IST trending purposes which is considered to be an additional hardship that is not practicable during cold shutdowns.

In addition, full stroke exercising in the open direction with flow cannot be performed during cold shutdown because flow testing would require injection to the RCS where there is not sufficient volume to receive the additional inventory. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

VALVE REFUELING OUTAGE JUSTIFICATION 25

Alternate Test: Full-stroke exercised open with flow during refueling outages per 2OST-11.14A (LHSI Full flow Test). Full-stroke exercised closed by observation of its mechanical weight loaded swing arm upon cessation of flow during refueling outages per 2OST-11.14A (LHSI Full Flow Test). The valve is also leak tested as required by Tech. Specs. for PIVs per 2OST-11.16 (Leakage Testing RCS PIV's).

References: ISTC-3510, ISTC-3522(b) and ISTC-3522(c).

VALVE REFUELING OUTAGE JUSTIFICATION 26

Valve No(s): 2SIS*132
2SIS*133

Category: A/C **Class:** 2

System: 11 - Safety Injection

Function: These low head safety injection (LHSI) inside containment isolation check valves must close to prevent reverse flow from the opposite train of LHSI during an accident and also serve a reactor coolant system (RCS) pressure boundary isolation function as pressure isolation valves (PIV's). They must also close to provide containment isolation of penetration no's. 60 and 62. They must open for LHSI cold leg recirculation.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed to provide reactor coolant system (RCS) pressure boundary isolation as pressure isolation valves (PIV's). Their safety positions are closed to prevent reverse flow from the opposite train of LHSI during an accident and for containment isolation of penetration no's. 60 and 62. Their safety positions are also open for LHSI cold leg recirculation. During plant operation when the RCS is at normal operating pressure, full stroke exercising in the open direction with flow cannot be performed because the Low Head Safety Injection Pumps cannot develop enough head to overcome RCS pressure. Therefore, full stroke exercising in the open and closed directions can only be verified by cycling the mechanical weight loaded swing arms of the check valves. However, because these check valves are located inside the slightly sub-atmospheric containment, they are not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns." In addition, because downstream check valves which isolate the LHSI system from the RCS may not be leak tight, and because the RCS may still be pressurized during cold shutdown, full stroke exercising by cycling the mechanical weight loaded swing arms in the open and closed directions may not be possible during cold shutdown if back leakage through the downstream check valves is present.

In addition, there could also be a head of water creating a d/p against the check valve disk due to elevation differences between downstream piping and the reactor coolant system (RCS). Therefore, in order to cycle the mechanical weight loaded swing arm of the check valve, the d/p may have to be equalized or removed to ensure repeatability of breakaway torque test results for IST trending purposes which is considered to be an additional hardship that is not practicable during cold shutdowns. In addition, full stroke exercising in the open

VALVE REFUELING OUTAGE JUSTIFICATION 26

Basis for ROJ: (Cont.) direction with flow cannot be performed during cold shutdown because flow testing would require injection to the RCS where there is not sufficient volume to receive the additional inventory. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open with flow during refueling outages per 2OST-11.14A (LHSI Full Flow Test). Full-stroke exercised closed by observation of its mechanical weight loaded swing arm upon cessation of flow during refueling outages per 2OST-11.14A (LHSI Full Flow Test). The valves are also leak tested as required by Tech. Specs. for PIVs per 2OST-11.16A (Leakage Testing RCS PIV's).

References: ISTC-3510, ISTC-3522(b) and ISTC-3522(c).

VALVE REFUELING OUTAGE JUSTIFICATION 27

Valve No(s): 2SIS*134
2SIS*135
2SIS*136
2SIS*137
2SIS*138
2SIS*139

Category: C **Class:** 1

System: 11 - Safety Injection

Function: These high head safety injection (HHSI) header check valves must open to provide a flow path from the HHSI Pumps to the reactor coolant system (RCS) cold legs during a safety injection. The valves also serve as Class 1 to Class 2 RCS boundary barrier valves.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation. Their safety position is open for HHSI. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the HHSI Pumps will not develop the required flow. During cold shutdowns, full stroke exercising in the open direction cannot be performed because this could result in low-temperature over-pressurization of the RCS. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open during refueling outages per 2OST-11.14B (HHSI Full Flow Test).

NOTE: Bi-directional exercising in the non-safety related closed direction will be satisfied by measuring leakage across the check valves while the RCS is somewhat pressurized per 2OST-11.16 (Leakage Testing RCS PIV's) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

References: ISTC-3510, ISTC-3522(c) and ISTC-5221(a).

NUREG-1482, Section 4.1.3.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 28

Valve No(s): 2SIS*141 2SIS*142
2SIS*145 2SIS*147
2SIS*148 2SIS*151

Category: A/C **Class:** 1

System: 11 - Safety Injection

Function: These Safety Injection (SI) Accumulator Series Discharge Check Valves are required to open upon depressurization of the Reactor Coolant System (RCS) to allow water from the SI Accumulators to be injected into the RCS during a loss of coolant accident (LOCA). [2SIS*141 and 145] must also open to provide a flow path for the Residual Heat Removal (RHR) System when it is placed into service for cool down of the plant to cold shutdown conditions. These valves also serve as RCS pressure isolation valves (PIVs).

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed as pressure isolation valves (PIV's) during plant operation in order to isolate the lower pressure Safety Injection (SI) Accumulators from the high pressure RCS. In the reverse direction, these valves do not have installed instrumentation, or weighted arms. Therefore, the only way to verify closure is with a leak test. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage, if no other practical means is available. Their safety position in the open direction is for passive low-pressure injection of the SI Accumulators into the RCS cold legs during a LOCA. An additional safety position for [2SIS*141 and 145] is open to support RHR system operation during cool down of the plant to cold shutdown conditions. Full stroke exercising in the open direction cannot be performed during plant operation because the RCS is at a higher pressure than the SI Accumulators. Full-stroke exercising of all six check valves in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed during cold shutdowns because of a lack of installed instrumentation to measure flow, and due to a possibility of developing low temperature overpressurization of the RCS. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open by measuring a level change over time as the SI Accumulators are dumped per 2OST-11.15A, B or C (SI Accumulator Discharge Check Valve Stroke Tests) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. Full-stroke exercised closed by leakage testing during refueling outages per 2OST-11.4 and 11.5 (Accumulator Check Valve Leakage Tests).

VALVE REFUELING OUTAGE JUSTIFICATION 28

References: ISTC-3510, ISTC-3522(c), ISTC-5221(a) and ISTC-5222.
NUREG-1482, Sections 4.1.3 and 4.1.6.
ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 29

Valve No(s): 2SIS*545
2SIS*546

Category: C **Class:** 1

System: 11 - Safety Injection

Function: These low head / high head safety injection (LHSI / HHSI) header check valves must open to provide a flow path from either the LHSI Pumps or HHSI Pumps to the reactor coolant system (RCS) "B" and "C" loop hot legs during a safety injection.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation. Their safety position is open for LHSI and HHSI. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the LHSI Pumps will not develop enough head to overcome RCS pressure. In addition, full-stroke exercising in the open direction cannot be performed using the HHSI Pumps because they will not develop the required flow. Full stroke exercising in the open direction cannot be performed during cold shutdowns using the LHSI Pumps because this would require injection to the RCS where there is not sufficient volume to receive the additional inventory. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open per 2OST-11.14A (LHSI Full Flow Test) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

NOTE: Bi-directional exercising in the non-safety related closed direction will be satisfied by measuring leakage across the check valves while the RCS is pressurized per 2OST-11.16 (Leakage Testing RCS PIV's) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

References: ISTC-3510, ISTC-3522(c), ISTC-5221(a) and ISTC-5222.

NUREG-1482, Section 4.1.3.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 30

Valve No(s): 2SIS*547

Category: C **Class:** 1

System: 11 - Safety Injection

Function: This high head safety injection (HHSI) header check valve must open to provide a flow path from the HHSI Pumps to the reactor coolant system (RCS) "A" loop hot leg during a safety injection.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally closed during plant operation. Its safety position is open for HHSI. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the HHSI Pumps will not develop the required flow. During cold shutdowns, full stroke exercising in the open direction cannot be performed because this could result in low-temperature over-pressurization of the RCS. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open during refueling outages per 2OST-11.14B (HHSI Full Flow Test).

NOTE: Bi-directional exercising in the non-safety related closed direction will be satisfied by measuring leakage across the check valves while the RCS is somewhat pressurized per 2OST-11.16 (Leakage Testing RCS PIV's) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

References: ISTC-3510, ISTC-3522(c), ISTC-5221(a) and ISTC-5222.

NUREG-1482, Section 4.1.3.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 31

Valve No(s): 2SIS*548
2SIS*550
2SIS*552

Category: C **Class:** 1

System: 11 - Safety Injection

Function: These low head / high head safety injection (LHSI / HHSI) header check valves must open to provide a flow path from either the LHSI Pumps or HHSI Pumps to the reactor coolant system (RCS) cold legs during a safety injection.

Test Requirement: Per IST-3510, "Exercising Test Frequency," check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation. Their safety position is open for LHSI and HHSI. During plant operation when the RCS is at normal operating pressure, full-stroke exercising in the open direction by initiating the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, cannot be performed because the LHSI Pumps will not develop enough head to overcome RCS pressure. In addition, full-stroke exercising in the open direction cannot be performed using the HHSI Pumps because they will not develop the required flow. Full -stroke exercising in the open direction cannot be performed during cold shutdowns using the LHSI Pumps because this would require injection to the RCS where there is not sufficient volume to receive the additional inventory. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open per 2OST-11.14A (LHSI Full Flow Test) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

NOTE: Bi-directional exercising in the non-safety related closed direction will be satisfied by measuring leakage across the check valves while the RCS is somewhat pressurized per 2OST-11.16 (Leakage Testing RCS PIV's) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

References: ISTC-3510, ISTC-3522(c), ISTC-5221(a) and ISTC-5222.

NUREG-1482, Section 4.1.3.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 32

Valve No(s): 2SIS*894
2SIS*895

Category: C **Class:** 2

System: 11 - Safety Injection

Function: These low-head safety injection (LHSI) pump mini-flow recirc check valves are normally closed and must open to provide a minimum flow path for each LHSI pump during low-flow conditions in order to protect the pumps from damage. They are also required to close to prevent reverse flow from the opposite train LHSI pump during similar low-flow conditions.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation. Their safety positions are open for LHSI pump protection during low-flow conditions, and closed to prevent reverse flow from the opposite train LHSI pump during similar low-flow conditions. Full-stroke exercising in the open direction is performed quarterly during LHSI pump testing. Due to the presence of a restricting orifice in the line between each LHSI pump and its opposite recirc check valve, verification of check valve closure based on a potential change in pump flow rate when a downstream flow path is opened up is not practical. Therefore, full-stroke exercising in the closed direction can only be performed by leak testing because no other practical means is available to verify check valve closure. Although a leak test could be performed during plant operation or during cold shutdown, extensive test equipment is required to be set up (i.e., water test panel, hoses, pressure gauge and regulator, and water supply accumulator). NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," states the NRC staff has determined that the need to set up test equipment constitutes adequate justification to defer reverse flow testing of a check valve to a refueling outage. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages".

Alternate Test: Full-stroke exercised open quarterly per 2OST-11.1 and 2 (LHSI Pump Tests). Full-stroke exercised closed by leakage testing during refueling outages per 2BVT 1.47.11 (Safety Injection and Charging System Containment Penetration Integrity Test)

References: ISTC-3510 and ISTC-3522(c).
NUREG-1482, Section 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 33

Valve No(s): 2SIS*MOV836

Category: A **Class:** 2

System: 11 - Safety Injection

Function: This high head safety injection (HHSI) to cold leg injection header outside containment isolation valve must close to provide containment isolation of penetration no. 34. It must open to establish a flow path to the reactor coolant system (RCS) cold legs when transferring to the cold leg recirculation mode.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: This valve is normally closed. Its safety position is closed for containment isolation of penetration no. 34, and open for cold leg recirculation. Full-stroke exercising in the open and closed directions cannot be performed during plant operation because this will inject relatively cold water into the RCS cold legs and cause thermal shock to system piping and components which will result in an increased probability of system and component failures. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns." In addition, full-stroke exercising in the open and closed directions may not be possible during cold shutdown if the charging system is in service to support operation of a Reactor Coolant Pump (RCP). Cycling this valve open and closed with a Charging Pump operating to support RCP operation would cause significant changes in pressures and flows to the RCP seals, resulting in seal damage. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to stroke these valves, the charging system and RCP's would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages."

Alternate Test: This valve may be full-stroke exercised open and closed in accordance with ASME OM Code Case OMN-1 during cold shutdowns when the reactor coolant pumps are secured, or at least during refueling outages per 2OST-1.10F (Cold Shutdown Valve Exercise Test). However, since it is ranked as a low safety significant valve that does not have additional exercising requirements per Paragraph 3.6.2 of OMN-1, its exercise frequency has been extended to refueling per OMN-1 Paragraph 3.6.1. In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since this valve does not have any plant safety analysis limits.

VALVE REFUELING OUTAGE JUSTIFICATION 33

References: ISTC-3510, ISTC-3521(c) and ISTC-3521(e).
NUREG-1482, Section 3.1.1.4.
OMN-1 Paragraphs 3.6.1 and 3.6.2.

VALVE REFUELING OUTAGE JUSTIFICATION 34

Valve No(s): 2SIS*MOV869A
2SIS*MOV869B

Category: A **Class:** 2

System: 11 - Safety Injection

Function: These high head safety injection (HHSI) to hot leg injection header outside containment isolation valves must close to provide containment isolation of penetration no's. 7 and 17. They must open to establish a flow path to the reactor coolant system (RCS) hot legs when transferring to the hot leg recirculation mode and must re-close when transferring back to the cold leg recirculation mode.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally closed. Their safety positions are closed for containment isolation of penetration no's. 7 and 17, and open and closed for hot and cold leg recirculation. Full-stroke exercising in the open and closed directions cannot be performed during plant operation because this will inject relatively cold water into the RCS cold legs and cause thermal shock to system piping and components which will result in an increased probability of system and component failures. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns." In addition, full-stroke exercising in the open and closed directions may not be possible during cold shutdown if the charging system is in service to support operation of a Reactor Coolant Pump (RCP). Cycling these valves open and closed with a Charging Pump operating to support RCP operation would cause significant changes in pressures and flows to the RCP seals, resulting in seal damage. Shutting down the charging system during RCP operation while in cold shutdown would secure seal injection water to the RCP seals, resulting in seal damage. In order to stroke these valves, the charging system and RCP's would both have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages."

VALVE REFUELING OUTAGE JUSTIFICATION 34

Alternate Test: These valves may be full-stroke exercised open and closed in accordance with ASME OM Code Case OMN-1 during cold shutdowns when the reactor coolant pumps are secured, or at least during refueling outages per 2OST-11.14B (HHIS Full Flow Test) and recorded in 2OST-1.10F (Cold Shutdown Valve Exercise Test). However, since they are ranked as low safety significant valves that do not have additional exercising requirements per Paragraph 3.6.2 of OMN-1, their exercise frequency may be extended to refueling per OMN-1 Paragraph 3.6.1. In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since these valves do not have any plant safety analysis limits.

References: ISTC-3510, ISTC-3521(c) and ISTC-3521(e).

NUREG-1482, Section 3.1.1.4.

OMN-1 Paragraphs 3.6.1 and 3.6.2.

VALVE REFUELING OUTAGE JUSTIFICATION 35

Valve No(s): 2SIS*MOV8889

Category: A **Class: 2**

System: 11 - Safety Injection

Function: This low head safety injection (LHSI) to hot leg injection header outside containment isolation valve must close to provide containment isolation of penetration no. 61. It must open to establish a flow path to the reactor coolant system (RCS) hot legs when transferring to the hot leg recirculation mode and must re-close when transferring back to the cold leg recirculation mode.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: This valve is normally de-energized closed per technical specifications. Its safety position is closed for containment isolation of penetration no. 61, and open and closed for hot and cold leg recirculation. Full-stroke exercising in the open and closed directions cannot be performed during plant operation when the RCS is at normal operating pressure because failure of this valve in the open position could result in over-pressurization of the low pressure portion of the LHSI system piping if downstream check valves to the RCS are not leak tight. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns." In addition, full-stroke exercising in the open and closed directions may not be possible during cold shutdown if the RCS is still pressurized during cold shutdown, and back leakage through downstream check valves from the RCS still exists. Setting up the plant conditions (RCS pressure) necessary to permit exercising this valve without threat of over-pressurizing the low pressure portion of the LHSI system piping is considered to be an additional hardship that is not practicable during cold shutdowns. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages."

In addition, the PRA Group has evaluated the demand failure rates for this high safety significant MOV based on the risk associated with exercising it per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

Alternate Test: Full-stroke exercised open and closed in accordance with ASME OM Code Case OMN-1 during cold shutdowns when the RCS is depressurized, or at least during refueling outages per 2OST-1.10H (Cold Shutdown Valve Exercise Test). In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since this valve does not have any plant safety analysis limits.

VALVE REFUELING OUTAGE JUSTIFICATION 35

References: ISTC-3510, ISTC-3521(c) and ISTC-3521(e).
OMN-1 Paragraph 3.6.1.

VALVE REFUELING OUTAGE JUSTIFICATION 36

Valve No(s): 2CVS*93

Category: A/C **Class:** 2

System: 12 - Containment Vacuum

Function: This Containment Airborne Activity Radiation Monitor Pump discharge header and post-accident sampling system (PASS) inside containment isolation check valve must close to provide containment isolation of penetration no. 43. It must re-open to permit sampling of the containment atmosphere after an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally open during plant operation to support continuous sampling of the containment atmosphere. Its safety position is closed for containment isolation of penetration no. 43, and open for post-accident sampling of the containment atmosphere. Full stroke exercising in the closed direction can only be performed by leak testing because no other practical means is available to verify check valve closure. Because this check valve is located inside the slightly sub-atmospheric containment, it is not accessible to perform leak testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. In addition, installation and removal of test equipment in order to perform leakage testing, if attempted during cold shutdowns, could result in a delayed plant startup. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak rate testing at each refueling outage, if no other practical means is available. ISTC-3522(c) states, "If exercising is not practicable during operation at power and during cold shutdowns, it shall be performed during refueling outages."

VALVE REFUELING OUTAGE JUSTIFICATION 36

Alternate Test: Full-stroke exercised closed by leakage testing during refueling outages per 2OST-47.121 and 2BVT 1.47.5 (Type-C Leak Tests) at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program.

NOTE: Per NUREG-1482, Section 4.4.1, "Post-Accident Sampling System Valves," valves in the PASS that perform a containment isolation function are required to be included in the IST Program as Category A or A/C and be tested to Code requirements (for the containment isolation function) except where relief has been granted. The remaining valves in the PASS would typically be tested as required by the technical specifications or other documents and need not be included in the IST Program. However, the NRC recommends that if the licensee elects to include these valves in the IST Program, a note be included that the testing is beyond the scope of 10CFR50.55a. Although not required per NUREG-1482, Section 4.4.1, the opening function of this check valve has been included in the BVPS-2 IST Program because it has a function to re-open to sample the containment atmosphere following an accident. Based on the above, however, full-stroke exercising in the open direction is not required to meet the requirements of 10CFR50.55a which includes ISTC-5221(a) and NUREG-1482, Section 4.1.3.

Full-stroke exercised open during normal system operation by observing Containment Airborne Activity Radiation Monitor performance per 2OM-54.3, Station Log L5-133 in accordance with ISTC-3550, "Valves in Regular Use."

References: ISTC-3510, ISTC-3522(c), ISTC-3550, ISTC-5221(a) and ISTC-5222.

NUREG-1482, Rev.1, Sections 4.1.3, 4.1.6 and 4.4.1.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 37

Valve No(s): 2RSS*MOV154C
2RSS*MOV154D

Category: B **Class:** 2

System: 13 - Recirculation Spray

Function: These recirculation spray pump recirculation valves must open to provide a minimum recirculation flow path for [2RSS*P21C and D] when pump flow rate is low following a CIB or during the recirculation mode of safety injection. They must close to isolate the recirculation flow path so that all recirculation spray flow is directed to the spray rings in containment following a CIB.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally closed. Their safety positions are open to provide a minimum recirculation flow path for C and D recirculation spray pumps if flow rate is low following a CIB or during the recirculation mode of safety injection, and closed to isolate the recirculation flow path so that all recirculation spray flow is directed to the spray rings in containment following a CIB. These valves do not have a control switch from which to stroke each valve. Their operation is strictly automatic as determined by recirculation spray pump flow rate. In order to cycle these valves open and closed for timing, recirculation spray pump flow must be initiated or a jumper wire must be installed in the circuitry of each valve. Installing a jumper creates a hardship as described in NUREG-1482, Section 3.1.1, "Deferring Valve Testing to Each Cold Shutdown or Refueling Outage." In addition, establishing recirculation spray pump flow can only be accomplished during refueling outages as described in the "Pump Outline Table" for [2RSS*P21C and D]. ISTC-3521(e) states, "if exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages.

In addition, the PRA Group has evaluated the demand failure rates for these high safety significant MOVs based on the risk associated with exercising them per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

Alternate Test: Full-stroke exercised open and closed in accordance with ASME OM Code Case OMN-1 during refueling outages per 2BVT 1.13.5 (Recirculation Spray Pump Test) or 2OST-1.10H (Cold Shutdown Valve Exercise Test). In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since these valves do not have any plant safety analysis limits.

VALVE REFUELING OUTAGE JUSTIFICATION 37

References: ISTC-3510 and ISTC-3521(e).
NUREG-1482, Section 3.1.1.
OMN-1 Paragraph 3.6.1.

VALVE REFUELING OUTAGE JUSTIFICATION 38

Valve No(s): 2CCP*4
2CCP*5
2CCP*6

Category: C **Class:** 3

System: 15 - Primary Component Cooling Water

Function: These Primary Component Cooling Water (CCP) Pump discharge check valves must open to supply CCP cooling water to the Residual Heat Removal (RHR) Heat Exchangers in order to achieve cold shutdown conditions following an accident. They must close to prevent reverse flow through the idle CCP Pump(s).

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally open during plant operation with 4000-6000 gpm flow through them. Their safety positions are open to provide CCP cooling to the RHR Heat Exchangers to support cool down of the plant to cold shutdown conditions, and closed to prevent reverse flow through the idle CCP Pump(s). Full-stroke exercising in the open direction by passing > 6457 gpm flow cannot be performed during plant operation because normal plant operating loads do not support enough CCP flow to develop the maximum required accident condition flow rate in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3. In order to increase flow above the maximum required accident condition flow rate, the manual throttle valves at the discharge of the RHR Heat Exchangers would require additional throttling in the open direction. Since these valves are located inside the slightly subatmospheric containment, they are not accessible during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. In addition, full-stroke exercising in the open direction may not be possible during cold shutdown if a Reactor Coolant Pump (RCP) is operating. In order to support RCP operation, reactor coolant system (RCS) temperature must be greater than 100F. Increasing CCP cooling flow through the RHR Heat Exchangers would reduce RCS temperature and could require shutdown of a RCP. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. In addition, setting up the plant conditions necessary to align the CCP system through the RHR Heat Exchangers as described above could also result in a delayed plant startup. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outage."

VALVE REFUELING OUTAGE JUSTIFICATION 38

Alternate Test: Full-stroke exercised closed quarterly per 2OST-15.1, 2OST-15.2 and 2OST-15.3 (CCP Pump Tests). Full-stroke exercised open and closed during cold shutdowns when the RCP's are secured per 2OST-15.1, 2OST-15.2 and 2OST-15.3 (CCP Pump Tests), or at least during refueling outages per 2OST-15.5(A)(B) (Refueling Tests of CCP Pumps) or individual 2OST-15.1, 2OST-15.2 or 2OST-15.3 (CCP Pump Tests).

References: ISTC-3510 and ISTC-3522(c) and ISTC-5221(a).

NUREG-1482, Sections 3.1.1.4 and 4.1.3.

VALVE REFUELING OUTAGE JUSTIFICATION _39_

Valve No(s): 2CCP*AOV107A
2CCP*AOV107B
2CCP*AOV107C

Category: _A_ **Class:** _3_

System: 15 - Primary Component Cooling Water

Function: These Reactor Coolant Pump (RCP) Thermal Barrier Cooler primary component cooling water (CCP) outlet isolation valves must close to isolate the lower pressure CCP system from the higher pressure reactor coolant system (RCS) in the event of a primary loop to CCP leak in the RCP Thermal Barrier Cooler.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally open to allow return of CCP cooling water from the RCP Thermal Barrier Coolers during RCP operation. Their safety position is closed in the event of a primary loop to CCP leak in the RCP Thermal Barrier Cooler. Full or part-stroke exercising in the closed direction cannot be performed during plant operation because this would interrupt or reduce flow of cooling water to the RCP seals. This could result in damage to the RCP seals. In addition, failure of these valves in the closed position could also result in a plant shutdown to avoid or due to RCP seal damage. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns." In addition, full-stroke exercising in the closed direction may not be possible during cold shutdown if a RCP is operating. In order to stroke these valves without the potential risk in damage to the RCP seals, the RCP's would have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not.be stopped for cold shutdown valve testing. The affected valves should be tested during outages when the RCP's are secured and during refueling outages, but not more often than once every 92 days. ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages."

Alternate Test: Full-stroke exercised and timed closed and fail-safe tested closed during cold shutdowns when the RCP's are secured, or at least during refueling outages per 2OST-1.10E (Cold Shutdown Valve Exercise Test).

References: ISTC-3510, ISTC-3521(c), ISTC-3521(e) and ISTC-3560.
NUREG-1482, Section 3.1.1.4.

VALVE REFUELING OUTAGE JUSTIFICATION 40

Valve No(s):

2CCP*MOV150-1	2CCP*MOV156-1
2CCP*MOV150-2	2CCP*MOV156-2
2CCP*MOV151-1	2CCP*MOV157-1
2CCP*MOV151-2	2CCP*MOV157-2

Category: A **Class:** 2

System: 15 - Primary Component Cooling Water

Function: These primary component cooling water (CCP) supply to and return from containment inside and outside containment isolation valves must close to provide containment isolation of penetration no's. 1, 2, 4 and 5. They must open, post-accident following reset of a CIB, to support cooling of the Residual Heat Removal (RHR) Heat Exchangers during shutdown to cold shutdown conditions.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category A valves shall be tested nominally every 3 months.

Basis for ROJ: These valves are normally open to provide CCP cooling water for various components inside containment. Their safety positions are closed for containment isolation of penetration no's. 1, 2, 4 and 5, and open to support cooling of the RHR Heat Exchangers during shutdown to cold shutdown conditions. Full-stroke exercising in the closed direction cannot be performed during plant operation because this would interrupt flow of cooling water to the Reactor Coolant Pump (RCP) seals. This could result in damage to the RCP seals. In addition, failure of these valves in the closed position could also result in a plant shutdown to avoid or due to RCP seal damage. ISTC-3521(c) states, "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns." In addition, full-stroke exercising in the closed direction may not be possible during cold shutdown if a RCP is operating. In order to stroke these valves without the potential risk in damage to the RCP seals, the RCP's would have to be shutdown. Per NUREG-1482, Section 3.1.1.4, "Stopping Reactor Coolant Pumps for Cold Shutdown Valve Testing," the RCP's need not be stopped for cold shutdown valve testing. Therefore, these valves should only be tested when the RCP's are secured.

ISTC-3521(e) states, "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages." However, per NUREG-1449, "Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States," at PWR's, the RHR system is essential to maintaining shutdown safety. If the RHR system is in service in Mode 5 as the operable RCS loops per Technical Specification 3.4.7 or 3.4.8 as applicable, these valves cannot be tested without entering the required action statement which requires immediate restoration of the RCS loop made inoperable. In Mode 6, with water level greater than or equal to 23 feet above the top of the Reactor Vessel flange, only one RHR loop is required to be operable and in operation per Technical Specification 3.9.4. However, if

VALVE REFUELING OUTAGE JUSTIFICATION 40

Basis for ROJ: (Cont.)

the water level is less than 23 feet above the top of the Reactor Vessel flange, two RHR loops are required to be operable and one RHR loop in operation per Technical Specification 3.9.5, and immediate restoration of the inoperable RHR loop shall be initiated. Failure of any valve to re-open during testing at that time would cause a loss of cooling flow for one of the required RCS loops. Therefore, in order to maintain this "defense in depth" strategy for shutdown safety with the RHR System not in service, and based on the fact that these valves cannot be cycled when the RCP's are operating, these valves should only be exercised closed during refueling outages when the core is defueled or while in Mode 6 when the water level above the top of the Reactor Vessel flange is greater than or equal to 23 feet.

In addition, the PRA Group has evaluated the demand failure rates for these high safety significant MOVs based on the risk associated with exercising them per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

Alternate Test:

Full-stroke exercised open and closed in accordance with ASME OM Code Case OMN-1 during refueling outages per 2OST-1.10E (Cold Shutdown Valve Exercise Test). In addition, these MOV's should be stroke time tested when exercised closed since they have a Containment Isolation plant safety analysis limit.

References:

ISTC-3510, ISTC-3521(c) and ISTC-3521(e).

NUREG-1482, Section 3.1.1.4.

NUREG-1449.

Technical Specification 3.4.7, 3.4.8, 3.9.4 and 3.9.5.

OMN-1 Paragraph 3.6.1.

VALVE REFUELING OUTAGE JUSTIFICATION 41

Valve No(s): 2CCP*289
2CCP*290
2CCP*291

Category: A/C **Class:** 3

System: 15 - Primary Component Cooling Water

Function: These primary component cooling water (CCP) supply to Reactor Coolant Pump (RCP) Thermal Barrier Cooler check valves must close to isolate the lower pressure CCP system from the higher pressure reactor coolant system (RCS) in the event of a primary loop to CCP leak in the RCP Thermal Barrier Cooler.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally open during RCP operations to supply CCP cooling water to the RCP Thermal Barrier Coolers. Their safety position is closed in the event of a primary loop to CCP leak in the RCP Thermal Barrier Coolers. Full stroke exercising in the closed direction can only be performed by leak testing because no other practical means is available to verify check valve closure. Leak testing to verify check valve closure cannot be performed during plant operation because these check valves are located inside the slightly sub-atmospheric containment which is not accessible during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. In addition, installation and removal of test equipment in order to perform leakage testing, if attempted during cold shutdowns, could result in a delayed plant startup. Leak testing would also require the removal of the RCPs from service. NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak rate testing at each refueling outage, if no other practical means is available. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed by leakage testing during refueling outages per 2BVT 1.60.6 (ASME XI Check Valve Reverse Flow Test).

NOTE: Bi-directional exercising in the non-safety related open direction is satisfied during normal system operation of the RCP's since temperature parameters associated with the RCPs are continuously monitored per ISTC-3550.

References: ISTC-3510, ISTC-3522(c) and ISTC-3550.
NUREG-1482, Section 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 42

Valve No(s): 2CCP*352

Category: C **Class:** 3

System: 15 - Primary Component Cooling Water

Function: This primary component cooling water (CCP) check valve is located in the return line from the Containment Instrument Air Compressors and must close to isolate these non-safety related pieces of equipment from the safety class 3 CCP piping when upstream motor operated valves (MOV's) close on a CIA.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally open during operation of the Containment Instrument Air Compressors. Its safety position is closed to isolate the non-safety related compressors from the safety class 3 CCP piping. Full stroke exercising in the closed direction can only be performed by leak testing because no other practical means is available to verify check valve closure. Leak testing to verify check valve closure cannot be performed during plant operation because this would cause extended interruption of CCP cooling water to the Containment Instrument Air Compressors. In addition, installation and removal of test equipment in order to perform leakage testing, if attempted during cold shutdowns, could result in a delayed plant startup. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak rate testing at each refueling outage, if no other practical means is available. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed by leakage testing during refueling outages per 2BVT 1.60.6 (ASME XI Check Valve Reverse Flow Test).

NOTE: Bi-directional exercising in the non-safety related open direction may be satisfied during normal system operation of CCP cooling water to the CNMT Air Compressors per ISTC-3550. However, this check valve is currently maintained "out of service" by a Shift Manager clearance that isolates it from the CCP System because the CNMT Air Compressors are currently retired in place and do not require any CCP cooling.

References: ISTC-3510, ISTC-3522(c) and ISTC-3550.

NUREG-1482, Section 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 43

Valve No(s):	2MSS*352	2MSS*18
	2MSS*19	2MSS*199
	2MSS*20	2MSS*196

Category: C **Class:** 3

System: 21 - Main Steam

Function: These Turbine Driven Auxiliary Feedwater Pump (TDAFWP) steam supply check valves must open to allow steam flow to operate the TDAFWP during an accident. They must close to prevent Steam Generator cross-connection during a high energy line break (HELB) accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation. Their safety positions are open to support operation of the TDAFWP and closed during a HELB accident. The required steam flow to achieve a full-stroke exercise in the open direction may be achieved by initiating a minimum TDAFWP flow rate of 250 gpm. This can be achieved quarterly per 2OST-24.4 (TDAFWP Test at Recirc Flow) or at refueling per 2OST-24.4A (TDAFWP and check valve test).

These check valves do not have installed instrumentation or weighted arms to allow testing in the reverse direction. Therefore, the only way to verify closure is by disassembly during refueling outages. Per ISTC-5221(c), "If the test methods in ISTC-5221(a) and ISTC-5221(b) are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly inspection program shall be used to verify valve obturator movement. Per ISTC-5222, BVPS-2 has elected to test these check valves in accordance with Mandatory Appendix II, Check Valve Condition Monitoring (CVCM) Program. Further guidelines for disassembly and inspection are provided in NUREG-1482, Section 4.1.4. Therefore per ISTC-3522(c), "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Each check valve will be full-stroke exercised open and closed during refueling outages by way of a disassembly and inspection per 1/2CMP-75-ENERTECH CHECK-1M at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. If the sample valve fails its inspection, then ISTC-5224 will be applied to determine if the remaining valves in the group should be disassembled and inspected during the same outage. As a PMT following valve re-assembly, the inspected valve will be exercised in the open direction during the Comprehensive Pump Test of [2FWE*P22] per 2OST-24.4A (TDAFWP and Check Valve Test) during refueling.

References: ISTC-3510, ISTC-3522(c), ISTC-5221(c), ISTC-5222 and ISTC-5224.

NUREG-1482, Section 4.1.4.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 44

Valve No(s): 2SVS*80
2SVS*81
2SVS*82

Category: C **Class:** 2

System: 21 - Main Steam (Vents)

Function: These Steam Generator residual heat release check valves must open to allow steam flow from the Steam Generators to atmosphere via the residual heat release path to aid in removal of all sensible and core decay heat after a reactor shutdown. They must close to prevent Steam Generator cross-connection during a high energy line break (HELB) accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation. Their safety positions are open to provide a residual heat release flow path to atmosphere and closed during a HELB accident. Full stroke exercising in the open direction cannot be performed during plant operation because a reduction in power would be required in order to prevent exceeding full power limitations. During cold shutdowns, full stroke exercising in the open direction cannot be performed because there is not motive force (steam flow) to open the check valves. It is not desirable to forward stroke exercise these check valves with maximum required accident condition flow while shutting down to cold shutdown or during startup from cold shutdown when steam flow is available in Mode 3, because a possible uncontrolled cool down could occur outside of Technical Specification and administrative limits, which if exceeded, could create positive reactivity. In addition, these check valves do not have installed instrumentation or weighted arms to allow testing in the forward or reverse directions. Therefore, the only way to verify full-stroke opening and closure is by disassembly during refueling outages. Per ISTC-5221(c), "If the test methods in ISTC-5221(a) and ISTC-5221(b) are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly examination program shall be used to verify valve obturator movement." Per ISTC-5222, BVPS-1 has elected to test these check valves in accordance with Mandatory Appendix II, Check Valve Condition Monitoring (CVCM) Program. Further guidelines for disassembly and inspection are provided in NUREG-1482, Section 4.1.4.

Alternate Test: Maintenance is to disassemble and inspect each check valve in the open and closed directions (full stroke) per 1/2 CMP-75-ENERTECH CHECK-1M at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. If a sample valve fails its inspection, then ISTC-5224 will be applied to determine if the remaining valves in the group should be disassembled and inspected during the same outage. As a PMT following valve re-assembly, a part-stroke exercise in the open direction will be performed per 2OM-50.4.M (Station Startup - Mode 5 to Mode 3).

VALVE REFUELING OUTAGE JUSTIFICATION 44

References:

ISTC-3510, ISTC-5221(c), ISTC-5222 and ISTC-5224.

NUREG-1482, Section 4.1.4.

CR 981791.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 45

Valve No(s): 2FWS*28
2FWS*29
2FWS*30

Category: C **Class:** 2

System: 24 - Main Feedwater

Function: These main feedwater system to Steam Generator inside containment header isolation check valves must close for feedwater isolation of the Steam Generators in the event if a high energy line break (HELB), and to prevent reverse flow to the non-safety related main feedwater system piping during operation of the Auxiliary Feedwater (AFW) Pumps during an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally open during plant operation to provide main feedwater flow to the Steam Generators. Their safety position is closed for feedwater isolation in the event of a HELB and to ensure adequate AFW Pump flow to the Steam Generators during an accident. Full stroke exercising in the closed direction can only be performed by leak testing because no other practical means is available to verify check valve closure. Leak testing to verify check valve closure cannot be performed during plant operation because it involves filling the Steam Generators to ≥85% level and shutting down all feedwater flow to the Steam Generators. In addition, leak testing if attempted during cold shutdowns could result in a delayed plant startup. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak rate testing at each refueling outage, if no other practical means is available. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed by leakage testing during refueling outages per 2OST-24.8 (Feedwater Check Valve Exercise Verification Test).

NOTE: Bi-directional exercising in the non-safety related open direction is satisfied by normal system operation with feedwater flow to the Steam Generators per ISTC-3550.

References: ISTC-3510, ISTC-3522(c) and ISTC-3550.
NUREG-1482, Section 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 46

Valve No(s): 2FWE*99
2FWE*100
2FWE*101

Category: C **Class:** 2

System: 24 - Auxiliary Feedwater

Function: These auxiliary feedwater (AFW) system to Steam Generator inside containment isolation check valves must close to provide containment isolation of penetration no's. 79, 80, and 83. They must open to provide an auxiliary feedwater system flow path to the Steam Generators during an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally closed during plant operation. Their safety positions are closed for containment isolation of penetration no's. 79, 80 and 83, and open for AFW system injection to Steam Generators. Full stroke exercising in the closed direction can only be performed by leak testing because no other practical means is available to verify check valve closure. Leak testing to verify check valve closure cannot be performed during plant operation because it involves filling the Steam Generators to ≥ 85% level and shutting down all flow to the Steam Generators. In addition, leak testing if attempted during cold shutdowns could result in a delayed plant startup. Per NUREG-1482, Section 4.1.6, "Extension of Test Interval to Refueling Outage for Check Valves Verified Closed by Leak Testing," it is acceptable to verify that check valves are capable of closing by performing leak rate testing at each refueling outage, if no other practical means is available. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed by leakage testing during refueling outages per 2OST-24.8A (Auxiliary Feedwater Check Valve Reverse Flow Test). Full-stroke exercising in the open direction is discussed in VCSJ No. 18.

References: ISTC-3510 and ISTC-3522(c)
NUREG-1482, Section 4.1.6.

VALVE REFUELING OUTAGE JUSTIFICATION 47

Valve Mark No(s): 2FWE*FCV122

Category: B/C **Class:** 3

System: 24 - Auxiliary Feedwater

Function: This Turbine-Driven Auxiliary Feedwater Pump (TDAFWP) discharge flow control/check valve has a dual function. This 3-way automatic recirculation control valve acts as both a manual automatic flow control valve in one direction and check valve in the other direction. As a manual automatic flow control valve, it must open to provide approximately 30% recirculation flow for the TDAFWP to prevent pump damage in the event of isolation of an AFW discharge line to the Steam Generators. It must close in order to isolate this same recirculation flow path when full TDAFWP flow is being directed to the Steam Generators during an accident. As a check valve, it must open to provide a flow path from the TDAFWP to the Steam Generators. It must close to prevent reverse flow and feedwater intra-system recirculation through an idle TDAFWP.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency", Active Category B valves and Category C check valves shall be tested nominally every 3 months.

Basis for ROJ: This 3-way automatic recirculation control valve acts as both a manual automatic flow control valve in one direction and check valve in the other direction. It is normally closed as a check valve and normally open as manual automatic flow control valve during plant operation. As a manual automatic flow control valve, its safety position is open for TDAFWP recirculation and closed for isolation of this recirculation flow path. As a check valve, its safety position is open for AFW system injection to the Steam Generators and closed to prevent reverse flow through an idle TDAFWP. In accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3, a full-stroke exercise of the flow control valve function of this valve in the closed direction and the check valve function of this valve in the open direction may be achieved by initiating the maximum required accident condition flow. In order to meet this requirement, a full-flow test of the TDAFWP must be performed at its design flow rate.

The full-flow test of the TDAFW Pump can only be performed in Mode 3, however, it is not practicable to perform this test in Mode 3 during shutdown for or during startup after each cold shutdown for several reasons. At that time, the introduction of relatively cold auxiliary feedwater into the Steam Generators (S/Gs) produces a potential for thermal shock to both the Main Feed Piping (Thermal Sleeves) and the secondary side of the S/Gs. Although the thermal sleeves and S/Gs are designed for thermal shock, exposure of the Station to these events shall be minimized in order to ensure that the benefits of plant life extension can be realized.

VALVE REFUELING OUTAGE JUSTIFICATION 47

Basis for ROJ: (Cont.)

The TDAFW Pump is designed to take suction from the Demineralized Water Storage Tank, [2FWE*TK210]. The water in [2FWE*TK210], however, is not treated for pH or Oxygen. Therefore, it could have some impact on the corrosion rates in the S/G. From a Chemistry perspective, it is preferred to minimize the use of this water while in Modes 1, 2 or 3.

In addition during startup, this test can only be performed once the steam pressure exceeds 600 psig. Testing at this time causes a temperature transient. The turbine draws steam from the S/Gs causing the Reactor Coolant System (RCS) to cool down. In addition, the cold auxiliary feedwater is injected into the S/Gs, causing the RCS to cool even more. This cool down delays startup and is critical path time. At this point in the outage, the only heat source for the RCS is the reactor coolant pumps. Therefore, any cool down is costly in the amount of time required to heat back up again.

Based on the above, performing the full-flow test of the TDAFWP at cold shutdowns is considered to be impracticable. Instead, testing of the TDAFWP will be performed during refueling outages only. Therefore, testing of the flow control valve function of this valve in the closed direction and the check valve function of this valve in the open direction will also be performed at a refueling outage frequency during the Comprehensive pump test. ISTC-3521(e) and ISTC-3522(c) state in part, If exercising is not practicable during operation at power and cold shutdowns, it may be limited to full-stroke exercising during refueling outages".

Alternate Test:

The flow control valve function of this valve in the closed direction will be full-stroke exercised closed and the check valve function of this valve in the open direction will be full-stroke exercised open in Mode 3 during shutdown for or during startup after refueling outages during the Comprehensive Pump Test (CPT) of [2FWE*P22] per 2OST-24.4A (TDAFWP and Check Valve Full-Flow Test). The flow control valve function of this valve in the open direction will be full-stroke exercised open quarterly (although only required every 2 years) per either 2OST-24.4 (TDAFWP Test on Recirculation Flow) during the Group B pump test or per 1OST-24.4A (TDAFWP and Check Valve Full-Flow Test) during the CPT at refueling. The check valve function of this valve in the closed direction is discussed in VCSJ No. 19.

References:

ISTC-3510, ISTC-3521(e), ISTC-3522(c) and ISTC-5221(a).

NUREG-1482, Section 4.1.3.

VALVE REFUELING OUTAGE JUSTIFICATION 48

Valve No(s): 2SWS*57
2SWS*58
2SWS*59

Category: C **Class:** 3

System: 30 - Service Water

Function: These Service Water (SWS) Pump discharge check valves must open to allow cooling water from the river to flow to station loads required during an accident. They must close to prevent reverse flow through an idle SWS Pump.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally open during plant operation. Their safety positions are open to provide SWS cooling to station loads required during an accident, and closed to prevent reverse flow through an idle SWS Pump. Full-stroke exercising in the open direction cannot always be performed during plant operation because normal plant operating loads do not always support enough SWS flow to develop the maximum required accident condition flow in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3. Note that full-stroke exercising in the open direction may still be possible during warm summer months when additional flow paths and heat exchangers are in service, however, this can normally only be accomplished by aligning the SWS system through additional flow paths which are only used for accident conditions and through additional heat exchangers not normally in service. The additional heat exchangers are maintained isolated for biota control to prevent fouling. Placing flow through these additional flow paths and heat exchangers unnecessarily during quarterly or cold shutdown testing could increase the potential for fouling, thereby degrading this part of the SWS system and reducing its reliability in meeting the required flow rates during an accident. In addition, setting up the plant conditions necessary to align the SWS system through additional flow paths and/or heat exchangers as described above is considered to be an additional hardship that is not practicable during cold shutdowns. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open during warm summer months when additional flow paths and heat exchangers are in service per 2OST-30.2, 2OST-30.3 and 2OST-30.6A or 6B (SWS Pump Tests). At least full-stroke exercised open during refueling outages per 2OST-30.13A or 13B (SWS Full Flow Tests), if not full-stroke tested open by one of the OST's above within the previous 92 days. Full-stroke exercising in the closed direction is discussed in VCSJ No. 24.

References: ISTC-3510, ISTC-3522(c) and ISTC-5221(a).
NUREG-1482, Section 4.1.3.

VALVE REFUELING OUTAGE JUSTIFICATION 49

Valve No(s): 2SWS*106
2SWS*107

Category: C **Class:** 3

System: 30 - Service Water

Function: These Service Water (SWS) Pump header check valves must open to allow cooling water from the river to flow to station loads required during an accident. They must close to prevent reverse flow by the Standby Service Water Pumps when they are supplying the SWS headers.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally open during plant operation. Their safety positions are open to provide SWS cooling to station loads required during an accident, and closed to prevent reverse flow to the SWS system if a Standby Service Water Pump is operating. Full-stroke exercising in the open direction cannot always be performed during plant operation because normal plant operating loads do not always support enough SWS flow to develop the maximum required accident condition flow in accordance with ISTC-5221(a) and NUREG-1482, Section 4.1.3. Note that full-stroke exercising in the open direction may still be possible during warm summer months when additional flow paths and heat exchangers are in service, however, this can normally only be accomplished by aligning the SWS system through additional flow paths which are only used for accident conditions and through additional heat exchangers not normally in service. The additional heat exchangers are maintained isolated for biota control to prevent fouling. Placing flow through these additional flow paths and heat exchangers unnecessarily during quarterly or cold shutdown testing could increase the potential for fouling, thereby degrading this part of the SWS system and reducing its reliability in meeting the required flow rates during an accident. In addition, setting up the plant conditions necessary to align the SWS system through additional flow paths and/or heat exchangers as described above which is considered to be an additional hardship that is not practicable during cold shutdowns. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

VALVE REFUELING OUTAGE JUSTIFICATION 49

Basis for ROJ: (Cont.)

Full stroke exercising in the closed direction is not practicable for the following reasons:

- Local observation of check valve closure is not possible because the check valves do not have position indicating devices that would indicate closure.
- Measuring a change in system pressure across the check valves is not possible because upstream isolation valves are not leak tight and may allow pressure to equalize across the SWS headers.
- Seat leakage measurement by shutting down the operating Service Water Pump supplying the associated SWS header, and by providing an upstream vent path with a Standby Service Water Pump providing reverse flow, is not always possible because a large enough leakage path may not exist. In order to create a large enough leakage path with a Standby Service Water Pump supplying the SWS header, both SWS headers must be cross-connected at the Service Water Pumps. Since both SWS headers are needed for the test, this limits the ability to perform work on the Service Water System. In addition during testing, cooling water would have to be isolated to one train of the Charging Pumps, Control Room Air Conditioning Units and Primary Plant Component Cooling Water System. This would affected the availability of these components and system along with the Residual Heat Removal System. In addition, there is no installed instrumentation to check for reverse flow. A temporary flow instrument would have to be installed to measure flow.

Per ISTC-5221(c), "If the test methods in ISTC-5221(a) and ISTC-5221(b) are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly examination program shall be used to verify valve obturator movement." Per ISTC-5222, BVPS-1 has elected to test these check valves in accordance with Mandatory Appendix II, Check Valve Condition Monitoring (CVCM) Program. Further guidelines for disassembly and inspection are provided in NUREG-1482, Section 4.1.4.

Alternate Test:

Maintenance is to disassemble and inspect each valve in the open and closed direction (full stroke) per 1/2CMP-75-WAFER CHECK-1M at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. If the sample valve fails its inspection, then ISTC-5224 will be applied to determine if the remaining valve in the group should be disassembled and inspected during the same outage. As a PMT following valve re-assembly, a part-stroke exercise in the open direction will be performed per 2OST-30.2, 3, 6A or 6B (SWS Pump Tests).

NOTE: Although these check valves are included in the CVCM Program, full-stroke exercising in the open direction will also to be performed during quarterly pump testing when sufficient heat exchanger loads are in service or during the comprehensive pump tests or during SWS Full Flow testing at a refueling frequency per 2OST-30.2, 3, 6A (SWS Pump Tests) or per 2OST-30.13A or 13B (SWS Full Flow Tests).

VALVE REFUELING OUTAGE JUSTIFICATION 49

References: ISTC-3510, ISTC-5221(a), ISTC-5222 and ISTC-5224.

NUREG-1482, Section 4.1.3.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 50

Valve No(s): 2SWS*111
2SWS*112

Category: C **Class:** 3

System: 30 - Service Water

Function: These Service Water System (SWS) header check valves to the Emergency Diesel Generator Heat Exchangers must open to allow cooling water flow to the heat exchangers during an accident.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: These check valves are normally shut during plant operation. Their safety position is open to provide SWS cooling to the Emergency Diesel Generator Heat Exchangers during an accident. Full-stroke exercising in the open direction can be performed with flow each month during testing of the Emergency Diesel Generators. However, bi-directional testing in the closed direction cannot be performed without disassembling the check valves because these check valves do not have installed instrumentation or weighted arms to allow testing in the reverse direction. Therefore, the only way to verify closure is by disassembly during refueling outages. Per ISTC-5221(c), "If the test methods in ISTC-5221(a) and ISTC-5221(b) are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly inspection program shall be used to verify valve obturator movement. Per ISTC-5222, BVPS-1 has elected to test these check valves in accordance with Mandatory Appendix II, Check Valve Condition Monitoring (CVCM) Program. Further guidelines for disassembly and inspection are provided in NUREG-1482, Section 4.1.4.

Alternate Test: Maintenance is to disassemble and inspect each valve in the open and closed direction (full stroke) per 1/2CMP-75-WAFER CHECK-1M at the frequency specified by the Check Valve Condition Monitoring (CVCM) Program. If the sample valve fails its inspection, then ISTC-5224 will be applied to determine if the remaining valve in the group should be disassembled and inspected during the same outage. As a PMT following valve re-assembly, a part-stroke exercise in the open direction will be performed per 2OST-36.1(1A) or 1OST-36.2(2A) (Emergency Diesel Generator Tests).

NOTE: Although these check valves are included in the CVCM Program, exercise testing in the open direction will continue to be performed at least quarterly per 2OST-36.1(1A) and 1OST-36.2(2A) (Emergency Diesel Generator Tests).

References: ISTC-3510, ISTC-5221(c), ISTC-5222 and ISTC-5224.

NUREG-1482, Section 4.1.4.

ASME OM Code, Appendix II (Check Valve Condition Monitoring Program).

VALVE REFUELING OUTAGE JUSTIFICATION 51

Valve No(s): 2SWS*MOV103A
2SWS*MOV103B
2SWS*MOV106A
2SWS*MOV106B

Category: B **Class:** 3

System: 30 - Service Water

Function: These Recirculation Spray (RSS) Heat Exchanger Service Water (SWS) Supply Isolation Valves [2SWS*MOV103A and B] must open to supply SWS cooling water to RSS Heat Exchangers during a CIB. They must reclose in the long-term post accident following a CIB and the residual heat removal (RHR) system placed into service, to provide SWS cooling for the Component Cooling Water (CCP) Heat Exchangers in order to cool the RHR Heat Exchangers and bring the plant to cold shutdown conditions.

The SWS Supply Header Isolation Valves [2SWS*MOV106A and B] must close on receipt of a CIB signal to ensure sufficient SWS cooling flow to the Recirculation Spray Heat Exchangers. They must re-open in the long-term post accident following a CIB to provide SWS cooling for the Component Cooling Water (CCP) Heat Exchangers in order to cool the Residual Heat Removal (RHR) Heat Exchangers and bring the plant to cold shutdown conditions.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category B valves shall be tested nominally every 3 months.

Basis for ROJ: [2SWS*MOV103A and B] are normally closed during plant operation to isolate SWS flow to the RSS Heat Exchangers which are maintained in a chemical wet lay-up condition. Their safety positions are open to supply DBA flow to the RSS Heat Exchangers following a CIB, and closed to ensure adequate SWS cooling for RHR cool down of the plant to cold shutdown conditions. [2SWS*MOV106A and B] are normally open during plant operation to support SWS operation. Their safety position is closed to ensure sufficient SWS supply to the Recirculation Spray Heat Exchangers and open to support RHR operation for cool down of the plant to cold shutdown conditions.

<u>During Normal Plant Operation:</u>

[2SWS*MOV103A and B] cannot be cycled open and closed during normal plant operation without directing service water (Ohio River water) to the RSS Heat Exchangers and/or connecting SWS piping. The piping and heat exchangers are normally maintained in a chemical wet lay-up condition in order to maintain them in an operationally ready state. Plant operating experience has shown the introduction of untreated service water deposits, asiatic clams, other marine life, river mud and silt into the heat exchangers and/or connecting piping and would unnecessarily degrade the operational readiness of the system.

VALVE REFUELING OUTAGE JUSTIFICATION 51

Basis for ROJ: (Cont.)

In addition, opening [2SWS*MOV103A or B] by themselves, cannot be performed during plant operation unless [2SWS*MOV106A or B] or the RSS Heat Exchanger Inlet Isolation Valves [2SWS*MOV104A-D] are closed because the SWS cannot simultaneously support normal plant operations and full flow to the RSS Heat Exchangers. If testing was conducted with RSS Heat Exchanger Inlet Isolation Valves [2SWS*MOV104A-D] shut, flushing of the connecting SWS piping, which is of significant diameter and length, would lead to increased maintenance and radiological exposure. If testing was conducted with [2SWS*MOV104A-D] open, additional flushing and cleaning of the RSS Heat Exchangers (in addition to the piping) would also lead to increased maintenance, radiological exposure and possibly a plant shutdown if cleaning of the RSS Heat Exchangers could not be accomplished within the Technical Specification 72 hour required action time.

Therefore, exercising these valves quarterly is considered to be impractical during normal operation. Per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns".

During normal plant operation, two service water trains are required to be OPERABLE per T.S. 3.7.8. Closing [2SWS*MOV106A(B)] during plant operation without also directing flow to RSS Heat Exchangers by opening [2SWS*MOV103A(B)], would require the SWS pump operating on the SWS train being tested to be shutdown (in order to prevent damaging the pump by operating at less than minimum flow). Shutting down the SWS pump operating on the SWS train being tested would result in the following:

(1) Loss of the redundant SWS subsystem due to no flow to the following safety-related cooling loads on that train. This is because the SWS subsystems cannot be cross-connected at these cooling loads in order to maintain train separation as required by GDC 44.

    Emergency Diesel Generator Coolers

    Charging Pump Coolers

    Control Room cooling

    Safeguards Area cooling

    Rod Control Area cooling (not normally aligned)

    Motor Control Center Room cooling

    PASS cooling (B Train only)

    This would also require entry into the 72 hour Technical Specification 3.7.8 Required Action.

(2) Maintenance Rule out-of-service time would be accumulated for EDG and Charging Pump operating on the train until the SWS header being tested is restored to operable status.

VALVE REFUELING OUTAGE JUSTIFICATION 51

Basis for ROJ: (Cont.)

(3) Partial draining of the SWS header being tested would occur due to gravity draining to the outfall. It is estimated it would take approximately four hours to restore the header to a filled and vented condition.

(4) The removal of the above equipment from service would result in high PRA risk which has been evaluated to exceed current limits for performing such an activity without first obtaining management authorization.

Pre-test alignment of the SWS subsystems would be required to enable as much cooling flow as possible to the station loads placed on the SWS header in service, if [2SWS*MOV106A(B)] were to be closed and the SWS pump shutdown (without also directing flow to the RSS Heat Exchangers). This would involve extra-ordinary time consuming valve line-ups which are not desirable during normal plant operation. These valve line-ups are estimated to take more than one shift (eight hours) per train to perform, both before and after the test.

Since both SWS subsystems must be maintained operable during normal operation, [2SWS*MOV103A(B)] must be opened with flow to the RSS Heat Exchangers when also closing [2SWS*MOV106A(B)]. Opening [2SWS*MOV103A and B] has been shown to be impractical during normal operation, therefore, testing of [2SWS*MOV106A and B] is also considered to be impractical during normal operation. Per ISTC-3521(c), "If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns".

<u>During Cold Shutdown:</u>

Testing of these valves is possible during cold shutdowns when one train of SWS can be isolated, because both trains of SWS are no longer required by Technical Specifications. However, this can be a burden during some cold shutdowns. Although it is not required by Technical 3.7.8 to have two service water trains OPERABLE in MODE 5, it is desired to maintain two trains of SWS in operation in order to maintain cooling to the opposite train cooling loads. This would include cooling to the Emergency Diesel Generator for electric power availability, Charging Pump for boration flow path & RCS inventory flow path, and the Residual Heat Removal (RHR) System cooling via Primary Component Cooling (CCP). Both trains of RHR are used during cool down of the plant to cold shutdown and are required to be operable in MODE 5 per Technical Specification 3.4.8 when all three Reactor Coolant Loops are inoperable or not in service.

VALVE REFUELING OUTAGE JUSTIFICATION 51

Basis for ROJ: (Cont.)

Testing [2SWS*MOV103A and B] and [2SWS*MOV106A and B] during cold shutdowns would also involve shutting down the SWS pump operating on the SWS train being tested. Testing [2SWS*MOV106A or B] would result in partial draining of the SWS header being tested due to gravity draining to the outfall. It is estimated it would take approximately four hours to restore the header to a filled and vented condition. In addition, re-alignment of the SWS subsystems to enable testing of [2SWS*MOV106A and B] while maintaining two SWS subsystems in operation during cold shutdown would require extra-ordinary time consuming valve line-ups which are not desirable during cold shutdowns of short duration. These valve line-ups are estimated to take more than one shift (eight hours) per train to perform, both before and after the test, and would divert necessary resources from other outage work. The entire testing evolution could increase the outage duration if performed during cold shutdowns of short duration. ISTC-3521(g) states that plant startup need not be delayed to complete inservice testing during cold shutdown. Per ISTC-3521(e), "If exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke exercising during refueling outages".

Therefore, full-stroke exercising [2SWS*MOV103A and B] and [2SWS*MOV106A and B] in both directions will be performed during cold shutdowns of sufficient duration and at least during refueling outages if not tested within the previous 92 days.

In addition, the PRA Group has evaluated the demand failure rates for these high safety significant MOVs based on the risk associated with exercising them per OMN-1 at the cold shutdown or refueling outage frequency versus quarterly, and has determined that the potential increase in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) associated with the extension is acceptably small (i.e., delta CDF<1.0E-05 and delta LERF<1.0E-06).

<u>During Refueling Outages:</u>

However, in order to remove the impact of performing the SWS Full-Flow Tests during refueling outages, testing may be performed on-line, just prior to the refueling outage. This testing has been reviewed from a risk perspective and is considered to be acceptable when appropriate environmental conditions exist. Following the testing on-line, the RSS Heat Exchangers remain full of water until they can be cleaned during the refueling outage as part of the GL 89-13 Program after which they will be returned to a chemical wet lay-up condition. Therefore, performing this test in the weeks just prior to the refueling outage will minimize the impact of the test on the station, while ensuring the heat exchangers are maintained operationally ready.

VALVE REFUELING OUTAGE JUSTIFICATION 51

Alternate Test: Full-stroke exercised in accordance with ASME OM Code Case OMN-1 during cold shutdowns of sufficient duration per 2OST-1.10D (Cold Shutdown Valve Exercise Test). Otherwise, full-stroke exercised in accordance with ASME OM Code Case OMN-1 at a refueling outage frequency while on-line (in the weeks just prior to the refueling outage) or during the refueling outage (if not tested within the previous 92 days) per 2OST-30.13A and 2OST-30.13B (SWS Full-Flow Tests). In addition, stroke timing (other than during diagnostic testing or for PMT) is not required since these valves do not have any plant safety analysis limits.

References: ISCT-3510, ISTC-3521(c), ISTC-3521(e) and ISTC-3521(g).

Technical Specifications 3.4.8 and 3.7.8.

OMN-1 Paragraph 3.6.1.

VALVE REFUELING OUTAGE JUSTIFICATION 52

Valve No(s): 2FPW*761

Category: A/C **Class:** 2

System: 33 - Fire Protection

Function: This fire protection header inside containment isolation check valve must close to provide containment isolation of penetration no. 99.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally closed and would only be opened in the event of a fire in containment. Its safety position is closed for containment isolation of penetration no. 99. Full stroke exercising in the closed direction can only be verified by cycling the mechanical weight loaded swing arm of the check valve open and then closed or by leak testing. Because this check valve is located inside the slightly sub-atmospheric containment, it is not accessible for testing during plant operation because the radiation levels and air temperature inside containment are higher than normal during power operation and would involve higher radiological dose rates and heat stress risk to plant personnel. This presents a working environment for station personnel that is not considered practicable for quarterly surveillance testing on a routine basis on-line. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns." In addition, the upstream MOV, although isolated, is cycled open quarterly which allows some water to flow past this check valve and into the downstream piping. Because a head of water may exist against the check valve disk due to elevation differences between the check valve and downstream fire protection piping in containment, the water must first be drained in order to cycle the check valve. This involves installing a hose and draining the containment penetration, which is considered to be a hardship that is not practicable during cold shutdowns. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised open using a manual mechanical exerciser attached to its mechanical weight loaded swing arm in accordance with ISTC-5221(b) and the guidelines provided in NUREG-1482, Section 4.1.7, and closed by observation of its mechanical weight loaded swing arm during refueling outages per 2OST-1.10J (Cold Shutdown Valve Exercise Test).NOTE: This activity also satisfies the bi-directional exercise requirement in the non-safety related open direction.

References: ISTC-3510, ISTC-3522(b), ISTC-3522(c) and ISTC-5221(b).

NUREG-1482, Section 4.1.7.

VALVE REFUELING OUTAGE JUSTIFICATION 53

Valve No(s): 2IAC*22

Category: A/C **Class:** 2

System: 34 - Compressed Air (Containment Instrument Air)

Function: This containment instrument air header inside containment isolation check valve must close to provide containment isolation of penetration no. 59.

Test Requirement: Per ISTC-3510, "Exercising Test Frequency," Active Category C check valves shall be exercised nominally every 3 months.

Basis for ROJ: This check valve is normally open and will remain open during operation of the containment instrument air system. Its safety position is closed for containment isolation of penetration no. 59. Full stroke exercising in the closed direction can only be verified by cycling the mechanical weight loaded swing arm of the check valve open and then closed or by leak testing. Because this check valve is located inside containment, it is not accessible for testing during plant operation. ISTC-3522(b) states, "If exercising is not practicable during operation at power, it shall be performed during cold shutdowns." It is not practicable to cycle this check valve during cold shutdown because the containment instrument air system must either be shut down or supported by a special valve alignment from the station service air system to maintain an air supply to containment components. Shutting down the containment instrument air system during cold shutdown or refueling is not practicable because this would cause loss of control air to containment instrumentation and air-operated components. Temporary use of the station service air system to support containment instrument air is to be minimized because the air is not dried and containment instrument air pressure indication would be lost. Using station service air could also add moisture to containment instrumentation and air-operated components that could adversely impact these components later during normal plant operation. Therefore, it is not practicable to test these valves during cold shutdown. ISTC-3522(c) states, "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

Alternate Test: Full-stroke exercised closed by observation of its external weight arm during refueling outages per 2OST-1.10J (Cold Shutdown Valve Exercise Test).

NOTE: Bi-directional exercising in the non-safety related open direction will be satisfied by demonstrating the ability to provide instrument air pressure to Containment per ISTC-3550.

References: ISTC-3510, ISTC-3522(b) and ISTC-3522(c).

NUREG-1482, Section 4.1.7.

SECTION VIII: VALVE RELIEF REQUESTS

VALVE RELIEF REQUEST 1

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(2)

-- Hardship Without a Compensating Increase in Quality and Safety --

1. **ASME Code Components Affected**

All valves within the Beaver Valley Power Station, Unit No. 2 Inservice Test (IST) Program.

2. **Applicable Code Edition and Addenda**

ASME OM Code, 2004 Edition with Addenda through OMb-2006.

3. **Applicable Code Requirements**

This request applies to the frequency specifications of the ASME OM Code for all valve testing contained within the IST Program scope. The applicable ASME OM Code sections include the following.

ISTA-3120, "Inservice Test Interval," (a) states, "The frequency for inservice testing shall be in accordance with the requirements of Section IST."

ISTC-3510, "Exercising Test Frequency," states in part that: "Active Category A, Category B, and Category C check valves shall be exercised nominally every 3 months, . . ."

ISTC-3540, "Manual Valves," states in part that: "Manual Valves shall be full-stroke exercised at least once every 2 years, . . ."

ISTC-3630, "Leakage Rate for Other Than Containment Isolation Valves," part (a), "Frequency," states that: "Tests shall be conducted at least once every 2 years."

ISTC-3700, "Position Verification Testing," states in part that: "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) states that: "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, "Test Frequencies, Class 1 Pressure Relief Valves," part (a) states in part that: "Class 1 pressure relief valves shall be tested at least once every 5 years . . ."

Appendix I, I-1350, "Test Frequency, Classes 2 and 3 Pressure Relief Valves," part (a) states in part that: "Classes 2 and 3 pressure relief valves, with the exception of PWR main steam safety valves, shall be tested every 10 years, . . ."

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 years, . . ."

VALVE RELIEF REQUEST 1

4. Reason for Request

Test period requirements for valves set forth in specific ASME OM Code documents present a hardship without a compensating increase in quality and safety. ASME OM Code Case OMN-20, "Inservice Test Frequency," was approved and is proposed to be used as an alternative to the test periods specified in the ASME OM code.

Operational flexibility is needed when scheduling valve tests to minimize conflicts between the ASME OM Code specified test interval, plant conditions, and other maintenance and test activities. Lack of a frequency tolerance applied to ASME OM Code testing places a hardship on the plant when scheduling valve tests.

Code Case OMN-20 is not referenced in the latest revision of Regulatory Guide 1.192, "Operation and Maintenance Code Case acceptability, ASME OM Code" (August 2014), as an acceptable OM Code Case to comply with 10 CFR 50.55a(f) requirements as allowed by 10 CFR 50.55a(b)(6).

5. Proposed Alternative and Basis for Use

The proposed alternative is OMN-20, "Inservice Test Frequency," which addresses testing periods for valves specified in ASME OM Division 1, Section IST, 2009 Edition through OMa-2011 Addenda, and all earlier editions and addenda of ASME OM Code.

This request is being made in accordance with 10 CFR 50.55a(z)(2), in that the existing requirements are considered a hardship without a compensating increase in quality and safety for the following reasons:

1) For testing periods up to two years, Code Case OMN-20 provides an allowance to extend the testing periods by up to 25 percent. The period extension is to facilitate test scheduling and considers plant operating conditions that may not be suitable for performance of the required testing (for example, 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. Use of the test period extension has been a practice in the nuclear industry for many decades and not applying an extension would be a hardship when there is no evidence that the period extensions affect component reliability.

2) For testing periods of greater than or equal to two years, OMN-20 allows an extension of up to six months. The ASME OM Committee determined that such an extension is appropriate. The six-month extension will have a minimal impact on component reliability considering that the most probable result of performing any inservice test is satisfactory verification of the test acceptance criteria. As such, valves will continue to be adequately assessed for operational readiness when tested in accordance with the requirements specified in 10 CFR 50.55a(f) with the frequency extensions allowed by Code Case OMN-20.

ASME OM, Division 1, Section IST, and earlier editions and addenda of ASME OM Code specify component test frequencies 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.). 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 the table below.

Frequency	Specified Time Period Between Tests
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

Per OMN-20, the specified time period between tests may be reduced or extended as follows:

(1) For periods specified as less than two years, the period may be extended by up to 25 percent for any given test.

(2) For periods specified as greater than or equal to two 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 extensions may also be applied to other less than two year test frequencies not specified in the table above.

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 the ASME OM Code.

6. **Duration of Proposed Alternative**

The proposed alternative is requested for use during the fourth 10-year IST interval.

7. **Precedent**

The NRC approved the use of OMN-20 for Fort Calhoun on February 19, 2016 (NRC Agencywide Documents Access and Management System (ADAMS) Accession Number ML16041A308), and for Grand Gulf Nuclear Station, Unit 1, on June 16, 2016 (ADAMS Accession Number ML16160A092).

VALVE RELIEF REQUEST 2

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. **ASME Code Components Affected**

   2RCS*RV551A, B and C Pressurizer Safety Valves (Class 1, Category C)

2. **Applicable Code Edition and Addenda**

   American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. **Applicable Code Requirement**

   Mandatory Appendix I, "Inservice Testing of Pressure Relief Devices in Light-Water Reactor Nuclear Power Plants," Paragraph I-1320, "Test Frequencies, Class 1 Pressure Relief Valves," Subparagraph (a), "5-Year Test Interval," states:

   > Class 1 pressure relief valves shall be tested at least once every five (5) years, starting with initial electric power generation. No maximum limit is specified for the number of valves to be tested within each interval; however, a minimum of 20% of the valves from each valve group shall be tested within any 24-month interval. This 20% shall consist of valves that have not been tested during the current 5-year interval, if they exist. The test interval for any individual valve shall not exceed 5 years.

4. **Reason for Request**

   Beaver Valley Power Station Unit No. 2 (BVPS-2) has three pressurizer safety valves installed to protect the reactor coolant system from overpressure. Since BVPS-2 operates on an 18-month fuel cycle, one valve can be tested each refueling outage such that each valve is tested over a four and one-half year period. In order to avoid outage delays due to valve testing, a pressurizer safety valve is replaced during each refueling outage with a spare valve that has been pre-tested. The removed valve is refurbished and tested for installation during the following refueling outage. In order to ensure the spare replacement valve does not exceed the five year test interval limit from test to test, it must be tested within six months prior to installation. Extending the maximum test interval to six years with a six-month grace period would permit the replacement of an installed pressurizer safety valve with the spare pressurizer safety valve without the need to test the spare valve within six months of installation.

   ASME OM Code Case OMN-17, "Alternative Rules for Testing ASME Class 1 Pressure Relief/Safety Valves," from the 2012 Edition of the ASME OM Code allows a 72-month (six-year) test interval plus an additional six-month grace period coinciding with a refueling outage, in order to accommodate extended shutdown periods.

5. **Proposed Alternative and Basis for Use**

   As an alternative to the ASME OM Code-2004 Edition, Mandatory Appendix I, Paragraph I-1320(a) test interval for pressurizer safety valve testing of at least once every five years, the pressurizer safety valves will be tested at least once every six years plus a six month grace period, if required, in accordance with the periodicity and other requirements of ASME OM Code Case OMN-17. Code Case OMN-17 provisions will not be applied to a valve until the valve is disassembled and inspected as described in Paragraph (e) of Code Case OMN-17.

VALVE RELIEF REQUEST 2

Paragraph (d) of Code Case OMN-17 requires disassembly and inspection of each valve after as-found set-pressure testing is performed in order to verify that parts are free of defects resulting from time related degradation or service induced wear.

Paragraph (e) of Code Case OMN-17 requires each valve to be disassembled and inspected in accordance with Paragraph (d) prior to the start of the 72-month test interval.

When the proposed alternative is applied to a valve, the valve will be disassembled and inspected, after as-found set pressure testing is performed in accordance with Code Case OMN-17 paragraphs (d) and (e). The initial inspection and ongoing inspections will verify that valve parts are free of defects resulting from time-related degradation or service-induced wear. These inspections will provide additional assurance that the pressurizer safety valves will perform their intended function.

The longer test interval will eliminate the need for a valve test within six months of installation during each refueling outage. Eliminating the test, will in turn, remove the risk of any shipping damage when the valve is returned from the offsite testing facility, and reduce wear on metal valve seats due to steam testing.

The as-found set-pressure acceptance criteria is plus or minus 3 percent of the valve nameplate set pressure in accordance with Paragraph I-1320(c)(1) of ASME OM Code, 2004 Edition, Appendix I, for the purpose of determining the need to test additional valves. The as-found set-pressure acceptance criteria is plus 1.6 percent or minus 3 percent of valve nameplate set-pressure in accordance with BVPS-2 Technical Specification Limiting Condition for Operation 3.4.10 for the purpose of determining pressurizer safety valve operability.

Since 1989, twenty-one as-found set pressure tests have been performed for the four Crosby Model HB-86-BP pressurizer safety valves (including the spare valve). These tests have been performed at an offsite test facility using saturated steam. The majority of the tests were performed after the valve was installed for three operating cycles. As-found tests were within plus or minus 3 percent of the valve set pressure with the exception of valve 2RCS*RV551C, which lifted low (minus 5.6 percent) in 1989 due to excessive seat leakage. BVPS-2 Technical Specification Surveillance Requirement 3.4.10.1 requires that following testing, lift settings shall be within plus or minus 1 percent. For 11 of the 21 tests, the valves were found within the as-left tolerance of plus or minus 1 percent. These test results show limited time-related degradation or set point drift and demonstrate that it is acceptable to extend the test interval from four and one-half years (three fuel cycles) to six years (four fuel cycles) with a six month grace period.

The ability to detect degradation and to ensure the operational readiness of the pressurizer safety valves to perform their intended function is assured based on the valve test history and by performing the required inspection and testing initially and at the proposed alternative frequency. Therefore, test and inspection of the valves in accordance with the proposed alternative demonstrates an acceptable level of quality and safety.

6. **Duration of Proposed Alternative**

The proposed alternative is requested for use during the fourth 10-year inservice test interval.

VALVE RELIEF REQUEST 2

7. **Precedent**

A similar request was approved by the United States Nuclear Regulatory Commission (USNRC) staff in their safety evaluation referenced below.

USNRC Letter, Beaver Valley Power Station Unit No. 2, Docket No. 50-412, Safety Evaluation of Valve Relief Request VRR4 for the Remainder of the Third 10-Year Inservice Testing Interval, dated February 7, 2012 (ADAMS Accession No. ML120330329).

VALVE RELIEF REQUEST 3

Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)

-- Alternative Provides Acceptable Level of Quality and Safety --

1. ASME Code Components Affected

2HCS*SOV133A	Hydrogen Analyzer A Outlet Inside Containment Isolation, (Class 2, Category A)
2HCS*SOV133B	Hydrogen Analyzer B Outlet Inside Containment Isolation, (Class 2, Category A)
2HCS*SOV134A	Hydrogen Analyzer A Outlet Outside Containment Isolation, (Class 2, Category A)
2HCS*SOV134B	Hydrogen Analyzer B Outlet Outside Containment Isolation, (Class 2, Category A)
2HCS*SOV135A	Hydrogen Analyzer B Inlet Inside Containment Isolation, (Class 2, Category A)
2HCS*SOV135B	Hydrogen Analyzer B Inlet Outside Containment Isolation, (Class 2, Category A)
2HCS*SOV136A	Hydrogen Analyzer A Inlet Inside Containment Isolation, (Class 2, Category A)
2HCS*SOV136B	Hydrogen Analyzer A Inlet Outside Containment Isolation, (Class 2, Category A)
2HCS*SOV114A	Containment Isolation to Hydrogen Recombiner 21A, (Class 2, Category A)
2HCS*SOV114B	Containment Isolation to Hydrogen Recombiner 21B, (Class 2, Category A)
2HCS*SOV115A	Backup Containment Isol. to Hydrogen Recombiner 21A, (Class 2, Category A)
2HCS*SOV115B	Backup Containment Isol. to Hydrogen Recombiner 21B, (Class 2, Category A)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, with Addenda through OMb-2006.

3. Applicable Code Requirement

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

> Valves with remote position indicators shall be observed locally at least once every 2 years to verify that valve position is accurately indicated. . . . Where local observation is not possible, other indications shall be used for verification of valve operation.

4. Reason for Request

The valves listed above are Category A containment isolation valves and are required to be seat leakage tested in accordance with 10 CFR 50 Appendix J (Option B, Type C). Due to the design of the valves, position verification testing is performed in conjunction with the Type C leak test. Each of the listed valves is a solenoid operated valve (SOV) designed such that the coil position is internal to the valve body and is not observable in either the energized or de-energized state.

The subject valves are seat leakage tested using local leakage rate test equipment as part of the Appendix J Type C leak test program. As part of the leakage rate test, the position verification test is also performed. This method involves attempting to pressurize the containment penetration volume to approximately 45 pounds per square inch gauge (psig) with the valve open as indicated by its remote position lights on the control room bench board. If the attempt to pressurize the containment penetration fails, the valve position is verified to be open. The valve is then closed using the control switch in the control room and the containment penetration volume is pressurized to approximately 45 psig. Being able to maintain pressure in the penetration while the valve is

VALVE RELIEF REQUEST 3

indicating closed by its remote position lights on the control room bench board, verifies the valve is closed. This method satisfies the requirement for position verification testing and ensures that the remote indicating lights in the control room accurately reflect the local valve position in the field.

Position verification testing is required to be performed once every two years and is typically performed during a refueling outage, regardless of whether the containment penetration is due for Type C leakage testing or not. In order to perform Type C leakage testing, piping and valves associated with the individual valve being tested are drained, vented and aligned. Because the position verification test requires the Type C leakage test to be performed, the above actions are completed during each refueling outage.

5. **Proposed Alternative and Basis for Use**

As an alternative to the ISTC-3700 test interval of at least once every two years, it is proposed that the required position verification testing of the valves listed above be performed in conjunction with the Type C seat leakage test at the frequency specified by 10 CFR 50 Appendix J, Option B for the Type C leakage test. This test interval may be adjusted to a frequency of testing commensurate with Option B of 10 CFR 50 Appendix J for Type C seat leakage testing based on valve seat leakage performance. If a valve fails a leak test representing an unacceptable remote position verification, the valve test frequency (including position verification testing) will be adjusted in accordance with 10 CFR 50 Appendix J, Option B.

Valves 2HCS*SOV114A and 115A, and 2HCS*SOV114B and 115B may be remote position verified at the longer test frequency specified above, or remote position verified in conjunction with the testing of containment isolation valves 2CVS*SOV151A and 152A (for Penetration No. 93) and 2CVS*SOV151B and 152B (for Penetration No. 92) in accordance with the frequency specified in the surveillance frequency control program referenced by Technical Specification Surveillance Requirement 3.3.3.3 (currently an 18-month frequency).

In addition to position verification testing and seat leakage testing, the SOVs associated with the hydrogen analyzers are stroke timed open and closed on a quarterly frequency. Because these SOVs are ganged in sets of two valves per control switch, two operators time the valves so that pre-conditioning is avoided by not cycling the valves more than once. For each valve, the opening stroke time is measured from the time the common control switch is placed in the open position until the red indicating light is the only indicating light remaining illuminated. For each valve, the closing stroke time is measured from the time the common control switch is placed in the closed position until the green indicating light is the only indicating light remaining illuminated. The stroke times are compared to a two second limiting time established in accordance with ISTC-5152(c) of the ASME OM Code. If the stroke time is within the two second limiting time, then the valve is considered to have passed and is operating acceptably.

The SOVs associated with the Train B hydrogen recombiners are not required to be stroke time tested as they are considered to be passive valves.

Option B of 10 CFR 50 Appendix J permits the extension of Type C leakage testing to a frequency based on leakage-rate limits and historical valve performance. Valves whose leakage test results indicate good performance may have their seat leakage test frequency extended up to 60 months or three refueling outages (based on an 18-month fuel cycle). In order for a valve's seat leakage test frequency to be extended, the individual containment isolation valve must first successfully pass two consecutive as-found seat leakage tests before it can be placed on an extended seat leakage test frequency.

VALVE RELIEF REQUEST 3

Over the past six refueling outages, the valves listed above have passed the position verification test performed in conjunction with its Type C leakage test. Valve performance data is recorded in a database and trended by the inservice test coordinator. If the leak rate exceeds the allowable limit, the valves are repaired or replaced. Any maintenance performed on these valves that might affect position indication is followed by an applicable post-maintenance test including position verification testing regardless of the Type C test frequency.

Additionally, the SOVs that are required to be stroke timed tested with their stroke times measured and compared to the ASME OM Code acceptance criteria of less than two seconds are exercised on a quarterly test frequency. For the past 10 years, no quarterly stroke time failures have been noted.

Valve exercise testing each quarter and position verification and seat leakage testing in accordance with the frequency specified by 10 CFR 50 Appendix J, Option B, provides an adequate assessment of valve health and therefore an acceptable level of quality and safety.

Based on past performance of the SOVs and the quarterly valve stroking for the valves subject to exercising, coupled with a 10 CFR 50, Appendix J, Option B performance based program to test for leakage and verify valve position indication, the proposed alternative to the ISTC-3700 test interval provides an acceptable level of quality and safety.

6. **Duration of Proposed Alternative**

   The proposed alternative is requested for use during the fifth 10-year inservice test interval.

7. **Precedent**

   A similar request was approved by the United States Nuclear Regulatory Commission (USNRC) staff in their safety evaluation referenced below.

   USNRC Letter, Beaver Valley Power Station Unit Nos. 1 and 2, Docket Nos. 50-334 and 50-412, Safety Evaluation of Valve Relief Request VRR3 for the Remainder of the BVPS-1 Fourth 10-Year Inservice Testing Interval and the BVPS-2 Third 10-Year Inservice Testing Interval, dated February 7, 2012 (ADAMS Accession No. ML120270298).

SECTION IX: VALVE TABLES

See the Valve Tables attached at the end of this document.

BV Unit 2

VALVE TABLE

SYSTEM NAME: Reactor Coolant **SYSTEM NUMBER:** 06

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2RCS*68	2	A/C	Active	2.5	Check		6-2 (E-2)	S	S		LJ-C	SP		2BVT 1.47.5	Penet. #49 per 2OST-47.125
PZR. RLF. TK NITROGEN SUPPLY CHECK											CV-S	R	VROJ - 01	2OST-1.10J	By observation of external weight arm to close
											CV-BDT-O	NSO		2OM-52.4.R.2.F	During station S/D
2RCS*72	2	A/C	Active	3	Check		6-2 (F-2)	S	S		LJ-C	SP		2BVT 1.47.5	Penet. #45 per 2OST-47.123
PZR. RLF. TK SPRAY LINE CHECK											CV-S	R	VROJ - 02	2OST-1.10J	By observation of external weight arm to close
											CV-BDT-O	NSO		2OM-52.4.R.2.F	During station S/D
2RCS*AOV101	2	A	Active	0.75	Diaphragm	AOV	6-2 (E-1)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #49 per 2OST-47.125
PZR. RLF. TK NITROGEN ISOLATION											FS-S	Q		2OST-47.3J	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech Specs
2RCS*AOV519	2	A	Active	3	Diaphragm	AOV	6-2 (F-1)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #45 per 2OST-47.123
PRI. WTR. TO PZR. RLF. TK & SEAL VENT POTS											FS-S	Q		2OST-47.3J	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech Specs
2RCS*HCV250A	2	B	Active	1	Globe	HCV	6-2 (G-6)	S	O/S	S	FS-S	CSD or R	VROJ - 03	2OST-6.9	
REACTOR VESSEL VENT PIPING TRAIN A											ST-O	CSD or R	VROJ - 03		
											ST-S	CSD or R	VROJ - 03		
											RPV	2YR			
2RCS*HCV250B	2	B	Active	1	Globe	HCV	6-2 (G-6)	S	O/S	S	FS-S	CSD or R	VROJ - 03	2OST-6.9	
REACTOR VESSEL VENT PIPING TRAIN B											ST-O	CSD or R	VROJ - 03		
											ST-S	CSD or R	VROJ - 03		
											RPV	2YR			
2RCS*MOV535	1	B	Active	1	Gate	MOV	6-1 (F-2)	O	O/S		ET	Q or CSD	VCSJ - 01	2OST-6.6	Per OMN-1
(2RCS*PCV455C) ISOLATION											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1

BV Unit 2

VALVE TABLE

SYSTEM NAME: Reactor Coolant **SYSTEM NUMBER:** 06

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2RCS*MOV536	1	B	Active	1	Gate	MOV	6-1 (E-2)	O	O/S		ET	Q or CSD	VCSJ - 01	2OST-6.6	Per OMN-1
(2RCS*PCV456) ISOLATION											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
2RCS*MOV537	1	B	Active	1	Gate	MOV	6-1 (F-2)	O	O/S		ET	Q or CSD	VCSJ - 01	2OST-6.6	Per OMN-1
(2RCS*PCV455D) ISOLATION											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
2RCS*PCV455C	1	B	Active	3	Globe	PCV	6-1 (F-1)	S	O/S	S	FS-S	R		2OST-6.8	
PZR. POWER RELIEF											ST-O	R			PMT
											ST-O-N2	R			With N2 Bubble
											ST-S	R			PMT
											ST-S-N2	R			With N2 Bubble
											RPV	2YR			
2RCS*PCV455D	1	B	Active	3	Globe	PCV	6-1 (F-1)	S	O/S	S	FS-S	R		2OST-6.8	
PZR. POWER RELIEF											ST-O	R			PMT
											ST-O-N2	R			With N2 Bubble
											ST-S	R			PMT
											ST-S-N2	R			With N2 Bubble
											RPV	2YR			
2RCS*PCV456	1	B	Active	3	Globe	PCV	6-1 (E-1)	S	O/S	S	FS-S	R		2OST-6.8	
PZR. POWER RELIEF											ST-O	R			PMT
											ST-O-N2	R			With N2 Bubble
											ST-S	R			PMT
											ST-S-N2	R			With N2 Bubble
											RPV	2YR			
2RCS*RV100	2	A/C	Active	0.75x1	Relief	RV	6-2 (G-2)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #45 per 2OST-47.123
PRI. WTR. TO PZR. RLF. TK THERMAL RELIEF											SPT	10YR		2BVT 1.60.5	
2RCS*RV551A	1	C	Active	6x6	Safety	RV	6-1 (D-3)	S	O/S		DIS&INSP	6YR	VRR - 02	VENDOR	Req'd by OMN-17
PRESSURIZER SAFETY											SPT	6YR	VRR - 02	2BVT 1.60.5	Per OMN-17
2RCS*RV551B	1	C	Active	6x6	Safety	RV	6-1 (D-3)	S	O/S		DIS&INSP	6YR	VRR - 02	VENDOR	Req'd by OMN-17
PRESSURIZER SAFETY											SPT	6YR	VRR - 02	2BVT 1.60.5	Per OMN-17

SYSTEM NAME: Reactor Coolant **SYSTEM NUMBER:** 06

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2RCS*RV551C PRESSURIZER SAFETY	1	C	Active	6x6	Safety	RV	6-1 (D-4)	S	O/S		DIS&INSP SPT	6YR 6YR	VRR - 02 VRR - 02	VENDOR 2BVT 1.60.5	Req'd by OMN-17 Per OMN-17
2RCS*SOV200A REACTOR VESSEL VENT PIPING UPSTREAM ISOLATION TRAIN A	1	B	Active	1	Globe	SOV	6-2 (E-6)	S	O/S	S	FS-S ST-O ST-S RPV	CSD or R CSD or R CSD or R 2YR	VROJ - 03 VROJ - 03 VROJ - 03	2OST-6.9	
2RCS*SOV200B REACTOR VESSEL VENT PIPING UPSTREAM ISOLATION TRAIN B	1	B	Active	1	Globe	SOV	6-2 (F-6)	S	O/S	S	FS-S ST-O ST-S RPV	CSD or R CSD or R CSD or R 2YR	VROJ - 03 VROJ - 03 VROJ - 03	2OST-6.9	
2RCS*SOV201A REACTOR VESSEL VENT PIPING DOWNSTREAM ISOLATION TRAIN A	1	B	Active	1	Globe	SOV	6-2 (E-6)	S	O/S	S	FS-S ST-O ST-S RPV	CSD or R CSD or R CSD or R 2YR	VROJ - 03 VROJ - 03 VROJ - 03	2OST-6.9	
2RCS*SOV201B REACTOR VESSEL VENT PIPING DOWNSTREAM ISOLATION TRAIN B	1	B	Active	1	Globe	SOV	6-2 (F-6)	S	O/S	S	FS-S ST-O ST-S RPV	CSD or R CSD or R CSD or R 2YR	VROJ - 03 VROJ - 03 VROJ - 03	2OST-6.9	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Chemical and Volume Control (Charging & HHSI) **SYSTEM NUMBER:** 07

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CHS*136 BORIC ACID TO CHG PP SUCT CHECK	2	C	Active	2	Check		7-2 (F-8)	S	O		CV-BDT-S	CVCM		2BVT 1.47.11	Tested with [2CHS*141] with frequency alternated with [2CHS*84] per CVCM Program Plan 2CHS-CMP-2.
											CV-O	CSD	VCSJ - 02	2OST-7.13	
2CHS*141 EMER BORATION CHECK	2	C	Active	2	Check		7-2 (F-9)	S	O		CV-BDT-S	CVCM		2BVT 1.47.11	Tested with [2CHS*136] with frequency alternated with [2CHS*84] per CVCM Program Plan 2CHS-CMP-2.
											CV-O	CSD	VCSJ - 02	2OST-7.13	
2CHS*152 CHG PP 21A MINI-FLOW CHECK	2	C	Active	2	Check		7-1A (E-3)	O/S	O		CV-BDT-S	Q		2OST-7.5	
											CV-BDT-S	Q		2OST-7.6	
											CV-O	Q		2OST-7.4	
2CHS*153 CHG PP 21B MINI-FLOW CHECK	2	C	Active	2	Check		7-1A (C-3)	O/S	O		CV-BDT-S	Q		2OST-7.4	
											CV-BDT-S	Q		2OST-7.6	
											CV-O	Q		2OST-7.5	
2CHS*154 CHG PP 21C MINI-FLOW CHECK	2	C	Active	2	Check		7-1A (D-3)	O/S	O		CV-BDT-S	Q		2OST-7.5	
											CV-BDT-S	Q		2OST-7.4	
											CV-O	Q		2OST-7.6	
2CHS*22 CHG PP 21A DISCH CHECK	2	C	Active	3	Check		7-1A (E-3)	O/S	O/S		CV-O	R	VROJ - 04	2OST-11.14B	
											CV-S	R	VROJ - 04		
											CV-S	Q		2OST-7.6	
											CV-S	Q		2OST-7.5	
2CHS*23 CHG PP 21B DISCH CHECK	2	C	Active	3	Check		7-1A (C-3)	O/S	O/S		CV-O	R	VROJ - 04	2OST-11.14B	
											CV-S	R	VROJ - 04		
											CV-S	Q		2OST-7.4	
											CV-S	Q		2OST-7.6	

SYSTEM NAME: Chemical and Volume Control (Charging & HHSI) **SYSTEM NUMBER:** 07

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CHS*24 CHG PP 21C DISCH CHECK	2	C	Active	3	Check		7-1A (D-3)	O/S	O/S		CV-O	R	VROJ - 04	2OST-11.14B	
											CV-S	R	VROJ - 04		
											CV-S	Q		2OST-7.4	
											CV-S	Q		2OST-7.5	
2CHS*31 CHARGING HEADER ISOL CHECK	2	A/C	Active	3	Check		7-1A (C-1)	O	O/S		CV-S	R	VROJ - 05	2BVT 1.47.11	By observation of external weight arm to close
											CV-O	Q		2OST-7.4	
											CV-O	Q		2OST-7.5	
											CV-O	Q		2OST-7.6	
											LT	2YR		2BVT 1.47.11	
2CHS*472 LOOP FILL CNMT ISOL CHECK	2	A/C	Active	2.5	Check		7-1A (G-3)	S	O/S		CV-ME	CSD	VCSJ - 04	2OST-1.10J	
											LT	2YR		2BVT 1.47.11	
2CHS*473 SEAL STR RETURN CNMT ISOL CHECK	2	A/C	Active	2.5	Check		7-3 (E-8)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #19 per 2OST-47.111
											CV-ME	CSD or R	VROJ - 15	2OST-1.10J	
2CHS*474 RCP 21A SEAL SUPPLY CONTAINMENT CHECK	2	A/C	Active	2.5	Check		7-3 (B-4)	O	S		CV-S	R	VROJ - 16	2BVT 1.47.11	By observation of external weight arm to close
											CV-BDT-O	NSO		ISTC-3550	During operation of "A" RCP per PM (Maint Plan 239900)
											LT	2YR		2BVT 1.47.11	
2CHS*475 RCP 21C SEAL SUPPLY CONTAINMENT CHECK	2	A/C	Active	2.5	Check		7-3 (G-4)	O	S		CV-S	R	VROJ - 16	2BVT 1.47.11	By observation of external weight arm to close
											CV-BDT-O	NSO		ISTC-3550	During operation of "C" RCP per PM (Maint Plan 239900)
											LT	2YR		2BVT 1.47.11	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Chemical and Volume Control (Charging & HHSI) **SYSTEM NUMBER:** 07

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CHS*476 RCP 21B SEAL SUPPLY CONTAINMENT CHECK	2	A/C	Active	2.5	Check		7-3 (D-4)	O	S		CV-S	R	VROJ - 16	2BVT 1.47.11	By observation of external weight arm to close
											CV-BDT-O	NSO		ISTC-3550	During operation of "B" RCP per PM (Maint Plan 239900)
											LT	2YR		2BVT 1.47.11	
2CHS*75 BORIC ACID PP 22A DISCH CHECK	3	C	Active	2	Check		7-2 (B-3)	O/S	O		CV-O	Q		2OST-7.1	
											CV-BDT-S	18MO		2OST-7.2	Once each cycle
2CHS*76 BORIC ACID PP 22B DISCH CHECK	3	C	Active	2	Check		7-2 (F-3)	O/S	O		CV-O	Q		2OST-7.2	
											CV-BDT-S	18MO		2OST-7.1	Once each cycle
2CHS*84 BLENDER TO VCT CHECK	3	C	Active	2	Check		7-2 (E-7)	O	O		CV-BDT-S	CVCM		2OST-7.14	Frequency alternated with [2CHS*136 & 141] per CVCM Program Plan 2CHS-CMP-2.
											CV-O	CSD	VCSJ - 02	2OST-7.13	
2CHS*870 NORM CHARGING UPSTREAM CHECK VALVE TO RCS	1	C	Active	3	Check		7-1A (B-1)	O	O		CV-O	Q		2OST-7.5	
											CV-O	Q		2OST-7.4	
											CV-O	Q		2OST-7.6	
											CV-BDT-S	CVCM		2OST-11.16	Tested with [2CHS*871] per ISTC-5223 at frequency per CVCM Program Plan 2CHS-CMP-1.
2CHS*871 NORM CHARGING DOWNSTREAM CHECK VALVE TO RCS	1	C	Active	3	Check		7-1A (B-2)	O	O		CV-O	Q		2OST-7.6	
											CV-O	Q		2OST-7.5	
											CV-O	Q		2OST-7.4	
											CV-BDT-S	CVCM		2OST-11.16	Tested with [2CHS*870] per ISTC-5223 at frequency per CVCM Program Plan 2CHS-CMP-1.

SYSTEM NAME: Chemical and Volume Control (Charging & HHSI) **SYSTEM NUMBER:** 07

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CHS*97 CHEM TK OUT CHECK	2	C	Active	1	Check		7-2 (F-10)	O	S		CV-S-LT	R	VROJ - 06	2OST-11.14C	
											CV-BDT-O	NSO		ISTC-3550	During zinc addition per PM (Maint Plan 239900)
2CHS*AOV200A LETDOWN ORIFICE 21 ISOLATION (45 GPM)	2	A	Active	2	Globe	AOV	7-1A (A-6)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #28 per 2OST-47.117
											FS-S	R	VROJ - 08	2OST-1.10F	
											ST-S	R	VROJ - 08		
											RPV	2YR/18MO			18 months per Tech Specs
2CHS*AOV200B LETDOWN ORIFICE 23 ISOLATION (60 GPM)	2	A	Active	2	Globe	AOV	7-1A (A-7)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #28 per 2OST-47.117
											FS-S	R	VROJ - 08	2OST-1.10F	
											ST-S	R	VROJ - 08		
											RPV	2YR/18MO			18 months per Tech Specs
2CHS*AOV200C LETDOWN ORIFICE 22 ISOLATION (60 GPM)	2	A	Active	2	Globe	AOV	7-1A (A-8)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #28 per 2OST-47.117
											FS-S	R	VROJ - 08	2OST-1.10F	
											ST-S	R	VROJ - 08		
											RPV	2YR/18MO			18 months per Tech Specs
2CHS*AOV204 NON-REGEN HEAT EXCHANGER LETDOWN INLET VALVE	2	A	Active	2	Globe	AOV	7-1A (A-10)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #28 per 2OST-47.117
											FS-S	CSD or R	VROJ - 09	2OST-1.10F	
											ST-S	CSD or R	VROJ - 09		
											RPV	2YR/18MO			18 months per Tech Specs
2CHS*FCV113A BORIC ACID TO BORIC AICD BLENDER	3	B	Active	2	Globe	FCV	7-2 (E-7)	S	O	O	FS-O	Q		2OST-47.3L	
											ST-O	Q			
											RPV-O	2YR		2OST-11.10	
											RPV-S	2YR		2OST-47.3L	
2CHS*FCV114A PRIMARY GRADE WATER TO BORIC ACID BLENDER	3	B	Active	2	Globe	FCV	7-2 (E-8)	S	S	S	FS-S	Q		2OST-47.3L	
											ST-S	Q			
											RPV	2YR			

BV Unit 2

VALVE TABLE

SYSTEM NAME: Chemical and Volume Control (Charging & HHSI) **SYSTEM NUMBER:** 07

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CHS*FCV160	2	A	Passive	2	Globe	FCV	7-1A (G-3)	S	S	S	LT	2YR		2BVT 1.47.11	
REACTOR COOLANT LOOP FILL HDR FLOW CONTROL VALVE											RPV	2YR		2OST-47.3L	
2CHS*HCV142	2	A	Active	2	Globe	HCV	7-1A (A-9)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #28 per 2OST-47.117
RHS LETDOWN FLOW CONTROL											ST-S	Q		2OST-47.3L	
											FS-S	CSD	VCSJ - 03	2OST-1.10F	
											RPV	2YR		2OST-47.3R	
2CHS*LCV115B	2	A	Active	8	Gate	MOV	7-1A (E-5)	S	O/S		ET	Q		2OST-47.3L	Per OMN-1
CHARGING PUMP SUCTION FROM RWST											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	
2CHS*LCV115C	2	B	Active	4	Gate	MOV	7-1A (F-5)	O	S		ET	CSD or R	VROJ - 07	2OST-1.10F	Per OMN-1
CHARGING PUMP SUCTION FROM VOLUME CONTROL TANK											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
2CHS*LCV115D	2	A	Active	8	Gate	MOV	7-1A (C-5)	S	O/S		ET	Q		2OST-47.3O	Per OMN-1
CHARGING PUMP SUCTION FROM RWST											DIAG-ST-O	3RFO			Per OMN-1
											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	
2CHS*LCV115E	2	B	Active	4	Gate	MOV	7-1A (F-5)	O	S		ET	CSD or R	VROJ - 07	2OST-1.10F	Per OMN-1
CHARGING PUMP SUCTION FROM VOLUME CONTROL TANK											DIAG-ST-S	3RFO			Per OMN-1
											RPV	3RFO			Per OMN-1
2CHS*LCV460A	1	B	Active	2	Globe	LCV	7-1A (A-1)	O	S	S	FS-S	CSD or R	VROJ - 14	2OST-1.10F	
REGENERATIVE HEAT EXCHANGER LETDOWN INLET VALVE											ST-S	CSD or R	VROJ - 14		
											RPV	2YR			
2CHS*LCV460B	1	B	Active	2	Globe	LCV	7-1A (A-2)	O	S	S	FS-S	CSD or R	VROJ - 14	2OST-1.10F	
REGENERATIVE HEAT EXCHANGER LETDOWN INLET VALVE											ST-S	CSD or R	VROJ - 14		
											RPV	2YR			
2CHS*MOV289	2	A	Active	3	Gate	MOV	7-1A (D-1)	O	S		ET	CSD or R	VROJ - 10	2OST-1.10F	Per OMN-1
NORMAL CHARGING HDR ISOLATION VALVE											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	

SYSTEM NAME: Chemical and Volume Control (Charging & HHSI) **SYSTEM NUMBER:** 07

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CHS*MOV308A	2	A	Active	2	Globe	MOV	7-3 (B-3)	O	S		ET	CSD or R	VROJ - 11	2OST-1.10F	Per OMN-1
RCP 21A SEAL WATER INJECTION ISOLATION VALVE											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	
2CHS*MOV308B	2	A	Active	2	Globe	MOV	7-3 (D-3)	O	S		ET	CSD or R	VROJ - 11	2OST-1.10F	Per OMN-1
RCP 21B SEAL WATER INJECTION ISOLATION VALVE											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	
2CHS*MOV308C	2	A	Active	2	Globe	MOV	7-3 (G-3)	O	S		ET	CSD or R	VROJ - 11	2OST-1.10F	Per OMN-1
RCP 21C SEAL WATER INJECTION ISOLATION VALVE											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	
2CHS*MOV310	2	B	Active	3	Gate	MOV	7-1A (B-2)	O	S		ET	CSD or R	VROJ - 12	2OST-1.10F	Per OMN-1
REGEN HX NORMAL CHARGING DISCHARGE VALVE											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2CHS*MOV350	2	B	Active	2	Globe	MOV	7-2 (F-8)	S	O		DIAG-ST-O	6RFO		2OST-47.3O	Per OMN-1
EMERGENCY BORATE VLV											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
2CHS*MOV378	2	A	Active	3	Gate	MOV	7-3 (E-8)	O	S		LJ-C	SP		2BVT 1.47.5	Penet. #19 per 2OST-47.111
REACTOR COOLANT PUMPS SEAL WATER RETURN ISOLATION											ET	CSD or R	VROJ - 13	2OST-1.10F	Per OMN-1
											RPV	6RFO/18MO			18 months per Tech Specs
											DIAG-ST-S	6RFO			Per OMN-1
2CHS*MOV381	2	A	Active	3	Gate	MOV	7-3 (F-8)	O	S		LJ-C	SP		2BVT 1.47.5	Penet. #19 per 2OST-47.111
SEAL WATER RETURN CONTAINMENT ISOLATION VALVE											ET	CSD or R	VROJ - 13	2OST-1.10F	Per OMN-1
											RPV	6RFO/18MO			18 months per Tech Specs
											DIAG-ST-S	6RFO			Per OMN-1
2CHS*MOV8130A	2	B	Active	8	Gate	MOV	7-1A (D-5)	LO	S		ET	CSD or R	VROJ - 17	2OST-1.10F	Per OMN-1
CHARGING PUMP SUCTION ISOLATION VALVE											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1

BV Unit 2

VALVE TABLE

SYSTEM NAME: Chemical and Volume Control (Charging & HHSI) **SYSTEM NUMBER:** 07

Valve ID / Name	Class	Cat.	Active / Passive	Size (In.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CHS*MOV8130B CHARGING PUMP SUCTION ISOLATION VALVE	2	B	Active	8	Gate	MOV	7-1A (D-5)	LO	S		ET DIAG-ST-S RPV	CSD or R 6RFO 6RFO	VROJ - 17	2OST-1.10F	Per OMN-1 Per OMN-1 Per OMN-1
2CHS*MOV8131A CHARGING PUMP SUCTION ISOLATION VALVE	2	B	Active	8	Gate	MOV	7-1A (D-5)	LO	S		ET DIAG-ST-S RPV	CSD or R 6RFO 6RFO	VROJ - 17	2OST-1.10F	Per OMN-1 Per OMN-1 Per OMN-1
2CHS*MOV8131B CHARGING PUMP SUCTION ISOLATION VALVE	2	B	Active	8	Gate	MOV	7-1A (C-5)	LO	S		ET DIAG-ST-S RPV	CSD or R 6RFO 6RFO	VROJ - 17	2OST-1.10F	Per OMN-1 Per OMN-1 Per OMN-1
2CHS*MOV8132A CHARGING PUMP DISCHARGE ISOLATION VALVE	2	B	Active	4	Gate	MOV	7-1A (D-2)	LO	S		ET DIAG-ST-S RPV	CSD or R 6RFO 6RFO	VROJ - 17	2OST-1.10F	Per OMN-1 Per OMN-1 Per OMN-1
2CHS*MOV8132B CHARGING PUMP DISCHARGE ISOLATION VALVE	2	B	Active	4	Gate	MOV	7-1A (D-2)	LO	S		ET DIAG-ST-S RPV	CSD or R 6RFO 6RFO	VROJ - 17	2OST-1.10F	Per OMN-1 Per OMN-1 Per OMN-1
2CHS*MOV8133A CHARGING PUMP DISCHARGE ISOLATION VALVE	2	B	Active	4	Gate	MOV	7-1A (C-2)	LO	S		ET DIAG-ST-S RPV	CSD or R 6RFO 6RFO	VROJ - 17	2OST-1.10F	Per OMN-1 Per OMN-1 Per OMN-1
2CHS*MOV8133B CHARGING PUMP DISCHARGE ISOLATION VALVE	2	B	Active	4	Gate	MOV	7-1A (C-2)	LO	S		ET DIAG-ST-S RPV	CSD or R 6RFO 6RFO	VROJ - 17	2OST-1.10F	Per OMN-1 Per OMN-1 Per OMN-1
2CHS*RV160 LOOP FILL HDR RELIEF	2	C	Active	0.75x1	Relief	RV	7-1A (G-2)	S	O/S		SPT	10YR		2BVT 1.60.5	
2CHS*RV203 LETDOWN RELIEF	2	A/C	Active	2x3	Relief	RV	7-1A (A-8)	S	O/S		LJ-C SPT	SP 10YR		2BVT 1.47.5 2BVT 1.60.5	Penet. #28 per 2OST-47.117
2CHS*RV260A RCP 21A SEAL WTR PENETRATION RELIEF	2	C	Active	0.75x1	Relief	RV	7-3 (B-4)	S	O/S		SPT	10YR		2BVT 1.60.5	
2CHS*RV260B RCP 21B SEAL WTR PENETRATION RELIEF	2	C	Active	0.75x1	Relief	RV	7-3 (E-3)	S	O/S		SPT	10YR		2BVT 1.60.5	

SYSTEM NAME: Chemical and Volume Control (Charging & HHSI) **SYSTEM NUMBER:** 07

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CHS*RV260C RCP 21C SEAL WTR PENETRATION RELIEF	2	C	Active	0.75x1	Relief	RV	7-3 (G-4)	S	O/S		SPT	10YR		2BVT 1.60.5	
2CHS*RV382A SEAL RETURN HDR RELIEF	2	C	Active	2x3	Relief	RV	7-3 (C-8)	S	O/S		SPT	10YR		2BVT 1.60.5	
2CHS*RV382B SEAL WATER HEAT EXCHANGER RELIEF	2	C	Active	2x3	Relief	RV	7-3 (E-10)	S	O/S		SPT	10YR		2BVT 1.60.5	
2CHS*RV8144 REGEN HX CHARGING RELIEF	2	C	Active	0.75x1	Relief	RV	7-1A (C-1)	S	O/S		SPT	10YR		2BVT 1.60.5	
2CHS*SOV206 ALTERNATE EMERGENCY BORATE VALVE	2	B	Active	1	Globe	SOV	7-2 (E-8)	S	O	O	FS-O ST-O RPV	Q Q 2YR		2OST-47.3L 2OST-7.13	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Reactor Plant Vents & Drains SYSTEM NUMBER: 09

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2DAS*AOV100A	2	A	Active	2	Globe	AOV	9-1 (F-4)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #38 per 2OST-47.119
CNMT SUMP PMPS INSIDE CNMT DISCHARGE ISOLATION											FS-S	Q		2OST-47.3M	
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.3R	18 months per Tech Specs
2DAS*AOV100B	2	A	Active	2	Globe	AOV	9-1 (F-2)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #38 per 2OST-47.119
CNMT SUMP PMPS OUTSIDE CNMT DISHARGE ISOLATION											FS-S	Q		2OST-47.3G	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech Specs
2DAS*RV110	2	A/C	Active	1.5x2.5	Relief	RV	9-1 (F-3)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #38 per 2OST-47.119
REACTOR CNMT SUMP PMPS (P204A&B) DISCH RELIEF											SPT	10YR		2BVT 1.60.5	
2DGS*AOV108A	2	A	Active	2	Globe	AOV	9-1 (F-10)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #29 per 2OST-47.118
PRIMARY DRAINS TFR TK PMPS INSIDE CNMT DISCHARGE ISOL											FS-S	Q		2OST-47.3M	
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.3R	18 months per Tech Specs
2DGS*AOV108B	2	A	Active	2	Globe	AOV	9-1 (E-10)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #29 per 2OST-47.118
PRIMARY DRAINS TFR TK PMPS OUTSIDE CNMT DISCHARGE ISOL											FS-S	Q		2OST-47.3G	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech Specs
2DGS*RV115	2	A/C	Active	1.5x2.5	Relief	RV	9-1 (E-9)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #29 per 2OST-47.118
PRIMARY DRAINS TFR PMPS (P21A&B) DISCH THERMAL RLF											SPT	10YR		2BVT 1.60.5	
2VRS*AOV109A1	2	A	Active	1.5	Globe	AOV	9-1 (C-9)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #48 per 2OST-47.124
PRZR RLF/PRI DRNS TFR TANKS OUTSIDE CNMT VENTS ISOLATION											FS-S	Q		2OST-47.3M	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech Specs

BV Unit 2

VALVE TABLE

SYSTEM NAME: Reactor Plant Vents & Drains **SYSTEM NUMBER:** 09

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2VRS*AOV109A2	2	A	Active	1.5	Globe	AOV	9-1 (C-9)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #48 per 2OST-47.124
PRZR RLF/PRI DRAINS TFR TANKS INSIDE CNMT VENTS ISO											FS-S	Q		2OST-47.3G	
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.3S	18 months per Tech Specs

SYSTEM NAME: Residual Heat Removal **SYSTEM NUMBER:** 10

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2RHS*107 RWST INNER CNTMNT ISOLATION	2	A	Passive	6	Globe		10-1 (D-7)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #24 per 2OST-47.114
2RHS*15 RWST OUTER CNTMNT. ISOLATION	2	A	Passive	6	Globe		10-1 (D-8)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #24 per 2OST-47.114
2RHS*3 RHS TRAIN A PP DISCHARGE CHECK	2	C	Active	10	Check		10-1 (B-3)	S	O/S		CV-O CV-S	CSD CSD	VCSJ - 05 VCSJ - 05	2OST-10.1 2OST-10.3	
2RHS*4 RHS TRAIN B PP DISCHARGE CHECK	2	C	Active	10	Check		10-1 (E-3)	S	O/S		CV-O CV-S	CSD CSD	VCSJ - 05 VCSJ - 05	2OST-10.2 2OST-10.4	
2RHS*FCV605A RHS TRAIN A HX BYPASS FLOW CONTROL	2	B	Active	8	Butterfly	FCV	10-1 (C-5)	T	S	S	FS-S RPV ST-S	CSD CSD CSD	VCSJ - 06 VCSJ - 06	2OST-10.3	
2RHS*FCV605B RHS TRAIN B HX BYPASS FLOW CONTROL	2	B	Active	8	Butterfly	FCV	10-1 (F-5)	T	S	S	FS-S RPV ST-S	CSD CSD CSD	VCSJ - 06 VCSJ - 06	2OST-10.4	
2RHS*HCV758A RHS TRAIN A HX OUTLET FLOW CONTROL	2	B	Active	10	Butterfly	HCV	10-1 (D-5)	T	O	O	FS-O RPV ST-O	CSD CSD CSD	VCSJ - 08 VCSJ - 08	2OST-10.3	
2RHS*HCV758B RHS TRAIN B HX OUTLET FLOW CONTROL	2	B	Active	10	Butterfly	HCV	10-1 (F-5)	T	O	O	FS-O RPV ST-O	CSD CSD CSD	VCSJ - 08 VCSJ - 08	2OST-10.4	
2RHS*MOV701A RHS TRAIN A SUPPLY ISOLATION	1	A	Active	12	Gate	MOV	10-1 (C-1)	S	O/S		ET ET-O ET-S DIAG-ST-O DIAG-ST-S RPV LT	CSD CSD CSD 6RFO 6RFO 6RFO 2YR/18MO	VCSJ - 07 VCSJ - 07 VCSJ - 07 	2OST-10.3 2OM-10.4.A 2OM-10.4.C 2OST-10.3 2OST-10.5	Per OMN-1 Per OMN-1 Per OMN-1 Per OMN-1 Per OMN-1 Per OMN-1 18 MO per Tech Specs

SYSTEM NAME: Residual Heat Removal **SYSTEM NUMBER:** 10

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2RHS*MOV701B	1	A	Active	12	Gate	MOV	10-1 (E-1)	S	O/S		ET	CSD	VCSJ - 07	2OST-10.4	Per OMN-1
RHS TRAIN B SUPPLY ISOLATION											ET-O	CSD	VCSJ - 07	2OM-10.4.A	Per OMN-1
											ET-S	CSD	VCSJ - 07	2OM-10.4.C	Per OMN-1
											DIAG-ST-O	6RFO		2OST-10.4	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR/18MO		2OST-10.5	18 MO per Tech Specs
2RHS*MOV702A	1	A	Active	12	Gate	MOV	10-1 (D-1)	S	O/S		ET	CSD	VCSJ - 07	2OST-10.3	Per OMN-1
RHS TRAIN A SUPPLY ISOLATION											ET-O	CSD	VCSJ - 07	2OM-10.4.A	Per OMN-1
											ET-S	CSD	VCSJ - 07	2OM-10.4.C	Per OMN-1
											DIAG-ST-O	6RFO		2OST-10.3	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR/18MO		2OST-10.5	18 MO per Tech Specs
2RHS*MOV702B	1	A	Active	12	Gate	MOV	10-1 (D-1)	S	O/S		ET	CSD	VCSJ - 07	2OST-10.4	Per OMN-1
RHS TRAIN B SUPPLY ISOLATION											ET-O	CSD	VCSJ - 07	2OM-10.4.A	Per OMN-1
											ET-S	CSD	VCSJ - 07	2OM-10.4.C	Per OMN-1
											DIAG-ST-O	6RFO		2OST-10.4	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR/18MO		2OST-10.5	18 MO per Tech Specs
2RHS*MOV720A	1	A	Active	10	Gate	MOV	10-1 (C-8)	S	O/S		LM	NSO		2OM-54.3	Continuously Monitored by 2OM-54.3, Station Log L5-120 per ISTC-3610.
RHS TRAIN RETURN TO B LOOP ISOLATION											ET	CSD	VCSJ - 07	2OST-10.3	Per OMN-1
											ET-O	CSD	VCSJ - 07	2OM-10.4.A	Per OMN-1
											ET-S	CSD	VCSJ - 07	2OM-10.4.C	Per OMN-1
											DIAG-ST-O	6RFO		2OST-10.3	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1

BV Unit 2

VALVE TABLE

SYSTEM NAME: Residual Heat Removal **SYSTEM NUMBER:** 10

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2RHS*MOV720B RHS TRAIN RETURN TO C LOOP ISOLATION	1	A	Active	10	Gate	MOV	10-1 (F-8)	S	O/S		LM	NSO		2OM-54.3	Continuously Monitored by 2OM-54.3, Station Log L5-120 per ISTC-3610.
											ET	CSD	VCSJ - 07	2OST-10.4	Per OMN-1
											ET-O	CSD	VCSJ - 07	2OM-10.4.A	Per OMN-1
											ET-S	CSD	VCSJ - 07	2OM-10.4.C	Per OMN-1
											DIAG-ST-O	6RFO		2OST-10.4	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2RHS*MOV750A RHS TRAIN A LETDOWN ISOLATION	2	B	Passive	2	Globe	MOV	10-1 (D-5)	S	S		RPV	2YR		2OST-10.3	
2RHS*MOV750B RHS TRAIN B LETDOWN ISOLATION	2	B	Passive	2	Globe	MOV	10-1 (E-5)	S	S		RPV	2YR		2OST-10.4	
2RHS*RV100 X-24 RELIEF VALVE	2	A/C	Active	0.75x1	Relief	RV	10-1 (D-8)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #24 per 2OST-47.114
											SPT	10YR		2BVT 1.60.5	
2RHS*RV721A RHS TRAIN A SUPPLY RELIEF	2	C	Active	3x4	Relief	RV	10-1 (C-1)	S	O/S		SPT	10YR		2BVT 1.60.5	
2RHS*RV721B RHS TRAIN B SUPPLY RELIEF	2	C	Active	3x4	Relief	RV	10-1 (E-1)	S	O/S		SPT	10YR		2BVT 1.60.5	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2GNS*AOV101-1	2	A	Active	1	Globe	AOV	11-2 (B-3)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #53 per 2OST-47.126
SI ACCUMULATORS N2 MAKEUP OUTSIDE CNMT ISOL VLV											FS-S	Q		2OST-47.3H	
											ST-S	Q			
											RPV	2YR/18MO		2OST-1.10G	18 months per Tech Specs
2GNS*AOV101-2	2	A	Active	1	Globe	AOV	11-2 (C-3)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #53 per 2OST-47.126
SI ACCUMULATORS N2 MAKEUP INSIDE CNMT ISOL VALVE											FS-S	Q		2OST-47.3J	
											ST-S	Q			
											RPV	2/YR18MO		2OST-1.10G	18 months per Tech Specs
2GNS*SOV853A	2	B	Passive	1	Globe	SOV	11-2 (C-4)	S	S	S	RPV	2YR		2OST-1.10G	
SI ACCUMULATOR TK21A NITROGEN MAKEUP															
2GNS*SOV853B	2	B	Passive	1	Globe	SOV	11-2 (C-6)	S	S	S	RPV	2YR		2OST-1.10G	
SI ACCUMULATOR TK21B NITROGEN MAKEUP															
2GNS*SOV853C	2	B	Passive	1	Globe	SOV	11-2 (C-9)	S	S	S	RPV	2YR		2OST-1.10G	
SI ACCUMULATOR TK21C NITROGEN MAKEUP															
2GNS*SOV853D	2	B	Passive	1	Globe	SOV	11-2 (C-4)	S	S	S	RPV	2YR		2OST-1.10G	
BYPASS N2 SUPPLY TO ACCUMULATOR (2SIS*TK21A)															
2GNS*SOV853E	2	B	Passive	1	Globe	SOV	11-2 (D-6)	S	S	S	RPV	2YR		2OST-1.10G	
BYPASS N2 SUPPLY TO ACCUMULATOR (2SIS*TK21B)															
2GNS*SOV853F	2	B	Passive	1	Globe	SOV	11-2 (D-9)	S	S	S	RPV	2YR		2OST-1.10G	
BYPASS N2 SUPPLY TO ACCUMULATOR (2SIS*TK21C)															
2GNS*SOV854A	2	B	Passive	1	Globe	SOV	11-2 (C-2)	S	S	S	RPV	2YR		2OST-1.10G	
N2 HEADER VENT ISOLATION															
2GNS*SOV854B	2	B	Passive	1	Globe	SOV	11-2 (D-2)	S	S	S	RPV	2YR		2OST-1.10G	
N2 HEADER VENT ISOLATION															

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*107	1	A/C	Active	6	Check		11-1 (G-9)	S	O/S		CV-S-LT	R	VROJ - 22	2OST-11.16A	
LOW HEAD SI CHECK TO LOOP 21A COLD LEG											CV-O	CVCM	VROJ - 22	2OST-11.14A	Tested with [2SIS*108, 109, 548, 550, 552] at frequency per CVCM Program Plan 2SIS-CMP-4.
											LT	2YR/18M/CSD		2OST-11.16A	CSD or 18 MO per Tech Specs
2SIS*108	1	A/C	Active	6	Check		11-1 (E-9)	S	O/S		CV-S-LT	R	VROJ - 22	2OST-11.16A	
LOW HEAD SI CHECK TO LOOP 21B COLD LEG											CV-O	CVCM	VROJ - 22	2OST-11.14A	Tested with [2SIS*107, 109, 548, 550, 552] at frequency per CVCM Program Plan 2SIS-CMP-4.
											LT	2YR/18M/CSD		2OST-11.16A	CSD or 18 MO per Tech Specs
2SIS*109	1	A/C	Active	6	Check		11-1 (F-9)	S	O/S		CV-S-LT	R	VCSJ - 22	2OST-11.16A	
LOW HEAD SI CHECK TO LOOP 21C COLD LEG											CV-O	CVCM	VCSJ - 22	2OST-11.14A	Tested with [2SIS*107, 108, 548, 550, 552] at frequency per CVCM Program Plan 2SIS-CMP-4.
											LT	2YR/18M/CSD		2OST-11.16A	CSD or 18 MO per Tech Specs
2SIS*122	1	C	Active	2	Check		11-1 (A-7)	S	O		CV-O	R	VROJ - 23	2OST-11.14B	
HIGH HEAD SI CHECK TO LOOP 21B HOT LEG											CV-BDT-S	CVCM		2OST-11.16	Frequency alternated with [2SIS*123, 124, 125, 126, 127] per CVCM Program Plan 2SIS-CMP-2.

BV Unit 2

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*123 HIGH HEAD SI CHECK TO LOOP 21C HOT LEG	1	C	Active	2	Check		11-1 (A-7)	S	O		CV-O CV-BDT-S	R CVCM	VROJ - 23	2OST-11.14B 2OST-11.16	Frequency alternated with [2SIS*122, 124, 125, 126, 127] per CVCM Program Plan 2SIS-CMP-2.
2SIS*124 HIGH HEAD SI CHECK TO LOOP 21A HOT LEG	1	C	Active	2	Check		11-1 (A-7)	S	O		CV-O CV-BDT-S	R CVCM	VROJ - 23	2OST-11.14B 2OST-11.16	Frequency alternated with [2SIS*122, 123, 125, 126, 127] per CVCM Program Plan 2SIS-CMP-2.
2SIS*125 HIGH HEAD SI CHECK TO LOOP 21A HOT LEG	1	C	Active	2	Check		11-1 (B-7)	S	O		CV-O CV-BDT-S	R CVCM	VROJ - 23	2OST-11.14B 2OST-11.16	Frequency alternated with [2SIS*122, 123, 124, 126, 127] per CVCM Program Plan 2SIS-CMP-2.
2SIS*126 HIGH HEAD SI CHECK TO LOOP 21C HOT LEG	1	C	Active	2	Check		11-1 (B-7)	S	O		CV-O CV-BDT-S	R CVCM	VROJ - 23	2OST-11.14B 2OST-11.16	Frequency alternated with [2SIS*122, 123, 124, 125, 127] per CVCM Program Plan 2SIS-CMP-2.
2SIS*127 HIGH HEAD SI CHECK TO LOOP 21B HOT LEG	1	C	Active	2	Check		11-1 (B-7)	S	O		CV-O CV-BDT-S	R CVCM	VROJ - 23	2OST-11.14B 2OST-11.16	Frequency alternated with [2SIS*122, 123, 124, 125, 126] per CVCM Program Plan 2SIS-CMP-2.

BV Unit 2

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*128	1	A/C	Active	6	Check		11-1 (B-9)	S	O/S		CV-S-LT	R	VROJ - 24	2OST-11.16	
LOW HEAD SI CHECK TO LOOP 21B HOT LEG											CV-O	CVCM	VROJ - 24	2OST-11.14A	Tested with [2SIS*129, 545, 546] per CVCM Program Plan 2SIS-CMP-6.
											LT	2YR/18M/CSD		2OST-11.16	18 MO per Tech Specs
2SIS*129	1	A/C	Active	6	Check		11-1 (B-9)	S	O/S		CV-S-LT	R	VROJ - 24	2OST-11.16	
LOW HEAD SI CHECK TO LOOP 21C HOT LEG											CV-O	CVCM	VROJ - 24	2OST-11.14A	Tested with [2SIS*128, 545, 546] per CVCM Program Plan 2SIS-CMP-6.
											LT	2YR/18M/CSD		2OST-11.16	18 MO per Tech Specs
2SIS*130	2	A/C	Active	10	Check		11-1 (F-9)	S	O/S		CV-O	R	VROJ - 25	2OST-11.14A	
LHSI PP COMBINED DISCH CHECK TO LOOPS 21B & 21C HOT LEGS											CV-S	R	VROJ - 25		By observation of external weight arm to close.
											LT	2YR/18MO		2OST-11.16	18 MO per Tech Specs
2SIS*132	2	A/C	Active	10	Check		11-1 (G-9)	S	O/S		CV-O	R	VROJ - 26	2OST-11.14A	
LHSI PUMP 21B DISCH CHECK TO COLD LEGS											CV-S	R	VROJ - 26		By observation of external weight arm to close.
											LT	2YR/18M/CSD		2OST-11.16A	CSD or 18 MO per Tech Specs
2SIS*133	2	A/C	Active	10	Check		11-1 (E-9)	S	O/S		CV-O	R	VROJ - 26	2OST-11.14A	
LHSI PUMP 21A DISCH CHECK TO COLD LEGS											CV-S	R	VROJ - 26		By observation of external weight arm to close.
											LT	2YR/18M/CSD		2OST-11.16A	CSD or 18 MO per Tech Specs

BV Unit 2

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*134 HIGH HEAD SI CHECK TO LOOP 21B COLD LEG	1	C	Active	2	Check		11-1 (C-9)	S	O		CV-O CV-BDT-S	R CVCM	VROJ - 27	2OST-11.14B 2OST-11.16	Frequency alternated with [2SIS*135, 136, 137, 138, 139] per CVCM Program Plan 2SIS-CMP-3.
2SIS*135 HIGH HEAD SI CHECK TO LOOP 21C COLD LEG	1	C	Active	2	Check		11-1 (D-9)	S	O		CV-O CV-BDT-S	R CVCM	VROJ - 27	2OST-11.14B 2OST-11.16	Frequency alternated with [2SIS*134, 136, 137, 138, 139] per CVCM Program Plan 2SIS-CMP-3.
2SIS*136 HIGH HEAD SI CHECK TO LOOP 21A COLD LEG	1	C	Active	2	Check		11-1 (D-9)	S	O		CV-O CV-BDT-S	R CVCM	VROJ - 27	2OST-11.14B 2OST-11.16	Frequency alternated with [2SIS*134, 135, 137, 138, 139] per CVCM Program Plan 2SIS-CMP-3.
2SIS*137 HHSI CHECK TO LOOP 21C COLD LEG	1	C	Active	2	Check		11-1 (C-9)	S	O		CV-O CV-BDT-S	R CVCM	VROJ - 27	2OST-11.14B 2OST-11.16	Frequency alternated with [2SIS*134, 135, 136, 138, 139] per CVCM Program Plan 2SIS-CMP-3.
2SIS*138 HHSI CHECK TO LOOP 21B COLD LEG	1	C	Active	2	Check		11-1 (C-9)	S	O		CV-O CV-BDT-S	R CVCM	VROJ - 27	2OST-11.14B 2OST-11.16	Frequency alternated with [2SIS*134, 135, 136, 137, 139] per CVCM Program Plan 2SIS-CMP-3.

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (In.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*139	1	C	Active	2	Check		11-1 (C-9)	S	O		CV-O	R	VROJ - 27	2OST-11.14B	
HHSI CHECK TO LOOP 21A COLD LEG											CV-BDT-S	CVCM		2OST-11.16	Frequency alternated with [2SIS*134, 135, 136, 137, 138] per CVCM Program Plan 2SIS-CMP-3.
2SIS*141	1	A/C	Active	12	Check		6-1 (E-6)	S	O/S		CV-S-LT	R	VROJ - 28	2OST-11.4	
SI ACCUM TANK 21C CHECK TO LOOP C COLD LEG											CV-O	CVCM	VROJ - 28	2OST-11.15C	Tested with [2SIS*142] at an alternating frequency with [2SIS*145, 147] and [2SIS*148, 151] per CVCM Program Plan 2SIS-CMP-1.
											LT	2YR/18M/CSD		2OST-11.4	CSD or 18 MO per Tech Specs
2SIS*142	1	A/C	Active	12	Check		11-2 (F-9)	S	O/S		CV-S-LT	R	VROJ - 28	2OST-11.5	
LOOP 21C SI ACCUMULATOR TANK 21C CHECK											CV-O	CVCM	VROJ - 28	2OST-11.15C	Tested with [2SIS*141] at an alternating frequency with [2SIS*145, 147] and [2SIS*148, 151] per CVCM Program Plan 2SIS-CMP-1.
											LT	2YR/18MO		2OST-11.5	18 MO per Tech Specs

BV Unit 2

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*145	1	A/C	Active	12	Check		6-1 (D-6)	S	O/S		CV-S-LT	R	VROJ - 28	2OST-11.4	
SI ACCUM TANK 21B CHECK TO LOOP B COLD LEG											CV-O	CVCM	VROJ - 28	2OST-11.15B	Tested with [2SIS*147] at an alternating frequency with [2SIS*141, 142] and [2SIS*148, 151] per CVCM Program Plan 2SIS-CMP-1.
											LT	2YR/18M/CSD		2OST-11.4	CSD or 18 MO per Tech Specs
2SIS*147	1	A/C	Active	12	Check		11-2 (F-7)	S	O/S		CV-S-LT	R	VROJ - 28	2OST-11.5	
LOOP 21B SI ACCUM TK 21B CHECK											CV-O	CVCM	VROJ - 28	2OST-11.15B	Tested with [2SIS*145] at an alternating frequency with [2SIS*141, 142] and [2SIS*148, 151] per CVCM Program Plan 2SIS-CMP-1.
											LT	2YR/18MO		2OST-11.5	18 MO per Tech Specs
2SIS*148	1	A/C	Active	12	Check		11-2 (F-4)	S	O/S		CV-S-LT	R	VROJ - 28	2OST-11.5	
LOOP 21A SI ACCUMULATOR TANK 21A CHECK											CV-O	CVCM	VROJ - 28	2OST-11.15A	Tested with [2SIS*151] at an alternating frequency with [2SIS*141, 142] and [2SIS*145, 147] per CVCM Program Plan 2SIS-CMP-1.
											LT	2YR/18MO		2OST-11.5	18 MO per Tech Specs

BV Unit 2

VALVE TABLE

SYSTEM NAME: Safety Injection															SYSTEM NUMBER: 11
Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*151 SI ACCUM TANK 21A CHECK TO LOOP A COLD LEG	1	A/C	Active	12	Check		6-1 (D-5)	S	O/S		CV-S-LT	R	VROJ - 28	2OST-11.4	
											CV-O	CVCM	VROJ - 28	2OST-11.15A	Tested with [2SIS*148] at an alternating frequency with [2SIS*141, 142] and [2SIS*145, 147] per CVCM Program Plan 2SIS-CMP-1.
											LT	2YR/18MO		2OST-11.4	18 MO per Tech Specs
2SIS*27 CHECK VALVE TO HHSI PUMPS FROM RWST	2	A/C	Active	8	Check		11-1 (F-1)	S	O/S		CV-O	R	VROJ - 19	2OST-11.14B	
											CV-S-LT	R	VROJ - 19	2BVT 1.47.11	
											LT	2YR			
2SIS*41 COMBINED SUPPLY LINE ISOL TO ACCUM	2	A	Passive	1	Globe		11-2 (C-2)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #20 per 2OST-47.112
2SIS*42 COMBINED SUPPLY CHECK VALVE TO ACCUMULATOR	2	A/C	Active	2.5	Check		11-2 (D-2)	S	S		LJ-C	SP		2BVT 1.47.5	Penet. #20 per 2OST-47.112
											CV-S	R	VROJ - 20	2OST-1.10J	By observation of external weight arm to close.
											CV-BDT-O	NSO		2OM-11.4.D	During makeup to SI Accumulator.
2SIS*46 RECIRC PUMP DISCHARGE LINE TO LHSI DISCHARGE CHECK	2	C	Active	10	Check		11-1 (G-5)	S	O		CV-ME	CSD	VCSJ - 09	2OST-1.10J	
2SIS*47 RECIRC PUMP DISCHARGE LINE TO LHSI DISCHARGE CHECK	2	C	Active	10	Check		11-1 (E-5)	S	O		CV-ME	CSD	VCSJ - 09	2OST-1.10J	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*545 SI CHECK TO LOOP 21B HOT LEG	1	C	Active	6	Check		11-1 (A-9)	S	O		CV-BDT-S	CVCM		2OST-11.16	Frequency alternated with [2SIS*128, 129, 546] per CVCM Program Plan 2SIS-CMP-6.
											CV-O	CVCM	VROJ - 29	2OST-11.14A	Tested with [2SIS*128, 129, 546] per CVCM Program Plan 2SIS-CMP-6.
2SIS*546 SI CHECK TO LOOP 21C HOT LEG	1	C	Active	6	Check		11-1 (A-9)	S	O		CV-BDT-S	CVCM		2OST-11.16	Frequency alternated with [2SIS*128, 129, 545] per CVCM Program Plan 2SIS-CMP-6.
											CV-O	CVCM	VROJ - 29	2OST-11.14A	Tested with [2SIS*128, 129, 545] per CVCM Program Plan 2SIS-CMP-6.
2SIS*547 SI CHECK TO LOOP 21A HOT LEG	1	C	Active	6	Check		11-1 (A-9)	S	O		CV-O	R	VROJ - 30	2OST-11.14B	
											CV-BDT-S	CVCM		2OST-11.16	Single valve group frequency per CVCM Program Plan 2SIS-CMP-5.
2SIS*548 SI CHECK TO LOOP 21A COLD LEG	1	C	Active	6	Check		11-1 (A-10)	S	O		CV-BDT-S	CVCM		2OST-11.16	Frequency alternated with [2SIS*107, 108, 109, 550, 552] per CVCM Program Plan 2SIS-CMP-4.
											CV-O	CVCM	VROJ - 31	2OST-11.14A	Tested with [2SIS*107, 108, 109, 550, 552] at frequency per CVCM Program Plan 2SIS-CMP-4.

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*550 SI CHECK TO LOOP 21B COLD LEG	1	C	Active	6	Check		11-1 (A-10)	S	O		CV-BDT-S	CVCM		2OST-11.16	Frequency alternated with [2SIS*107, 108, 109, 548, 552] per CVCM Program Plan 2SIS-CMP-4.
											CV-O	CVCM	VROJ - 31	2OST-11.14A	Tested with [2SIS*107, 108, 109, 548, 552] at frequency per CVCM Program Plan 2SIS-CMP-4.
2SIS*552 SI CHECK TO LOOP 21C COLD LEG	1	C	Active	6	Check		11-1 (A-10)	S	O		CV-BDT-S	CVCM		2OST-11.16	Frequency alternated with [2SIS*107, 108, 109, 548, 550] per CVCM Program Plan 2SIS-CMP-4.
											CV-O	CVCM	VROJ - 31	2OST-11.14A	Tested with [2SIS*107, 108, 109, 548, 550] at frequency per CVCM Program Plan 2SIS-CMP-4.
2SIS*6 LHSI PUMP (A) DISCHARGE CHECK	2	A/C	Active	10	Check		11-1 (E-4)	S	O/S		CV-O	R	VROJ - 18	2OST-11.14A	
											CV-S	Q		2OST-11.2	
											LT	2YR		2BVT 1.47.11	
2SIS*7 LHSI PUMP (B) DISCHARGE CHECK	2	A/C	Active	10	Check		11-1 (G-4)	S	O/S		CV-O	R	VROJ - 18	2OST-11.14A	
											CV-S	Q		2OST-11.1	
											LT	2YR		2BVT 1.47.11	
2SIS*83 HHSI LINE CHECK VALVE TO RCS HOT LEGS	2	A/C	Active	3	Check		11-1 (A-4)	S	O/S		CV-O	R	VROJ - 21	2OST-11.14B	
											CV-S	R	VROJ - 21		
											LT	2YR		2BVT 1.47.11	
2SIS*84 HHSI LINE CHECK VALVE TO RCS HOT LEGS	2	A/C	Active	3	Check		11-1 (B-4)	S	O/S		CV-O	R	VROJ - 21	2OST-11.14B	
											CV-S	R	VROJ - 21		
											LT	2YR		2BVT 1.47.11	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*894 LHSI PUMP (2SIS*P21A) MIN FLOW RECIRC CHECK	2	C	Active	4	Check		11-1 (E-3)	S	O/S		CV-S-LT CV-O	R Q	VROJ - 32	2BVT 1.47.11 2OST-11.1	
2SIS*895 LHSI PUMP (2SIS*P21B) MIN FLOW RECIRC CHECK	2	C	Active	4	Check		11-1 (G-4)	S	O/S		CV-S-LT CV-O	R Q	VROJ - 32	2BVT 1.47.11 2OST-11.2	
2SIS*94 HHSI LINE CHECK VALVE TO RCS COLD LEGS	2	A/C	Active	3	Check		11-1 (D-6)	S	O/S		CV-O CV-S LT	R R 2YR	VROJ - 21 VROJ - 21	2OST-11.14B 2BVT 1.47.11	
2SIS*95 HHSI LINE CHECK VALVE TO RCS COLD LEGS	2	A/C	Active	3	Check		11-1 (C-6)	S	O/S		CV-O CV-S LT	R R 2YR	VROJ - 21 VROJ - 21	2OST-11.14B 2BVT 1.47.11	
2SIS*AOV850A SI ACCUMULATOR TK21A LEAK TEST LINE ISOLATION	2	B	Passive	0.75	Globe	AOV	11-2 (F-3)	S	S	S	RPV	2YR		2OST-11.5	
2SIS*AOV850B SI ACCUMULATOR TK21A LEAK TEST LINE ISOLATION	2	B	Passive	0.75	Globe	AOV	11-2 (F-3)	S	S	S	RPV	2YR		2OST-11.4	
2SIS*AOV850C SI ACCUMULATOR TK21B LEAK TEST LINE ISOLATION	2	B	Passive	0.75	Globe	AOV	11-2 (F-6)	S	S	S	RPV	2YR		2OST-11.5	
2SIS*AOV850D SI ACCUMULATOR TK 21B LEAK TEST LINE ISOLATION	2	B	Passive	0.75	Globe	AOV	11-2 (F-6)	S	S	S	RPV	2YR		2OST-11.4	
2SIS*AOV850E SI ACCUMULATOR TK21C LEAK TEST LINE ISOLATION	2	B	Passive	0.75	Globe	AOV	11-2 (F-8)	S	S	S	RPV	2YR		2OST-11.5	
2SIS*AOV850F SI ACCUMULATOR TK21C LEAK TEST LINE ISOLATION	2	B	Passive	0.75	Globe	AOV	11-2 (F-8)	S	S	S	RPV	2YR		2OST-11.4	
2SIS*AOV889 SI ACCUMULATOR TEST LINE ISOLATION	2	A	Active	0.75	Globe	AOV	11-2 (F-1)	S	S	S	LJ-C FS-S ST-S RPV	SP Q Q 2YR/18MO		2BVT 1.47.5 2OST-47.3M	Penet. #106 per 2OST-47.154 18 months per Tech Specs

BV Unit 2

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*HCV868A	2	B	Active	1	Globe	HCV	11-1 (D-5)	S	O/S	S	FS-S	R	VCSJ - 11	2OST-11.14B	
HHSI DISCHARGE TO COLD LEG INJECTION											ST-O	R	VCSJ - 11		
											ST-S	R	VCSJ - 11		
											FS-S	CSD	VCSJ - 11	2OST-1.10H	
											ST-O	CSD	VCSJ - 11		
											ST-S	CSD	VCSJ - 11		
											RPV	2YR		2OST-11.14B	
											RPV	2YR		2OST-1.10H	
2SIS*HCV868B	2	B	Active	1	Globe	HCV	11-1 (B-3)	S	O/S	S	FS-S	R	VCSJ - 11	2OST-11.14B	
HHSI DISCHARGE TO COLD LEG INJECTION											ST-O	R	VCSJ - 11		
											ST-S	R	VCSJ - 11		
											FS-S	CSD	VCSJ - 11	2OST-1.10H	
											ST-O	CSD	VCSJ - 11		
											ST-S	CSD	VCSJ - 11		
											RPV	2YR		2OST-11.14B	
											RPV	2YR		2OST-1.10H	
2SIS*MOV836	2	A	Active	3	Gate	MOV	11-1 (D-5)	S	O/S		ET	CSD or R	VROJ - 33	2OST-1.10F	Per OMN-1
HIGH HEAD TO COLD LEG INJECTION ISOLATION											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	
2SIS*MOV840	2	A	Active	1	Globe	MOV	11-1 (D-6)	S	O/S		DIAG-ST-O	6RFO		2OST-47.3M	Per OMN-1
HIGH HEAD TO COLD LEG INJECTION ISOLATION											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	
											ET	18MO or R		2OST-47.3M	Per OMN-1
2SIS*MOV841	2	B	Active	3	Gate	MOV	11-1 (B-2)	O	O/S		DIAG-ST-O	6RFO		2OST-47.3M	Per OMN-1 (passive direction)
HIGH HEAD TO COLD LEG INJECTION ISOLATION											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1

BV Unit 2

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*MOV842	2	A	Active	2	Globe	MOV	11-2 (F-2)	S	S		LJ-C	SP		2BVT 1.47.5	Penet. #106 per 2OST-47.154
SI ACCUM TEST LINE ISOLATION VALVE TO RWST											RPV	6RFO/18MO		2OST-47.3S	18 months per Tech Specs
											DIAG-ST-S	6RFO		2OST-47.3O	Per OMN-1
											ET	18MO or R			Per OMN-1
2SIS*MOV851A	2	B	Passive	2	Globe	MOV	11-2 (E-3)	S	S		RPV	2YR		2OST-1.10G	
SI ACCUMULATOR TK21A WATER MAKEUP ISOLATION															
2SIS*MOV851B	2	B	Passive	2	Globe	MOV	11-2 (E-5)	S	S		RPV	2YR		2OST-1.10G	
SI ACCUMULATOR TK21B WATER MAKEUP ISOLATION															
2SIS*MOV851C	2	B	Passive	2	Globe	MOV	11-2 (E-8)	S	S		RPV	2YR		2OST-1.10G	
SI ACCUMULATOR TK21C WATER MAKEUP ISOLATION															
2SIS*MOV852A	2	B	Passive	2	Globe	MOV	11-2 (F-4)	S	S		RPV	2YR		2OST-1.10G	
SI ACCUMULATOR TK21A DISCH TO PRI DRAINS TFR TK21															
2SIS*MOV852B	2	B	Passive	2	Globe	MOV	11-2 (F-7)	S	S		RPV	2YR		2OST-1.10G	
SI ACCUMULATOR TK21B DISCH TO PRI DRAINS TFR TK21															
2SIS*MOV852C	2	B	Passive	2	Globe	MOV	11-2 (F-10)	S	S		RPV	2YR		2OST-1.10G	
SI ACCUMULATOR TK21C DISCH TO PRI DRAINS TFR TK21															
2SIS*MOV863A	2	B	Active	8	Gate	MOV	11-1 (E-7)	S	O		ET	Q		2OST-47.3M	Per OMN-1
LHSI PUMP 21A DISCH TO HHSI PUMPS ISOLATION											DIAG-ST-O	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SIS*MOV863B	2	B	Active	8	Gate	MOV	11-1 (F-6)	S	O		ET	Q		2OST-47.3O	Per OMN-1
LHSI PUMP 21B DISCH TO HHSI PUMPS ISOLATION											DIAG-ST-O	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SIS*MOV865A	2	B	Active	12	Gate	MOV	11-2 (F-4)	O	O/S		ST-O	CSD	VCSJ - 10	2OST-1.10H	(passive direction)
SI ACCUMULATOR TK21A DISCH STOP											ST-O	CSD	VCSJ - 10	2OST-52.4.R.1.F	(passive direction)
											ST-S	CSD	VCSJ - 10	2OST-1.10H	
											ST-S	CSD	VCSJ - 10	2OM-52.4.R.1.F	
											RPV	2YR			
											RPV	2YR		2OST-1.10H	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*MOV865B	2	B	Active	12	Gate	MOV	11-2 (F-7)	O	O/S		ST-O	CSD	VCSJ - 10	2OST-1.10H	(passive direction)
SI ACCUMULATOR TK21B DISCH STOP											ST-O	CSD	VCSJ - 10	2OM-52.4.R.1.F	(passive direction)
											ST-S	CSD	VCSJ - 10	2OST-1.10H	
											ST-S	CSD	VCSJ - 10	2OM-52.4.R.1.F	
											RPV	2YR			
											RPV	2YR		2OST-1.10H	
2SIS*MOV865C	2	B	Active	12	Gate	MOV	11-2 (F-9)	O	O/S		ST-O	CSD	VCSJ - 10	2OST-1.10H	(passive direction)
SI ACCUMULATOR TK21C DISCH STOP											ST-O	CSD	VCSJ - 10	2OM-52.4.R.1.F	(passive direction)
											ST-S	CSD	VCSJ - 10	2OST-1.10H	
											ST-S	CSD	VCSJ - 10	2OM-52.4.R.1.F	
											RPV	2YR			
											RPV	2YR		2OST-1.10H	
2SIS*MOV867A	2	B	Active	3	Gate	MOV	11-1 (B-2)	S	O		ET	Q		2OST-47.3M	Per OMN-1
HHSI PUMPS ISOLATION TO COLD LEG INJECTION											DIAG-ST-O	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SIS*MOV867B	2	B	Active	3	Gate	MOV	11-1 (C-2)	S	O		ET	Q		2OST-47.3O	Per OMN-1
HHSI PUMPS ISOLATION TO COLD LEG INJECTION											DIAG-ST-O	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SIS*MOV867C	2	A	Active	3	Gate	MOV	11-1 (C-5)	S	O/S		ET	Q		2OST-47.3M	Per OMN-1
HHSI PUMPS ISOLATION TO COLD LEG INJECTION											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	
2SIS*MOV867D	2	A	Active	3	Gate	MOV	11-1 (C-4)	S	O/S		ET	Q		2OST-47.3O	Per OMN-1
HHSI PUMPS ISOLATION TO COLD LEG INJECTION											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	
2SIS*MOV869A	2	A	Active	3	Gate	MOV	11-1 (A-3)	S	O/S		ET	CSD or R	VROJ - 34	2OST-1.10F	Per OMN-1. May also be ET in 2OST-11.14B.
HIGH HEAD SI HOT LEG INJECTION ISOL											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*MOV869B	2	A	Active	3	Gate	MOV	11-1 (B-3)	S	O/S		ET	CSD or R	VROJ - 34	2OST-1.10F	Per OMN-1. May also be ET in 2OST-11.14B.
HIGH HEAD SI HOT LEG INJECTION ISOLATION											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	
2SIS*MOV8809A	2	A	Active	14	Gate	MOV	11-1 (E-1)	O	O/S		ET	Q		2OST-47.3M	Per OMN-1
LHSI PUMP (2SIS*P2A) SUCTION ISOLATION											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	
2SIS*MOV8809B	2	A	Active	14	Gate	MOV	11-1 (G-2)	O	O/S		ET	Q		2OST-47.3O	Per OMN-1
LHSI PUMP (2SIS*P2B) SUCTION ISOLATION											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	
2SIS*MOV8811A	2	B	Active	10	Gate	MOV	11-1 (E-5)	S	O		ET	Q		2OST-47.3M	Per OMN-1
RS PP (2RSS*P21C) DISCH CROSSOVER TO LHSI P21A DISCH											DIAG-ST-O	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SIS*MOV8811B	2	B	Active	10	Gate	MOV	11-1 (F-5)	S	O		ET	Q		2OST-47.3O	Per OMN-1
RS PP (2RSS*P21D) DISCH CROSSOVER TO LHSI P21B DISCH											DIAG-ST-O	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SIS*MOV8887A	2	B	Active	10	Gate	MOV	11-1 (F-7)	O	O/S		ET	Q		2OST-47.3M	Per OMN-1
LOW HEAD SI PUMP 2A DISCH TO HOT LEGS ISOLATION											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SIS*MOV8887B	2	B	Active	10	Gate	MOV	11-1 (E-8)	O	O/S		ET	Q		2OST-47.3O	Per OMN-1
LOW HEAD SI PUMP 2B DISCH TO HOT LEGS ISOLATION											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1

BV Unit 2

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*MOV8888A	2	A	Active	10	Gate	MOV	11-1 (E-8)	O	O/S		ET	Q		2OST-47.3M	Per OMN-1
LOW HEAD SI PUMP 2A DISCH ISOLATION TO COLD LEGS											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2OST-11.16A	
2SIS*MOV8888B	2	A	Active	10	Gate	MOV	11-1 (G-8)	O	O/S		ET	Q		2OST-47.3O	Per OMN-1
LOW HEAD SI PUMP 2B DISCH ISOLATION TO COLD LEGS											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2OST-11.16A	
2SIS*MOV8889	2	A	Active	10	Gate	MOV	11-1 (F-8)	S	O/S		ET	CSD or R	VROJ - 35	2OST-1.10H	Per OMN-1, May also be ET in 2OST-11.16
LOW HEAD SI PUMP COMBINED DISCH TO HOT LEGS ISOLATION											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2OST-11.16	
2SIS*MOV8890A	2	A	Active	4	Gate	MOV	11-1 (E-4)	S	O/S		ET	Q		2OST-47.3M	Per OMN-1
LOW HEAD SI PP 2A MINI FLOW RECIRC ISOLATION											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	
2SIS*MOV8890B	2	A	Active	4	Gate	MOV	11-1 (F-4)	S	O/S		ET	Q		2OST-47.3O	Per OMN-1
LOW HEAD SI PUMP 2B MINI FLOW RECIRC ISOLATION											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											LT	2YR		2BVT 1.47.11	
2SIS*RV130	2	A/C	Active	0.75x1	Relief	RV	11-2 (D-2)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #20 per 2OST-47.112
RELIEF ON ACCUMULATOR FILL LINE											SPT	10YR		2BVT 1.60.5	
2SIS*RV175	2	A/C	Active	0.75x1	Relief	RV	11-2 (F-1)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #106 per 2OST-47.154
RELIEF ON BACK LEAKAGE LINE OUT SIDE RX CNMT											SPT	10YR		2BVT 1.60.5	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Safety Injection **SYSTEM NUMBER:** 11

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SIS*RV858A ACCUMULATOR (2SIS*TK21A) RELIEF	2	C	Active	1x2	Relief	RV	11-2 (D-4)	S	O/S		SPT	10YR		2BVT 1.60.5	
2SIS*RV858B ACCUMULATOR (2SIS*TK21B) RELIEF	2	C	Active	1x2	Relief	RV	11-2 (D-7)	S	O/S		SPT	10YR		2BVT 1.60.5	
2SIS*RV858C ACCUMULATOR (2SIS*TK21C) RELIEF	2	C	Active	1x2	Relief	RV	11-2 (D-9)	S	O/S		SPT	10YR		2BVT 1.60.5	
2SIS*RV8864A LHSI PUMP DISCHARGE RELIEF	2	C	Active	0.75x1	Relief	RV	11-1 (F-7)	S	O/S		SPT	10YR		2BVT 1.60.5	
2SIS*RV8864B LHSI PUMP DISCHARGE RELIEF	2	C	Active	0.75x1	Relief	RV	11-1 (G-6)	S	O/S		SPT	10YR		2BVT 1.60.5	
2SIS*RV8865 LHSI PUMPS COMBINED HOT LEG INJECTION RELIEF	2	C	Active	0.75x1	Relief	RV	11-1 (F-7)	S	O/S		SPT	10YR		2BVT 1.60.5	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Containment Vacuum **SYSTEM NUMBER:** 12

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CVS*151 CNMT EJ SUCTION CNMT ISOL	2	A	Passive	8	Butterfly		12-1 (A-2)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #94 per 2OST-47.144
2CVS*151-1 CNMT EJ SUCTION CNMT ISOL	2	A	Passive	8	Butterfly		12-1 (A-3)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #94 per 2OST-47.144
2CVS*93 CNMT ACT MONITOR SUPPLY CHECK	2	A/C	Active	1	Check		12-1 (E-2)	O	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #43 per 2OST-47.121
											CV-O.	NSO		2OM-54.3 (L5-133)	See VROJ-36
											CV-S-LT	CVCM	VROJ - 36	2OST-47.121	Frequency per Appendix J, Option B per CVCM Program Plan 2CVS-CMP-1 (Penet. #43).
2CVS*SOV102 POST ACCIDENT SAMPLING	2	A	Active	1	Globe	SOV	12-1 (E-3)	O	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #43 per 2OST-47.121
											FS-S	Q		2OST-47.3F	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.175	18 months per Tech Specs
											RPV	2YR/18MO		2OST-47.121	For PMT ONLY
2CVS*SOV151A CNMT VAC PP 21A SUCTION ISOL	2	A	Active	2	Globe	SOV	12-1 (B-4)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #93 per 2OST-47.143
											FS-S	Q		2OST-47.3L	
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.174	18 months per Tech Specs
											RPV	2YR/18MO		2OST-47.143	For PMT ONLY
2CVS*SOV151B CNMT VAC PP 21B SUCTION ISOL	2	A	Active	2	Globe	SOV	12-1 (D-4)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #92 per 2OST-47.142
											FS-S	Q		2OST-47.3L	
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.174	18 months per Tech Specs
											RPV	2YR/18MO		2OST-47.142	For PMT ONLY

BV Unit 2

VALVE TABLE

SYSTEM NAME: Containment Vacuum **SYSTEM NUMBER:** 12

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CVS*SOV152A	2	A	Active	2	Globe	SOV	12-1 (B-4)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #93 per 2OST-47.143
CNMT VAC PP 21A SUCTION ISOL											FS-S	Q		2OST-47.3F	
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.174	18 months per Tech Specs
											RPV	2YR/18MO		2OST-47.143	For PMT ONLY
2CVS*SOV152B	2	A	Active	2	Globe	SOV	12-1 (D-4)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #92 per 2OST-47.142
CNMT VAC PP 21B SUCTION ISOL											FS-S	Q		2OST-47.3F	
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.174	18 months per Tech Specs
											RPV	2YR/18MO		2OST-47.142	For PMT ONLY
2CVS*SOV153A	2	A	Active	1	Globe	SOV	12-1 (F-3)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #44 per 2OST-47.122
AIR ACTIVITY MONITOR INLET ISOLATION											FS-S	Q		2OST-47.3F	
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.175	18 months per Tech Specs
											RPV	2YR/18MO		2OST-47.122	For PMT ONLY
2CVS*SOV153B	2	A	Active	1	Globe	SOV	12-1 (F-2)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #44 per 2OST-47.122
AIR ACTIVITY MONITOR INLET ISOLATION											FS-S	Q		2OST-47.3F	
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.175	18 months per Tech Specs
											RPV	2YR/18MO		2OST-47.122	For PMT ONLY
2LMS*51	2	A	Passive	0.5	Globe/Sealed		12-2 (E-6)	SS	S		LJ-C	SP		2BVT 1.47.5	Penet. #105-D per 2OST-47.153
ISOL TO (2LMS-PIT102)															
2LMS*52	2	A	Passive	0.5	Globe/Sealed		12-2 (E-6)	SS	S		LJ-C	SP		2BVT 1.47.5	Penet. #105-D per 2OST-47.153
ISOL TO (2LMS-PIT102)															

BV Unit 2

VALVE TABLE

SYSTEM NAME: Containment Vacuum **SYSTEM NUMBER:** 12

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2LMS*SOV950	2	B	Active	0.375	Globe	SOV	12-1 (F-9)	O	O/S	O	FS-O	Q		2OST-47.3L	
CNMT PRESSURE TRANSMITTER ISOL (2LMS*PT950)											ST-O	Q			
											ST-S	Q			
											RPV	2YR		2OST-47.105	
2LMS*SOV951	2	B	Active	0.375	Globe	SOV	12-1 (E-9)	O	O/S	O	FS-O	Q		2OST-47.3L	
CNMT PRESSURE TRANSMITTER ISOL (2LMS*PT951)											ST-O	Q			
											ST-S	Q			
											RPV	2YR		2OST-47.105	
2LMS*SOV952	2	B	Active	0.375	Globe	SOV	12-1 (C-9)	O	O/S	O	FS-O	Q		2OST-47.3F	
CNMT PRESSURE TRANSMITTER ISOL (2LMS*PT952)											ST-O	Q			
											ST-S	Q			
											RPV	2YR		2OST-47.105	
2LMS*SOV953	2	B	Active	0.375	Globe	SOV	12-1 (B-9)	O	O/S	O	FS-O	Q		2OST-47.3F	
CNMT PRESSURE TRANSMITTER ISOL (2LMS*PT953)											ST-O	Q			
											ST-S	Q			
											RPV	2YR		2OST-47.105	

SYSTEM NAME: Containment Depressurization (Quench Spray & Recirc Spray) **SYSTEM NUMBER:** 13

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2QSS*3 QUENCH PUMP P21B DISCHARGE CHECK	2	A/C	Active	10	Check		13-2 (D-10)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #64 per 2OST-47.137
											CV-ME	CSD	VCSJ - 12	2OST-1.10J	
2QSS*4 QUENCH PUMP P21A DISCHARGE CHECK	2	A/C	Active	10	Check		13-2 (C-9)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #63 per 2OST-47.136
											CV-ME	CSD	VCSJ - 12	2OST-1.10J	
2QSS*AOV120A REFUELING WATER COOLING PUMP SUCTION ISOL	2	B	Active	6	Globe	AOV	13-2 (E-3)	O	S	S	FS-S	Q		2OST-47.3I	
											ST-S	Q			
											RPV	2YR			
2QSS*AOV120B REFUELING WATER COOLING PUMP SUCTION ISOL	2	B	Active	6	Globe	AOV	13-2 (D-3)	O	S	S	FS-S	Q		2OST-47.3N	
											ST-S	Q			
											RPV	2YR			
2QSS*MOV100A QUENCH SPRAY PUMP 21A SUCTION ISOL VALVE	2	B	Passive	12	Gate	MOV	13-2 (A-8)	O	O		RPV	2YR		2OST-47.3I	
2QSS*MOV100B QUENCH PUMP 21B SUCTION ISOLATION VALVE	2	B	Passive	12	Gate	MOV	13-2 (G-8)	O	O		RPV	2YR		2OST-47.3O	
2QSS*MOV101A QUENCH PUMP 21A DISCHARGE ISOLATION VALVE	2	A	Active	10	Gate	MOV	13-2 (C-9)	O	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #63 per 2OST-47.136
											DIAG-ST-O	6RFO		2OST-13.1	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
2QSS*MOV101B QUENCH PUMP 21B DISCHARGE ISOLATION VALVE	2	A	Active	10	Gate	MOV	13-2 (D-9)	O	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #64 per 2OST-47.137
											DIAG-ST-O	6RFO		2OST-13.2	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
2QSS*RV101A 2QSS*MOV101A BONNET RELIEF	2	A/C	Active	0.75x1	Relief	RV	13-2 (C-9)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #63 per 2OST-47.136
											SPT	10YR		2BVT 1.60.5	
2QSS*RV101B 2QSS*MOV101B BONNET RELIEF	2	A/C	Active	0.75x1	Relief	RV	13-2 (E-9)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #64 per 2OST-47.137
											SPT	10YR		2BVT 1.60.5	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Containment Depressurization (Quench Spray & Recirc Spray) **SYSTEM NUMBER:** 13

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2RSS*10	2	A	Passive	1.5	Gate		13-1 (E-9)	S	S		LT	2YR		2BVT 1.13.6	
RECIRC PUMP P21B DRAIN TO NUCLEAR VENT AND DRN SYSTEM															
2RSS*11	2	A	Passive	1.5	Gate		13-1 (E-4)	S	S		LT	2YR		2BVT 1.13.6	
RECIRC PUMP P21C DRAIN TO NUCLEAR VENT AND DRN SYSTEM															
2RSS*12	2	A	Passive	1.5	Gate		13-1 (E-7)	S	S		LT	2YR		2BVT 1.13.6	
RECIRC PUMP P21D DRAIN TO NUCLEAR VENT AND DRN SYSTEM															
2RSS*27	2	A	Passive	4	Gate		13-1 (C-2)	LS	S		LT	2YR		2BVT 1.13.5	
RECIRC PUMP P21A DISCHARGE RECIRC ISOL															
2RSS*28	2	A	Passive	4	Gate		13-1 (C-9)	LS	S		LT	2YR		2BVT 1.13.5	
RECIRC PUMP P21B DISCHARGE RECIRC ISOL															
2RSS*29	2	C	Active	12	Check		13-1 (B-2)	S	O/S		CV-ME	CSD	VCSJ - 13	2OST-1.10J	
RECIRC PUMP P21A DISCHARGE CHECK															
2RSS*3	2	A	Passive	4	Gate		13-1 (B-3)	LS	S		LT	2YR		2BVT 1.13.6	
DEMINERALIZED WATER TO RECIRC PUMP P21C ISOL															
2RSS*30	2	C	Active	12	Check		13-1 (B-9)	S	O/S		CV-ME	CSD	VCSJ - 13	2OST-1.10J	
RECIRC PUMP P21B DISCHARGE CHECK															
2RSS*31	2	C	Active	12	Check		13-1 (B-4)	S	O/S		CV-ME	CSD	VCSJ - 13	2OST-1.10J	
RECIRC PUMP P21C DISCHARGE CHECK															
2RSS*32	2	C	Active	12	Check		13-1 (B-7)	S	O/S		CV-ME	CSD	VCSJ - 13	2OST-1.10J	
RECIRC PUMP P21D DISCHARGE CHECK															
2RSS*4	2	A	Passive	4	Gate		13-1 (C-8)	LS	S		LT	2YR		2BVT 1.13.6	
DEMINERALIZED WATER TO RECIRC PUMP P21D ISOL															
2RSS*5	2	A	Passive	4	Gate		13-1 (E-1)	LS	S		LT	2YR		2BVT 1.13.6	
RECIRC PUMP P21A SUCTION RECIRC ISOL															

SYSTEM NAME: Containment Depressurization (Quench Spray & Recirc Spray) **SYSTEM NUMBER:** 13

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2RSS*6 RECIRC PUMP P21B SUCTION RECIRC ISOL	2	A	Passive	4	Gate		13-1 (E-10)	LS	S		LT	2YR		2BVT 1.13.6	
2RSS*9 RECIRC PUMP P21A DRAIN TO NUCLEAR VENT AND DRN SYSTEM	2	A	Passive	1.5	Gate		13-1 (F-2)	S			LT	2YR		2BVT 1.13.6	
2RSS*MOV154C RECIRC PUMP P21C RECIRCULATION VALVE	2	B	Active	3	Gate	MOV	13-1 (C-4)	S	O/S		ET ET DIAG-ST-O DIAG-ST-S	R R 6RFO 6RFO	VROJ - 37 VROJ - 37	2BVT 1.13.5 2OST-1.10H 2BVT 1.13.5	Per OMN-1 Per OMN-1 Per OMN-1 Per OMN-1
2RSS*MOV154D RECIRC PUMP P21D RECIRCULATION VALVE	2	B	Active	3	Gate	MOV	13-1 (C-7)	S	O/S		ET ET DIAG-ST-O DIAG-ST-S	R R 6RFO 6RFO	VROJ - 37 VROJ - 37	2BVT 1.13.5 2OST-1.10H 2BVT 1.13.5	Per OMN-1 Per OMN-1 Per OMN-1 Per OMN-1
2RSS*MOV155A RECIRC SPRAY PUMP 21A OUTSIDE CNMT SUCTION ISOL	2	B	Active	12	Butterfly	MOV	13-1 (G-4)	O	O/S		ET DIAG-ST-O DIAG-ST-S RPV	Q 6RFO 6RFO 6RFO		2OST-47.3Q	Per OMN-1 Per OMN-1 Per OMN-1 Per OMN-1
2RSS*MOV155B RECIRC SPRAY PUMP P21B OUTSIDE CNMT SUCTION ISOL	2	B	Active	12	Butterfly	MOV	13-1 (G-7)	O	O/S		ET DIAG-ST-O DIAG-ST-S RPV	Q 6RFO 6RFO 6RFO		2OST-47.3G	Per OMN-1 Per OMN-1 Per OMN-1 Per OMN-1
2RSS*MOV155C RECIRC PUMP 21C OUTSIDE CNMT SUCTION ISOLATION	2	B	Active	12	Butterfly	MOV	13-1 (F-5)	O	O/S		ET DIAG-ST-O DIAG-ST-S RPV	Q 6RFO 6RFO 6RFO		2OST-47.3Q	Per OMN-1 Per OMN-1 Per OMN-1 Per OMN-1
2RSS*MOV155D RECIRC SPRAY PUMP P21D OUTSIDE CNMT SUCTION ISOL	2	B	Active	12	Butterfly	MOV	13-1 (F-6)	O	O/S		ET DIAG-ST-O DIAG-ST-S RPV	Q 6RFO 6RFO 6RFO		2OST-47.3G	Per OMN-1 Per OMN-1 Per OMN-1 Per OMN-1
2RSS*MOV156A RECIRC SPRAY PUMP 21A OUTSIDE CNMT DISCH ISOL	2	B	Active	12	Gate	MOV	13-1 (B-2)	O	O/S		ST-O ST-S RPV	Q Q 2YR		2OST-47.3Q	

SYSTEM NAME: Containment Depressurization (Quench Spray & Recirc Spray) **SYSTEM NUMBER:** 13

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2RSS*MOV156B RECIRC SPRAY PUMP 21B OUTSIDE CNMT DISCH ISOLATION	2	B	Active	12	Gate	MOV	13-1 (B-9)	O	O/S		ST-O ST-S RPV	Q Q 2YR		2OST-47.3G	
2RSS*MOV156C RECIRC SPRAY PUMP 21C OUTSIDE CNMT DISCH ISOLATION	2	B	Active	12	Gate	MOV	13-1 (B-4)	O	O/S		ET DIAG-ST-O DIAG-ST-S RPV	Q 6RFO 6RFO 6RFO		2OST-47.3Q	Per OMN-1 Per OMN-1 Per OMN-1 Per OMN-1
2RSS*MOV156D RECIRC SPRAY PUMP 21D OUTSIDE CNMT DISCH ISOLATION	2	B	Active	12	Gate	MOV	13-1 (B-7)	O	O/S		ET DIAG-ST-O DIAG-ST-S RPV	Q 6RFO 6RFO 6RFO		2OST-47.3G	Per OMN-1 Per OMN-1 Per OMN-1 Per OMN-1
2RSS*RV101C RECIRC PUMP P21C RECIRCULATION LINE RELIEF	2	C	Active	0.75x1	Relief	RV	13-1 (C-4)	S	O/S		SPT	10YR		2BVT 1.60.5	
2RSS*RV101D RECIRC PUMP P21D.RECIRCULATION LINE RELIEF	2	C	Active	0.75x1	Relief	RV	13-1 (C-7)	S	O/S		SPT	10YR		2BVT 1.60.5	
2RSS*RV156A RECIRC PUMP P21A DISCHARGE VALVE RELIEF	2	C	Active	0.75x1	Relief	RV	13-1 (B-2)	S	O/S		SPT	10YR		2BVT 1.60.5	
2RSS*RV156B RECIRC PUMP P21B DISCHARGE VALVE RELIEF	2	C	Active	0.75x1	Relief	RV	13-1 (B-9)	S	O/S		SPT	10YR		2BVT 1.60.5	
2RSS*RV156C RECIRC PUMP P21C DISCHARGE VALVE RELIEF	2	C	Active	0.75x1	Relief	RV	13-1 (B-4)	S	O/S		SPT	10YR		2BVT 1.60.5	
2RSS*RV156D RECIRC PUMP P21D DISCHARGE VALVE RELIEF	2	C	Active	0.75x1	Relief	RV	13-1 (B-7)	S	O/S		SPT	10YR		2BVT 1.60.5	

SYSTEM NAME: Reactor Plant Sample **SYSTEM NUMBER:** 14A

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SSR*AOV100A1	2	A	Active	0.75	Globe	AOV	14A-1 (C-9)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #56-D per 2OST-47.132
PRZR LIQUID SPACE SAMPLE INSIDE CNMT ISOL											FS-S	Q		2OST-47.3H	
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.3R	18 months per Tech Specs
2SSR*AOV100A2	2	A	Active	0.75	Globe	AOV	14A-1 (D-9)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #56-D per 2OST-47.132
PRZR LIQUID SPACE SAMPLE OUTSIDE CNMT ISOL											FS-S	Q		2OST-47.3F	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech Specs
2SSR*AOV102A1	2	A	Active	0.75	Globe	AOV	14A-2 (C-1)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #56-C per 2OST-47.130
PRI COOL COLD LEG SAMPLE INSIDE CNMT ISOL											FS-S	Q		2OST-47.3H	
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.3R	18 months per Tech Specs
2SSR*AOV102A2	2	A	Active	0.75	Globe	AOV	14A-2 (D-1)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #56-C per 2OST-47.130
PRI COOL COLD LEG SAMPLE OUTSIDE CNMT ISOL											FS-S	Q		2OST-47.3F	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech Specs
2SSR*AOV109A1	2	A	Active	0.75	Globe	AOV	14A-1 (C-7)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #55-D per 2OST-47.127
SAFETY INJECT ACCUM SAMPLE INSIDE CNMT ISOL											FS-S	Q		2OST-47.3H	
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.3R	18 months per Tech Specs
2SSR*AOV109A2	2	A	Active	0.75	Globe	AOV	14A-1 (D-7)	O	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #55-D per 2OST-47.127
SAFETY INJECT ACCUM SAMPLE OUTSIDE CNMT ISOL											FS-S	Q		2OST-47.3F	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech Specs

SYSTEM NAME: Reactor Plant Sample **SYSTEM NUMBER:** 14A

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SSR*AOV112A1 PRZR VAPOR SPACE SAMPL INSIDE CNMT ISOL	2	A	Active	0.75	Globe	AOV	14A-1 (C-8)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #57-A per 2OST-47.133
											FS-S	Q		2OST-47.3H	
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.3R	18 months per Tech Specs
2SSR*AOV112A2 PRZR VAPOR SPACE SAMPLE OUTSIDE CNMT	2	A	Active	0.75	Globe	AOV	14A-1 (D-8)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #57-A per 2OST-47.133
											FS-S	Q		2OST-47.3F	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech Specs
2SSR*AOV117A 21A STM GEN BLOWDOWN SAMPLE OUTSIDE CNMT ISOL	2	B	Active	0.75	Globe	AOV	14A-1 (B-2)	O	S	S	FS-S	Q		2OST-47.3L	
											ST-S	Q			
											RPV	2YR			
2SSR*AOV117B 21B STM GEN BLOWDOWN SAMPLE OUTSIDE CNMT ISOL	2	B	Active	0.75	Globe	AOV	14A-1 (B-3)	O	S	S	FS-S	Q		2OST-47.3L	
											ST-S	Q			
											RPV	2YR			
2SSR*AOV117C 21C STM GEN BLOWDOWN SAMPLE OUTSIDE CNMT ISOL	2	B	Active	0.75	Globe	AOV	14A-1 (B-5)	O	S	S	FS-S	Q		2OST-47.3L	
											ST-S	Q			
											RPV	2YR			
2SSR*RV117 (2SSR*AOV109A) OVERPRESS RELIEF	2	A/C	Active	0.75x1	Relief	RV	14A-1 (D-6)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #55-D per 2OST-47.127
											SPT	10YR		2BVT 1.60.5	
2SSR*RV118 (2SSR*AOV102A) OVERPRESS RELIEF	2	A/C	Active	0.75x1	Relief	RV	14A-2 (C-1)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #56-C per 2OST-47.130
											SPT	10YR		2BVT 1.60.5	
2SSR*RV119 (2SSR*AOV100A) OVERPRESS RELIEF	2	A/C	Active	0.75x1	Relief	RV	14A-1 (D-9)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #56-D per 2OST-47.132
											SPT	10YR		2BVT 1.60.5	
2SSR*RV120 (2SSR*SOV128A) OVERPRESS RELIEF	2	A/C	Active	0.75x1	Relief	RV	14A-2 (C-2)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #56-B per 2OST-47.131
											SPT	10YR		2BVT 1.60.5	
2SSR*RV121 (2SSR*AOV112A) OVERPRESS RELIEF	2	A/C	Active	0.75x1	Relief	RV	14A-1 (D-8)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #57-A per 2OST-47.133
											SPT	10YR		2BVT 1.60.5	

SYSTEM NAME: Reactor Plant Sample **SYSTEM NUMBER:** 14A

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SSR*RV122	2	A/C	Active	0.75x1	Relief	RV	14A-2 (C-2)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #97-C per 2OST-47.144
(2SSR*SOV129A) OVERPRESS RELIEF											SPT	10YR		2BVT 1.60.5	
2SSR*SOV128A1	2	A	Active	0.375	Globe	SOV	14A-2 (B-3)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #56-B per 2OST-47.131
PRI COOL HOT LEG SAMPLE CNMT ISOL											FS-S	Q		2OST-47.3H	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		2-CHM-SAM-3.37	18 months per Tech Specs
2SSR*SOV128A2	2	A	Active	0.375	Globe	SOV	14A-2 (D-2)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #56-B per 2OST-47.131
PRI COOL HOT LEG SAMPLE OUTSIDE CNMT ISOL											FS-S	Q		2OST-47.3F	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		2-CHM-SAM-3.37	18 months per Tech Specs
2SSR*SOV129A1	2	A	Active	0.375	Globe	SOV	14A-2 (B-4)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #97-C per 2OST-47.144
RHR/CNMT SUMP SAMPLE CNMT ISOL											FS-S	Q		2OST-47.3H	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		2-CHM-SAM-3.40	18 months per Tech Specs
2SSR*SOV129A2	2	A	Active	0.375	Globe	SOV	14A-2 (D-2)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #97-C per 2OST-47.144
RHR/CNMT SUMP SAMPLE OUTSIDE CNMT ISOL											FS-S	Q		2OST-47.3F	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		2-CHM-SAM-3.40	18 months per Tech Specs
2SSR*SOV130A1	2	A	Active	0.375	Globe	SOV	14A-2 (B-10)	O	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #55-A per 2OST-47.128
PRZR RELIEF TK GAS/PDTT SAMPLE CNMT ISOL											FS-S	Q		2OST-47.3H	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		2-CHM-SAM-3.38	18 months per Tech Specs

BV Unit 2

VALVE TABLE

SYSTEM NAME: Reactor Plant Sample **SYSTEM NUMBER:** 14A

Valve ID / Name	Class	Cat.	Active / Passive	Size (In.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SSR*SOV130A2	2	A	Active	0.375	Globe	SOV	14A-2 (C-10)	O	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #55-A per 2OST-47.128
PRZR RELIEF TK GAS/PDTT SAMPLE OUTSIDE CNMT ISOL											FS-S	Q		2OST-47.3F	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		2-CHM-SAM-3.38	18 months per Tech Specs

BV Unit 2

VALVE TABLE

SYSTEM NAME: Post Accident Sample **SYSTEM NUMBER:** 14C

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2PAS*SOV105A1	2	A	Active	0.375	Globe	SOV	14C-2 (A-2)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #105-A per 2OST-47.152
CONTAINMENT ATMOSPHERE SAMPLE LINE INSIDE ISOLATION											FS-S	Q		2OST-47.3P	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.152	18 months per Tech Specs
2PAS*SOV105A2	2	A	Active	0.375	Globe	SOV	14C-2 (A-3)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #105-A per 2OST-47.152
CONTAINMENT ATMOSPHERE SAMPLE LINE OUTSIDE ISOL											FS-S	Q		2OST-47.3N	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR/18MO		2OST-47.152	18 months per Tech Specs

SYSTEM NAME: Primary Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CCP*27A COMP COOL PUMP P21C DISCH CROSS CONN TO HDR A	3	B	Active	20	Butterfly		15-1 (D-6)	O	S		MAN MAN MAN	2YR 2YR 2YR		2OST-15.1 2OST-15.2 2OST-15.3	
2CCP*27B COMP COOL PUMP P21C DISCH CROSS CONN TO HDR B	3	B	Active	20	Butterfly		15-1 (D-6)	O	S		MAN MAN MAN	2YR 2YR 2YR		2OST-15.1 2OST-15.2 2OST-15.3	
2CCP*289 RCP 21A THERMAL BARRIER SUPPLY CK	3	A/C	Active	2	Check		15-3 (C-1)	O	S		CV-S-LT CV-BDT-O LT	R NSO 2YR	VROJ - 41	2BVT 1.60.6 ISTC-3550 2BVT 1.60.6	During operation of "A" RCP per PM (Maint Plan 239900)
2CCP*290 RCPB THERMAL BARRIER COOLING WATER SUPPLY CHECK	3	A/C	Active	2	Check		15-3 (F-1)	O	S		CV-S-LT CV-BDT-O LT	R NSO 2YR	VROJ - 41	2BVT 1.60.6 ISTC-3550 2BVT 1.60.6	During operation of "B" RCP per PM (Maint Plan 239900)
2CCP*291 RCPC THERMAL BARRIER COOLING WATER SUPPLY CHECK	3	A/C	Active	2	Check		15-3 (F-6)	O	S		CV-S-LT CV-BDT-O LT	R NSO 2YR	VROJ - 41	2BVT 1.60.6 ISTC-3550 2BVT 1.60.6	During operation of "C" RCP per PM (Maint Plan 239900)
2CCP*321 CCP SURGE TK A SURGE LINE ISOL TO PP P21A SUCT	3	B	Active	2	Gate		15-1 (B-3)	LO	S		MAN MAN	R 2YR		2OST-15.5(A)(B) 2OST-15.1	
2CCP*322 CCP SURGE TK B SURGE LINE ISOL TO PP P21B SUCT	3	B	Active	2	Gate		15-1 (F-3)	LO	S		MAN MAN	R 2YR		2OST-15.5(A)(B) 2OST-15.2	
2CCP*323 CCP SURGE TK A SURGE LINE ISOL TO PP P21C SUCT	3	B	Active	2	Gate		15-1 (C-3)	LO	S		MAN MAN	R 2YR		2OST-15.5(A)(B) 2OST-15.1	
2CCP*324 SUCTION HEADER CROSS CONNECT	3	B	Active	20	Butterfly		15-1 (E-3)	O	S		MAN MAN	R 2YR		2OST-15.5(A)(B) 2OST-15.2	

SYSTEM NAME: Primary Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CCP*325	3	B	Active	20	Butterfly		15-1 (C-3)	O	S		MAN	R		2OST-15.5(A)(B)	
SUCTION HEADER CROSS CONNECT											MAN	2YR		2OST-15.1	
2CCP*326	3	B	Active	2	Gate		15-1 (E-3)	LO	S		MAN	R		2OST-15.5(A)(B)	
CCP SURGE TK B SURGE LINE ISOL TO PP P21C SUCT											MAN	2YR		2OST-15.2	
2CCP*352	3	C	Active	2	Check		15-2 (A-1)	O	S		CV-S-LT	R	VROJ - 42	2BVT 1.60.6	CNMT Air Compressors are RIP so this check valve is on clearance (OOS)
RETURN FROM CONTAINMENT INST AIR COMPRESSORS CHECK											CV-BDT-O	NSO		ISTC-3550	During cooling of CNMT Air Compressors when in service (OOS)
2CCP*354	3	B	Active	20	Butterfly		15-1 (E-8)	O	S		MAN	2YR		2OST-15.1	
CCP HT EX COMBINED DISCH HEADER CROSS CONN											MAN	2YR		2OST-15.2	
											MAN	2YR		2OST-15.3	
2CCP*355	3	B	Active	20	Butterfly		15-1 (D-8)	O	S		MAN	2YR		2OST-15.1	
CCP HT EX COMBINED DISCH HEADER CROSS CONN											MAN	2YR		2OST-15.2	
											MAN	2YR		2OST-15.3	
2CCP*4	3	C	Active	20	Check		15-1 (B-5)	O	O/S		CV-O	R	VROJ - 38	2OST-15.5(A)(B)	
COMPONENT COOLING PUMP P21A DISCH CHECK											CV-S-PR	R	VROJ - 38		
											CV-S-PR	Q/CSD/R	VROJ - 38	2OST-15.1	
											CV-O	CSD or R	VROJ - 38		
2CCP*5	3	C	Active	20	Check		15-1 (F-5)	O	O/S		CV-O	R	VROJ - 38	2OST-15.5(A)(B)	
COMPONENT COOLING PUMP P21B DISCH CHECK											CV-S-PR	R	VROJ - 38		
											CV-S-PR	Q/CSD/R	VROJ - 38	2OST-15.2	
											CV-O	CSD or R	VROJ - 38		
2CCP*6	3	C	Active	20	Check		15-1 (D-5)	O	O/S		CV-O	R	VROJ - 38	2OST-15.5(A)(B)	
COMPONENT COOLING PUMP P21C DISCH CHCK											CV-S-PR	R	VROJ - 38		
											CV-S-PR	Q/CSD/R	VROJ - 38	2OST-15.3	
											CV-O	CSD or R	VROJ - 38		

SYSTEM NAME: Primary Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CCP*AOV107A	3	A	Active	2	Globe	AOV	15-3 (C-5)	O	S	S	FS-S	CSD or R	VROJ - 39	2OST-1.10E	
RCP A THERMAL BARRIER COOLING WATER DISCHARGE											ST-S	CSD or R	VROJ - 39		
											LT	2YR		2BVT 1.60.6	
											RPV	2YR		2OST-1.10E	
2CCP*AOV107B	3	A	Active	2	Globe	AOV	15-3 (F-5)	O	S	S	FS-S	CSD or R	VROJ - 39	2OST-1.10E	
RCP B THERMAL BARRIER COOLING WATER DISCHARGE											ST-S	CSD or R	VROJ - 39		
											LT	2YR		2BVT 1.60.6	
											RPV	2YR		2OST-1.10E	
2CCP*AOV107C	3	A	Active	2	Globe	AOV	15-3 (F-10)	O	S	S	FS-S	CSD or R	VROJ - 39	2OST-1.10E	
RCP C THERMAL BARRIER COOLING WATER DISCHARGE											ST-S	CSD or R	VROJ - 39		
											LT	2YR		2BVT 1.60.6	
											RPV	2YR		2OST-1.10E	
2CCP*AOV171	3	B	Active	3	Globe	AOV	15-2 (E-7)	O	S	S	FS-S	Q		2OST-47.3I	
PRIMARY DRAINS COOLER COOLING WTR SUPPLY											ST-S	Q			
											RPV	2YR/18MO		2OST-47.3R	18 months per Tech Specs
2CCP*AOV172	3	B	Active	3	Globe	AOV	15-2 (D-7)	O	S	S	FS-S	Q		2OST-47.3K	
PRIMARY DRAINS COOLER COOLING WTR SUPPLY											ST-S	Q			
											RPV	2YR/18MO		2OST-47.3S	18 months per Tech Specs
2CCP*AOV173	3	B	Active	3	Globe	AOV	15-2 (B-7)	O	S	S	FS-S	Q		2OST-47.3I	
PRIMARY DRAINS COOLER COOLING WTR DISCH											ST-S	Q			
											RPV	2YR/18MO		2OST-47.3R	18 months per Tech Specs
2CCP*AOV174	3	B	Active	3	Globe	AOV	15-2 (B-7)	O	S	S	FS-S	Q		2OST-47.3K	
PRIMARY DRAINS COOLER COOLING WTR DISCH											ST-S	Q			
											RPV	2YR/18MO		2OST-47.3S	18 months per Tech Specs
2CCP*MOV112A	3	B	Active	18	Butterfly	MOV	15-2 (D-8)	S	O		ET	Q		2OST-15.1	Per OMN-1
(2RHS*E21A,22A) SUPPLY ISOL											ET	Q		2OST-15.3	Per OMN-1
											ET	CSD	VCSJ - 14	2OST-10.3	Per OMN-1
											ET	CSD	VCSJ - 14	2OM-10.4.C	Per OMN-1
											ET	CSD	VCSJ - 14	2OM-10.4.A	Per OMN-1
											DIAG-ST-O	6RFO		2OST-10.3	Per OMN-1
											RPV	6RFO			Per OMN-1

BV Unit 2

VALVE TABLE

SYSTEM NAME: Primary Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CCP*MOV112B	3	B	Active	18	Butterfly	MOV	15-2 (F-9)	S	O		ET	Q		2OST-15.2	Per OMN-1
(2RHS*E21B,22B) SUPPLY ISOL											ET	Q		2OST-15.3	Per OMN-1
											ET	CSD	VCSJ - 14	2OST-10.4	Per OMN-1
											ET	CSD	VCSJ - 14	2OM-10.4.C	Per OMN-1
											ET	CSD	VCSJ - 14	2OM-10.4.A	Per OMN-1
											DIAG-ST-O	6RFO		2OST-10.4	Per OMN-1
											RPV	6RFO			Per OMN-1
2CCP*MOV118	3	B	Active	2	Ball	MOV	15-2 (C-2)	O	S		ET	Q		2OST-47.3I	Per OMN-1
CNMT INSTR AIR COMPRESSORS CLG WATER SUPPLY ISOL											DIAG-ST-S	10YR			Per OMN-1
											RPV	10YR			Per OMN-1
2CCP*MOV119	3	B	Active	2	Ball	MOV	15-2 (C-2)	O	S		ET	Q		2OST-47.3K	Per OMN-1
CNMT INSTR AIR COMPRESSORS CLG WTR SUPPLY ISOL											DIAG-ST-S	10YR			Per OMN-1
											RPV	10YR			Per OMN-1
2CCP*MOV120	3	B	Active	2	Ball	MOV	15-2 (A-1)	O	S		ET	Q		2OST-47.3K	Per OMN-1
CNMT INSTRU AIR COMPRESS CLG WTR RETURN ISOL											DIAG-ST-S	10YR			Per OMN-1
											RPV	10YR			Per OMN-1
2CCP*MOV150-1	2	A	Active	18	Butterfly	MOV	15-2 (D-3)	O	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #2 & #5 per 2OST-47.108
PRIM COMP CLG HDR ISOL - OUTSIDE CONTNMNT											ET	R	VROJ - 40	2OST-1.10E	Per OMN-1
											RPV	6RFO/18MO			18 months per Tech Specs
											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
2CCP*MOV150-2	2	A	Active	18	Butterfly	MOV	15-2 (D-4)	O	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #2 & #5 per 2OST-47.108
PRIM COMP CLG HDR ISOL - INSIDE CONTNMNT											ET	R	VROJ - 40	2OST-1.10E	Per OMN-1
											RPV	6RFO/18MO			18 months per Tech Specs
											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1

BV Unit 2

VALVE TABLE

SYSTEM NAME: Primary Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CCP*MOV151-1	2	A	Active	18	Butterfly	MOV	15-2 (E-3)	O	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #1 & #4 per 2OST-47.107
PRIM COMP CLG HDR ISOL - OUTSIDE CONTNMNT											ET	R	VROJ - 40	2OST-1.10E	Per OMN-1
											RPV	6RFO/18MO			18 months per Tech Specs
											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
2CCP*MOV151-2	2	A	Active	18	Butterfly	MOV	15-2 (E-5)	O	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #1 & #4 per 2OST-47.107
PRIM COMP CLG HDR ISOL - INSIDE CONTAINMENT											ET	R	VROJ - 40	2OST-1.10E	Per OMN-1
											RPV	6RFO/18MO			18 months per Tech Specs
											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
2CCP*MOV156-1	2	A	Active	18	Butterfly	MOV	15-2 (D-3)	O	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #2 & #5 per 2OST-47.108
PRIM COMP CLG HDR ISOL - OUTSIDE CONTNMNT											ET	R	VROJ - 40	2OST-1.10E	Per OMN-1
											RPV	6RFO/18MO			18 months per Tech Specs
											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
2CCP*MOV156-2	2	A	Active	18	Butterfly	MOV	15-2 (D-5)	O	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #2 & #5 per 2OST-47.108
PRIM COMP CLG HDR ISOL - INSIDE CONTNMNT											ET	R	VROJ - 40	2OST-1.10E	Per OMN-1
											RPV	6RFO/18MO			18 months per Tech Specs
											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
2CCP*MOV157-1	2	A	Active	18	Butterfly	MOV	15-2 (E-3)	O	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #1 & #4 per 2OST-47.107
PRIM COMP CLG HDR ISOL - OUTSIDE CONTNMNT											ET	R	VROJ - 40	2OST-1.10E	Per OMN-1
											RPV	6RFO/18MO			18 months per Tech Specs
											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1

BV Unit 2

VALVE TABLE

SYSTEM NAME: Primary Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CCP*MOV157-2	2	A	Active	18	Butterfly	MOV	15-2 (E-4)	O	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #1 & #4 per 2OST-47.107
PRIM COMP CLG HDR ISOL - INSIDE CONTNMNT											ET	R	VROJ - 40	2OST-1.10E	Per OMN-1
											RPV	6RFO/18MO			18 months per Tech Specs
											DIAG-ST-O	6RFO			Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
2CCP*MOV175-1	3	B	Active	10	Butterfly	MOV	15-5 (A-4)	O	S		ET	Q		2OST-47.3I	Per OMN-1
PRI COMP CLG SUPPLY ISOL											DIAG-ST-S	10YR			Per OMN-1
											RPV	10YR			Per OMN-1
2CCP*MOV175-2	3	B	Active	10	Butterfly	MOV	15-5 (A-5)	O	S		ET	Q		2OST-47.3K	Per OMN-1
PRIM COMP CLG SUPPLY ISOL											DIAG-ST-S	10YR			Per OMN-1
											RPV	10YR			Per OMN-1
2CCP*MOV176-1	3	B	Active	10	Butterfly	MOV	15-5 (A-4)	O	S		ET	Q		2OST-47.3I	Per OMN-1
PRIM COMP CLG SUPPLY ISOL											DIAG-ST-S	10YR			Per OMN-1
											RPV	10YR			Per OMN-1
2CCP*MOV176-2	3	B	Active	10	Butterfly	MOV	15-5 (A-5)	O	S		ET	Q		2OST-47.3K	Per OMN-1
PRIM COMP CLG SUPPLY ISOL											DIAG-ST-S	10YR			Per OMN-1
											RPV	10YR			Per OMN-1
2CCP*MOV177-1	3	B	Active	10	Butterfly	MOV	15-5 (G-5)	O	S		ET	Q		2OST-47.3I	Per OMN-1
PRIM COMP CLG RET ISOL											DIAG-ST-S	10YR			Per OMN-1
											RPV	10YR			Per OMN-1
2CCP*MOV177-2	3	B	Active	10	Butterfly	MOV	15-5 (G-5)	O	S		ET	Q		2OST-47.3K	Per OMN-1
PRIM COMP CLG RET ISOL											DIAG-ST-S	10YR			Per OMN-1
											RPV	10YR			Per OMN-1
2CCP*MOV178-1	3	B	Active	10	Butterfly	MOV	15-5 (G-5)	O	S		ET	Q		2OST-47.3I	Per OMN-1
PRIM COMP CLG RET ISOL											DIAG-ST-S	10YR			Per OMN-1
											RPV	10YR			Per OMN-1
2CCP*MOV178-2	3	B	Active	10	Butterfly	MOV	15-5 (G-5)	O	S		ET	Q		2OST-47.3K	Per OMN-1
PRIM COMP CLG RET ISOL											DIAG-ST-S	10YR			Per OMN-1
											RPV	10YR			Per OMN-1
2CCP*RV102	2	A/C	Active	0.75x1	Relief	RV	15-2 (D-4)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #2 & #5 per 2OST-47.108
COMP COOL WTR CONTAINMENT ISOL RELIEF											SPT	10YR		2BVT 1.60.5	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Primary Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CCP*RV103 COMP COOL WTR CONTAINMENT ISOL RELIEF	2	A/C	Active	0.75x1	Relief	RV	15-2 (E-5)	S	O/S		LJ-C SPT	SP 10YR		2BVT 1.47.5 2BVT 1.60.5	Penet. #1 & #4 per 2OST-47.107
2CCP*RV104 COMP COOL WTR CONTAINMENT ISOL RELIEF	2	A/C	Active	0.75x1	Relief	RV	15-2 (D-4)	S	O/S		LJ-C SPT	SP 10YR		2BVT 1.47.5 2BVT 1.60.5	Penet. #2 & #5 per 2OST-47.108
2CCP*RV105 COMP COOL WTR CONTAINMENT RELIEF	2	A/C	Active	0.75x1	Relief	RV	15-2 (E-4)	S	O/S		LJ-C SPT	SP 10YR		2BVT 1.47.5 2BVT 1.60.5	Penet. #1 & #4 per 2OST-47.107
2CCP*RV109 SEAL WATER HX (2CHS*E21) RELIEF	3	C	Active	0.75x1	Relief	RV	15-5 (D-5)	S	O/S		SPT	10YR		2BVT 1.60.5	
2CCP*RV116A RCPA THERMAL BARRIER CLG WTR SUPPLY RELIEF	3	C	Active	0.75x1	Relief	RV	15-3 (C-2)	S	O/S		SPT	10YR		2BVT 1.60.5	
2CCP*RV116B RCPB THERMAL BARRIER CLG WTR SUPPLY RELIEF	3	C	Active	0.75x1	Relief	RV	15-3 (F-1)	S	O/S		SPT	10YR		2BVT 1.60.5	
2CCP*RV116C RCPC THERMAL BARRIER CLG WTR SUPPLY RELIEF	3	C	Active	0.75x1	Relief	RV	15-3 (F-6)	S	O/S		SPT	10YR		2BVT 1.60.5	
2CCP*RV119A RESIDUAL HX 2RHS*21A CLG WTR RETURN RELIEF	3	C	Active	0.75x1	Relief	RV	15-2 (B-10)	S	O/S		SPT	10YR		2BVT 1.60.5	
2CCP*RV119B RESIDUAL HX 2RHS*21B CLG WTR RETURN RELIEF	3	C	Active	0.75x1	Relief	RV	15-2 (E-10)	S	O/S		SPT	10YR		2BVT 1.60.5	
2CCP*RV120A PRIMARY COMP CLG WTR SUPPLY TO CNMT INSTR AIR COMPR RLF	3	C	Active	0.75x1	Relief	RV	15-2 (C-2)	S	O/S		SPT	10YR		2BVT 1.60.5	
2CCP*RV136A RESIDUAL HX SEAL CLR 2RHS*22A CLG WTR SUPPLY RLF	3	C	Active	0.75x1	Relief	RV	15-2 (B-9)	S	O/S		SPT	10YR		2BVT 1.60.5	
2CCP*RV136B RESIDUAL HX SEAL CLR 2RHS*22B CLG WTR SUPPLY RLF	3	C	Active	0.75x1	Relief	RV	15-2 (E-9)	S	O/S		SPT	10YR		2BVT 1.60.5	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Primary Component Cooling Water **SYSTEM NUMBER:** 15

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2CCP*RV139B	3	C	Active	0.75x1	Relief	RV	15-2 (G-3)	S	O/S		SPT	10YR		2BVT 1.60.5	
CNMT PNT CLG COIL NO. 39 RELIEF															
2CCP*RV139D	3	C	Active	0.75x1	Relief	RV	15-2 (F-3)	S	O/S		SPT	10YR		2BVT 1.60.5	
CNMT PNT CLG COIL NO. 41 RELIEF															
2CCP*RV139E	3	C	Active	0.75x1	Relief	RV	15-2 (F-3)	S	O/S		SPT	10YR		2BVT 1.60.5	
CNMT PNT CLG COIL NO. 40 RELIEF															
2CCP*RV139F	3	C	Active	0.75x1	Relief	RV	15-2 (E-3)	S	O/S		SPT	10YR		2BVT 1.60.5	
CNMT PNT CLG COIL NO. 28 RELIEF															
2CCP*RV139G	3	C	Active	0.75x1	Relief	RV	15-2 (A-3)	S	O/S		SPT	10YR		2BVT 1.60.5	
CNMT PNT CLG COIL NO. 76 RELIEF															
2CCP*RV139H	3	C	Active	0.75x1	Relief	RV	15-2 (A-3)	S	O/S		SPT	10YR		2BVT 1.60.5	
CNMT PNT CLG COIL NO. 73 RELIEF															
2CCP*RV139I	3	C	Active	0.75x1	Relief	RV	15-2 (B-3)	S	O/S		SPT	10YR		2BVT 1.60.5	
CNMT PNT CLG COIL NO. 77 RELIEF															
2CCP*RV139J	3	C	Active	0.75x1	Relief	RV	15-2 (B-3)	S	O/S		SPT	10YR		2BVT 1.60.5	
CNMT PNT CLG COIL NO. 74 RELIEF															
2CCP*RV139K	3	C	Active	0.75x1	Relief	RV	15-2 (C-3)	S	O/S		SPT	10YR		2BVT 1.60.5	
CNMT PNT CLG COIL NO. 78 RELIEF															
2CCP*RV139L	3	C	Active	0.75x1	Relief	RV	15-2 (C-3)	S	O/S		SPT	10YR		2BVT 1.60.5	
CNMT PNT CLG COIL NO. 75 RELIEF															
2CCP*RV140	3	C	Active	0.75x1	Relief	RV	15-2 (E-7)	S	O/S		SPT	10YR		2BVT 1.60.5	
PRIMARY DRAINS COOLER 2DGS-E22 COOL WTR SUP RLF															
2CCP*RV141	3	C	Active	0.75x1	Relief	RV	15-2 (B-7)	S	O/S		SPT	10YR		2BVT 1.60.5	
PRIMARY DRAINS COOLER 2DGS-E22 COOL WTR RTN RLF															

BV Unit 2

VALVE TABLE

SYSTEM NAME: Fuel Pool Cooling and Purification **SYSTEM NUMBER:** 20

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2FNC*121 REFUELING CAVITY SUPPLY FROM FILTERS INSIDE CNMT ISOL	2	A	Passive	6	Ball		20-1 (D-2)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #103 per 2OST-47.149
2FNC*122 REFUELING CAVITY SUCTION INSIDE CNMT ISOL	2	A	Passive	6	Ball		20-1 (F-2)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #104 per 2OST-47.150
2FNC*38 REFUELING CAVITY SUPPLY OUTSIDE CNMT ISOL	2	A	Passive	6	Ball		20-1 (E-2)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #103 per 2OST-47.149
2FNC*9 REFUELING CAVITY SUCTION OUTSIDE CNMT ISOL	2	A	Passive	6	Ball		20-1 (E-2)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #104 per 2OST-47.150

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2MSS*18	3	C	Active	3	Check		21-2 (A-3)	S	O/S		CV-O	R		2OST-24.4A	
(2FWE*T22) STM SUPPLY CHECK											CV-O	Q		2OST-24.4	
											CV-DIS	CVCM	VROJ - 43	1/2CMP-75-ENER TECH CHECK-1M	Sample disassembly and inspection with [2MSS* 352] at an alternating frequency with [2MSS*19, 199] and [2MSS*20, 196] per CVCM Program Plan 2MSS-CMP-1 as tied to TDAFWP overspeed trip test (2OST-24.9).
											PMT	CVCM	VROJ - 43	2OST-24.4A	Stroke open during CPT after disassembly and inspection.
2MSS*19	3	C	Active	3	Check		21-2 (C-2)	S	O/S		CV-O	R		2OST-24.4A	
(2FWE*T22) STM SUPPLY CHECK											CV-O	Q		2OST-24.4	
											CV-DIS	CVCM	VROJ - 43	1/2CMP-75-ENER TECH CHECK-1M	Sample disassembly and inspection with [2MSS* 199] at an alternating frequency with [2MSS*18, 352] and [2MSS*20, 196] per CVCM Program Plan 2MSS-CMP-1 as tied to TDAFWP overspeed trip test (2OST-24.9).
											PMT	CVCM	VROJ - 43	2OST-24.4A	Stroke open during CPT after disassembly and inspection.

BV Unit 2

VALVE TABLE

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2MSS*196 (2FWE*T22) STM SUPPLY CHECK	3	C	Active	3	Check		21-2 (D-3)	S	O/S		CV-O	R		2OST-24.4A	
											CV-O	Q		2OST-24.4	
											CV-DIS	CVCM	VROJ - 43	1/2CMP-75-ENER TECH CHECK-1M	Sample disassembly and inspection with [2MSS* 20] at an alternating frequency with [2MSS*19, 199] and [2MSS*18, 352] per CVCM Program Plan 2MSS-CMP-1 as tied to TDAFWP overspeed trip test (2OST-24.9).
											PMT	CVCM	VROJ - 43	2OST-24.4A	Stroke open during CPT after disassembly and inspection.
2MSS*199 (2FWE*T22) STM SUPPLY CHECK	3	C	Active	3	Check		21-2 (C-3)	S	O/S		CV-O	R		2OST-24.4A	
											CV-O	Q		2OST-24.4	
											CV-DIS	CVCM	VROJ - 43	1/2CMP-75-ENER TECH CHECK-1M	Sample disassembly and inspection with [2MSS* 19] at an alternating frequency with [2MSS*20, 196] and [2MSS*18, 352] per CVCM Program Plan 2MSS-CMP-1 as tied to TDAFWP overspeed trip test (2OST-24.9).
											PMT	CVCM	VROJ - 43	2OST-24.4A	Stroke open during CPT after disassembly and inspection.

BV Unit 2

VALVE TABLE

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2MSS*20	3	C	Active	3	Check		21-2 (D-2)	S	O/S		CV-O	R		2OST-24.4A	
(2FWE*T22) STM SUPPLY CHECK											CV-O	Q		2OST-24.4	
											CV-DIS	CVCM	VROJ - 43	1/2CMP-75-ENER TECH CHECK-1M	Sample disassembly and inspection with [2MSS* 196] at an alternating frequency with [2MSS*19, 199] and [2MSS*18, 352] per CVCM Program Plan 2MSS-CMP-1 as tied to TDAFWP overspeed trip test (2OST-24.9).
											PMT	CVCM	VROJ - 43	2OST-24.4A	Stroke open during CPT after disassembly and inspection.
2MSS*352	3	C	Active	3	Check		21-2 (A-2)	S	O/S		CV-O	R		2OST-24.4A	
(2FWE*T22) STM SUPPLY CHECK											CV-O	Q		2OST-24.4	
											CV-DIS	CVCM	VROJ - 43	1/2CMP-75-ENER TECH CHECK-1M	Sample disassembly and inspection with [2MSS* 18] at an alternating frequency with [2MSS*19, 199] and [2MSS*20, 196] per CVCM Program Plan 2MSS-CMP-1 as tied to TDAFWP overspeed trip test (2OST-24.9).
											PMT	CVCM	VROJ - 43	2OST-24.4A	Stroke open during CPT after disassembly and inspection.

BV Unit 2

VALVE TABLE

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2MSS*AOV101A	2	B	Active	32	Globe	AOV	21-1 (G-7)	O	S	S	FS-S	CSD	VCSJ - 15	2OST-21.7	
(2RCS*SG21A) MN STM ISOL VALVE											ST-S-A	CSD	VCSJ - 15		
											ST-S-B	CSD	VCSJ - 15		
											RPV	2YR			
2MSS*AOV101B	2	B	Active	32	Globe	AOV	21-1 (D-7)	O	S	S	FS-S	CSD	VCSJ - 15	2OST-21.7	
(2RCS*SG21B) MN STM ISOL VALVE											ST-S-A	CSD	VCSJ - 15		
											ST-S-B	CSD	VCSJ - 15		
											RPV	2YR			
2MSS*AOV101C	2	B	Active	32	Globe	AOV	21-1 (B-7)	O	S	S	FS-S	CSD	VCSJ - 15	2OST-21.7	
(2RCS*SG21C) MN STM ISOL VALVE											ST-S-A	CSD	VCSJ - 15		
											ST-S-B	CSD	VCSJ - 15		
											RPV	2YR			
2MSS*AOV102A	2	B	Active	2	Globe	AOV	21-1 (G-7)	S	S	S	FS-S	CSD	VCSJ - 16	2OST-1.10K	
21A STEAM GENERATOR MN STM BYPASS TRIP VALVE											ST-S	CSD	VCSJ - 16		
											RPV	2YR	VCSJ - 16		
2MSS*AOV102B	2	B	Active	2	Globe	AOV	21-1 (E-7)	S	S	S	FS-S	CSD		2OST-1.10K	
21B STEAM GENERATOR MN STM BYPASS TRIP VALVE											ST-S	CSD	VCSJ - 16		
											RPV	2YR			
2MSS*AOV102C	2	B	Active	2	Globe	AOV	21-1 (C-7)	S	S	S	FS-S	CSD	VCSJ - 16	2OST-1.10K	
21C STEAM GENERATOR MN STM BYPASS TRIP VALVE											ST-S	CSD	VCSJ - 16		
											RPV	2YR			

BV Unit 2

VALVE TABLE

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2MSS*SOV105A TURBINE DRIVEN AUX FEEDWATER PMP STEAMLINE A ISOL VALVE	2	B	Active	3	Globe	SOV	21-2 (D-1)	S	O/S	O	PMT	SP		(LUC)	LUC-Limited Use Change to 2OST-24.4(4A) for hot and cold stroke and RPV.
											FS-O	R		2OST-24.4A	With Steam
											FS-O	R		2OST-47.3T	At refueling only when no steam is available.
											ST-O	R			At refueling only when no steam is available.
											ST-O	R		2OST-24.4A	With Steam
											ST-S	R		2OST-47.3T	At refueling only when no steam is available.
											ST-S	R		2OST-24.4A	With Steam
											FS-O	Q		2OST-24.4	With Steam
											ST-O	Q			With Steam
											ST-S	Q			With Steam
											RPV-O	2YR			With Steam
											RPV-S	2YR		2OST-24.4A	With Steam

BV Unit 2

VALVE TABLE

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2MSS*SOV105B	2	B	Active	3	Globe	SOV	21-2 (C-2)	S	O/S	O	PMT	SP		(LUC)	LUC-Limited Use Change to 2OST-24.4(4A) for hot and cold stroke and RPV.
TURBINE DRIVEN AUX FEEDWATER PMP STEAMLINE B ISOL VALVE											FS-O	R		2OST-24.4A	With Steam
											FS-O	R		2OST-47.3T	At refueling only when no steam is available.
											ST-O	R			At refueling only when no steam is available.
											ST-O	R		2OST-24.4A	With Steam
											ST-S	R		2OST-47.3T	At refueling only when no steam is available.
											ST-S	R		2OST-24.4A	With Steam
											FS-O	Q		2OST-24.4	With Steam
											ST-O	Q			With Steam
											ST-S	Q			With Steam
											RPV-O	2YR			With Steam
											RPV-S	2YR		2OST-24.4A	With Steam

BV Unit 2

VALVE TABLE

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2MSS*SOV105C TURBINE DRIVEN AUX FEEDWATER PMP STEAMLINE C ISOL VALVE	2	B	Active	3	Globe	SOV	21-2 (A-1)	S	O/S	O	PMT	SP		(LUC)	LUC-Limited Use Change to 2OST-24.4(4A) for hot and cold stroke and RPV.
											FS-O	R		2OST-47.3T	At refueling only when no steam is available.
											FS-O	R		2OST-24.4A	With Steam
											ST-O	R		2OST-47.3T	At refueling only when no steam is available.
											ST-O	R		2OST-24.4A	With Steam
											ST-S	R			With Steam
											ST-S	R		2OST-47.3T	At refueling only when no steam is available.
											FS-O	Q		2OST-24.4	With Steam
											ST-O	Q			With Steam
											ST-S	Q			With Steam
											RPV-O	2YR			With Steam
											RPV-S	2YR		2OST-24.4A	With Steam

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2MSS*SOV105D	2	B	Active	3	Globe	SOV	21-2 (D-2)	S	O/S	O	PMT	SP		(LUC)	LUC-Limited Use Change to 2OST-24.4(4A) for hot and cold stroke and RPV.
TURBINE DRIVEN AUX FEEDWATER PMP STEAMLINE A ISOL VALVE											FS-O	R		2OST-24.4A	With Steam
											FS-O	R		2OST-47.3T	At refueling only when no steam is available.
											ST-O	R		2OST-24.4A	With Steam
											ST-O	R		2OST-47.3T	At refueling only when no steam is available.
											ST-S	R			At refueling only when no steam is available.
											ST-S	R		2OST-24.4A	With Steam
											FS-O	Q		2OST-24.4	With Steam
											ST-O	Q			With Steam
											ST-S	Q			With Steam
											RPV-O	2YR			With Steam
											RPV-S	2YR			With Steam

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2MSS*SOV105E TURBINE DRIVEN AUX FEEDWATER PMP STEAMLINE B ISOL VALVE	2	B	Active	3	Globe	SOV	21-2 (C-2)	S	O/S	O	PMT	SP		(LUC)	LUC-Limited Use Change to 2OST-24.4(4A) for hot and cold stroke and RPV.
											FS-O	R		2OST-24.4A	With Steam
											FS-O	R		2OST-47.3T	At refueling only when no steam is available.
											ST-O	R		2OST-24.4A	With Steam
											ST-O	R		2OST-47.3T	At refueling only when no steam is available.
											ST-S	R			At refueling only when no steam is available.
											ST-S	R		2OST-24.4A	With Steam
											FS-O	Q		2OST-24.4	With Steam
											ST-O	Q			With Steam
											ST-S	Q			With Steam
											RPV-O	2YR			With Steam
											RPV-S	2YR			With Steam

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2MSS*SOV105F	2	B	Active	3	Globe	SOV	21-2 (A-2)	S	O/S	O	PMT	SP		(LUC)	LUC-Limited Use Change to 2OST-24.4(4A) for hot and cold stroke and RPV.
TURBINE DRIVEN AUX FEEDWATER PUMP STEAMLINE C ISOL VALVE											FS-O	R		2OST-24.4A	With Steam
											FS-O	R		2OST-47.3T	At refueling only when no steam is available.
											ST-O	R			At refueling only when no steam is available.
											ST-O	R		2OST-24.4A	With Steam
											ST-S	R			With Steam
											ST-S	R		2OST-47.3T	At refueling only when no steam is available.
											FS-O	Q		2OST-24.4	With Steam
											ST-O	Q			With Steam
											ST-S	Q			With Steam
											RPV-O	2YR			With Steam
											RPV-S	2YR			With Steam
2MSS*SOV120	2	B	Active	0.375	Globe	SOV	21-2 (G-5)	S	O/S	S	FS-S	Q		2OST-47.3M	
RADIATION MONITOR [2MSS*RQI101A,B,C] DISCHARGE ISOLATION VALVE											ST-O	Q			
											ST-S	Q			
											RPV	2YR			
2MSS*SV101A	2	C	Active	6x10	Safety	SV	21-1 (F-5)	S	O/S		SPT	5YR		2BVT 1.21.2	
(2RCS*SG21A) MN STM SAFETY											SPT	5YR		2BVT 1.60.5	
2MSS*SV101B	2	C	Active	6x10	Safety	SV	21-1 (C-5)	S	O/S		SPT	5YR		2BVT 1.21.2	
(2RCS*SG21B) MN STM SAFETY											SPT	5YR		2BVT 1.60.5	
2MSS*SV101C	2	C	Active	6x10	Safety	SV	21-1 (A-5)	S	O/S		SPT	5YR		2BVT 1.21.2	
(2RCS*SG21C) MN STM SAFETY											SPT	5YR		2BVT 1.60.5	
2MSS*SV102A	2	C	Active	6x10	Safety	SV	21-1 (F-5)	S	O/S		SPT	5YR		2BVT 1.21.2	
(2RCS*SG21A) MN STM SAFETY											SPT	5YR		2BVT 1.60.5	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2MSS*SV102B (2RCS*SG21B) MN STM SAFETY	2	C	Active	6x10	Safety	SV	21-1 (C-5)	S	O/S		SPT SPT	5YR 5YR		2BVT 1.21.2 2BVT 1.60.5	
2MSS*SV102C (2RCS*SG21C) MN STM SAFETY	2	C	Active	6x10	Safety	SV	21-1 (A-5)	S	O/S		SPT SPT	5YR 5YR		2BVT 1.21.2 2BVT 1.60.5	
2MSS*SV103A (2RCS*SG21A) MN STM SAFETY	2	C	Active	6x10	Safety	SV	21-1 (F-4)	S	O/S		SPT SPT	5YR 5YR		2BVT 1.21.2 2BVT 1.60.5	
2MSS*SV103B (2RCS*SG21B) MN STM SAFETY	2	C	Active	6x10	Safety	SV	21-1 (C-4)	S	O/S		SPT SPT	5YR 5YR		2BVT 1.21.2 2BVT 1.60.5	
2MSS*SV103C (2RCS*SG21C) MN STM SAFETY	2	C	Active	6x10	Safety	SV	21-1 (A-4)	S	O/S		SPT SPT	5YR 5YR		2BVT 1.21.2 2BVT 1.60.5	
2MSS*SV104A (2RCS*SG21A) MN STM SAFETY	2	C	Active	6x10	Safety	SV	21-1 (F-4)	S	O/S		SPT SPT	5YR 5YR		2BVT 1.21.2 2BVT 1.60.5	
2MSS*SV104B (2RCS*SG21B) MN STM SAFETY	2	C	Active	6x10	Safety	SV	21-1 (C-4)	S	O/S		SPT SPT	5YR 5YR		2BVT 1.21.2 2BVT 1.60.5	
2MSS*SV104C (2RCS*SG21C) MN STM SAFETY	2	C	Active	6x10	Safety	SV	21-1 (A-4)	S	O/S		SPT SPT	5YR 5YR		2BVT 1.21.2 2BVT 1.60.5	
2MSS*SV105A (2RCS*SG21A) MN STM SAFETY	2	C	Active	6x10	Safety	SV	21-1 (F-3)	S	O/S		SPT SPT	5YR 5YR		2BVT 1.21.2 2BVT 1.60.5	
2MSS*SV105B (2RCS*SG21B) MN STM SAFETY	2	C	Active	6x10	Safety	SV	21-1 (C-3)	S	O/S		SPT SPT	5YR 5YR		2BVT 1.21.2 2BVT 1.60.5	
2MSS*SV105C (2RCS*SG21C) MN STM SAFETY	2	C	Active	6x10	Safety	SV	21-1 (A-3)	S	O/S		SPT SPT	5YR 5YR		2BVT 1.60.5 2BVT 1.21.2	
2SDS*AOV111A1 MN STEAMLINE A DRAIN TO CONDENSER	2	B	Active	1.5	Globe	AOV	21-3 (A-4)	O	S	S	FS-S ST-S RPV	Q Q 2YR		2OST-47.3P	

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SDS*AOV111A2 MN STEAMLINE A DRAIN TO CONDENSER	2	B	Active	1.5	Globe	AOV	21-3 (B-4)	O	S	S	FS-S ST-S RPV	Q Q 2YR		2OST-47.3N	
2SDS*AOV111B1 MN STEAMLINE B DRAIN TO CONDENSER	2	B	Active	1.5	Globe	AOV	21-3 (A-6)	O	S	S	FS-S ST-S RPV	Q Q 2YR		2OST-47.3P	
2SDS*AOV111B2 MN STEAMLINE B DRAIN TO CONDENSER	2	B	Active	1.5	Globe	AOV	21-3 (B-6)	O	S	S	FS-S ST-S RPV	Q Q 2YR		2OST-47.3N	
2SDS*AOV111C1 MN STEAMLINE C DRAIN TO CONDENSER	2	B	Active	1.5	Globe	AOV	21-3 (B-8)	O	S	S	FS-S ST-S RPV	Q Q 2YR		2OST-47.3P	
2SDS*AOV111C2 MN STEAMLINE C DRAIN TO CONDENSER	2	B	Active	1.5	Globe	AOV	21-3 (B-8)	O	S	S	FS-S ST-S RPV	Q Q 2YR		2OST-47.3N	
2SDS*AOV129A RESIDUAL HEAT RELEASE PIPING DRAIN ISOL	2	B	Active	1	Globe	AOV	21-3 (C-1)	O	S	S	FS-S ST-S RPV	Q Q 2YR		2OST-47.3P	
2SDS*AOV129B RESIDUAL HEAT RELEASE PIPING DRAIN ISOL	2	B	Active	1	Globe	AOV	21-3 (B-1)	O	S	S	FS-S ST-S RPV	Q Q 2YR		2OST-47.3N	
2SVS*23 (2SVS*PCV101A) ISOL	2	B	Active	4	Gate		21-1 (F-3)	O	O/S		MAN	2YR		2OST-47.3M	
2SVS*24 (2SVS*PCV101B) ISOL	2	B	Active	4	Gate		21-1 (D-3)	O	O/S		MAN	2YR		2OST-47.3M	
2SVS*25 (2SVS*PCV101C) ISOL	2	B	Active	4	Gate		21-1 (B-3)	O	O/S		MAN	2YR		2OST-47.3M	
2SVS*27 (2RCS*SG21A) MN STEAM RESIDUAL HEAT RELEASE ISOL	2	B	Active	6	Gate		21-2 (E-8)	O	O/S		MAN	2YR		2OST-47.3G	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SVS*28 (2RCS*SG21B) MN STM RESIDUAL HEAT RELEASE ISOL	2	B	Active	6	Gate		21-2 (E-9)	O	O/S		MAN	2YR		2OST-47.3G	
2SVS*29 (2RCS*SG21C) MN STM RESIDUAL HEAT RELEASE ISOL	2	B	Active	6	Gate		21-2 (E-10)	O	O/S		MAN	2YR		2OST-47.3G	
2SVS*4 (2SVS*HCV104) ISOL	2	B	Active	8	Gate		21-2 (F-7)	O	O/S		MAN	2YR		2OST-47.3G	
2SVS*80 (2RCS*SG21A) MN STM RESIDUAL HEAT RELEASE CHECK	2	C	Active	6	Check		21-2 (F-8)	S	O/S		CV-DIS	CVCM	VROJ - 44	1/2CMP-75-ENER TECH CHECK-1M	Sample Disassembly & Inspection frequency with [2SVS*81, 82] per CVCM Program Plan 2SVS-CMP-1.
											PMT	CVCM	VROJ - 44	2OM-50.4.M	Partial stroke open during S/U after disassembly and inspection
2SVS*81 (2RCS*SG21B) MN STM RESIDUAL HEAT RELEASE CHECK	2	C	Active	6	Check		21-2 (F-9)	S	O/S		CV-DIS	CVCM	VROJ - 44	1/2CMP-75-ENER TECH CHECK-1M	Sample Disassembly & Inspection frequency with [2SVS*80, 82] per CVCM Program Plan 2SVS-CMP-1.
											PMT	CVCM	VROJ - 44	2OM-50.4.M	Partial stroke open during S/U after disassembly and inspection

BV Unit 2

VALVE TABLE

SYSTEM NAME: Main Steam **SYSTEM NUMBER:** 21

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SVS*82 (2RCS*SG21C) MN STM RESIDUAL HEAT RELEASE CHECK	2	C	Active	6	Check		21-2 (F-10)	S	O/S		CV-DIS	CVCM	VROJ - 44	1/2CMP-75-ENER TECH CHECK-1M	Sample Disassembly & Inspection frequency with [2SVS*80, 81] per CVCM Program Plan 2SVS-CMP-1.
											PMT	CVCM	VROJ - 44	2OM-50.4.M	Partial stroke open during S/U after disassembly and inspection
2SVS*HCV104 RESIDUAL HEAT RELEASE VALVE	2	B	Active	10	Globe	HCV	21-2 (F-7)	S	O/S	S	FS-S	Q		2OST-47.3G	
											RPV	Q			
											ST-O	Q			
											ST-S	Q			
2SVS*PCV101A 21A STEAM GENERATOR ATMOS STM DUMP VALVE	2	B	Active	10	Globe	PCV	21-1 (F-4)	S	O/S	S	FS-S	Q		2OST-47.3M	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR			
2SVS*PCV101B 21B STEAM GENERATOR ATMOS STM DUMP VALVE	2	B	Active	10	Globe	PCV	21-1 (D-4)	S	O/S	S	FS-S	Q		2OST-47.3M	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR			
2SVS*PCV101C 21C STEAM GENERATOR ATMOS STM DUMP VALVE	2	B	Active	10	Globe	PCV	21-1 (B-4)	S	O/S	S	FS-S	Q		2OST-47.3M	
											ST-O	Q			
											ST-S	Q			
											RPV	2YR			

BV Unit 2

VALVE TABLE

SYSTEM NAME: Feedwater & Auxiliary Feedwater **SYSTEM NUMBER:** 24

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2FWE*100 AUX FEED TO SG 'B' CHECK	2	C	Active	4	Check		24-3 (C-10)	S	O/S		CV-S-LT	R	VROJ - 46	2OST-24.8A	
											CV-O	CSD	VCSJ - 18	2OST-24.6A	
											CV-O	CSD	VCSJ - 18	2OST-24.6B	
2FWE*101 AUX FEED TO SG 'C' CHECK	2	C	Active	4	Check		24-3 (E-10)	S	O/S		CV-S-LT	R	VROJ - 46	2OST-24.8A	
											CV-O	CSD	VCSJ - 18	2OST-24.6B	
											CV-O	CSD	VCSJ - 18	2OST-24.6A	
2FWE*121 STRAINER [2FWE-STRY200] BLOWDOWN ISOLATION VALVE	3	B	Active	1	Ball		24-3 (G-2)	S	O		MAN	2YR		2OST-24.1	
2FWE*122 SERVICE WATER SUPPLY VENT ISOL.	3	B	Active	0.75	Gate		24-3 (F-2)	S	O		MAN	2YR		2OST-24.1	
2FWE*356 SERVICE WATER SUPPLY TELL TALE DRAIN	3	B	Active	0.75	Gate		24-3 (G-2)	O	S		MAN	2YR		2OST-24.1	Position Verification 31 days per Tech Specs
2FWE*42A AUX FEED CHECK 'A' HEADER TO SG 'A'	2	A/C	Active	4	Check		24-3 (A-8)	S	O/S		LM	NSO		2OM-54.3	Monitored shiftly by 2OM-54.3, Station Log PAB2 per ISTC-3610.
											CV-O	CSD	VCSJ - 17	2OST-24.6A	
											CV-S	CSD	VCSJ - 17	2OST-24.6B	
2FWE*42B AUX FEED CHECK 'B' HEADER TO SG 'A'	2	A/C	Active	4	Check		24-3 (B-8)	S	O/S		LM	NSO		2OM-54.3	Monitored shiftly by 2OM-54.3, Station Log PAB2 per ISTC-3610.
											CV-O	CSD	VCSJ - 17	2OST-24.6B	
											CV-S	CSD	VCSJ - 17	2OST-24.6A	
2FWE*43A AUX FEED CHECK 'A' HEADER TO SG 'B'	2	A/C	Active	4	Check		24-3 (C-8)	S	O/S		LM	NSO		2OM-54.3	Monitored shiftly by 2OM-54.3, Station Log PAB2 per ISTC-3610.
											CV-O	CSD	VCSJ - 17	2OST-24.6A	
											CV-S	CSD	VCSJ - 17	2OST-24.6B	

SYSTEM NAME: Feedwater & Auxiliary Feedwater **SYSTEM NUMBER:** 24

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2FWE*43B	2	A/C	Active	4	Check		24-3 (C-8)	S	O/S		LM	NSO		2OM-54.3	Monitored shiftly by 2OM-54.3, Station Log PAB2 per ISTC-3610.
AUX FEED CHECK 'B' HEADER TO SG 'B'															
											CV-O	CSD	VCSJ - 17	2OST-24.6B	
											CV-S	CSD	VCSJ - 17	2OST-24.6A	
2FWE*44A	2	A/C	Active	4	Check		24-3 (D-8)	S	O/S		LM	NSO		2OM-54.3	Monitored shiftly by 2OM-54.3, Station Log PAB2 per ISTC-3610.
AUX FEED CHECK 'A' HEADER TO SG 'C'															
											CV-O	CSD	VCSJ - 17	2OST-24.6A	
											CV-S	CSD	VCSJ - 17	2OST-24.6B	
2FWE*44B	2	A/C	Active	4	Check		24-3 (E-8)	S	O/S		LM	NSO		2OM-54.3	Monitored shiftly by 2OM-54.3, Station Log PAB2 per ISTC-3610.
AUX FEED CHECK 'B' HEADER TO SG 'C'															
											CV-O	CSD	VCSJ - 17	2OST-24.6B	
											CV-S	CSD	VCSJ - 17	2OST-24.6A	
2FWE*90	3	B	Active	6	Butterfly		24-3 (D-2)	S	O		MAN	2YR		2OST-24.1	Position Verification 31 days per Tech Specs
(2FWE*P22) SUPPLY FROM SERVICE WATER															
2FWE*91	3	B	Active	4	Butterfly		24-3 (E-2)	S	O		MAN	2YR		2OST-24.1	Position Verification 31 days per Tech Specs
(2FWE*P23A) SUPPLY FROM SERVICE WATER															
2FWE*92	3	B	Active	4	Butterfly		24-3 (F-2)	S	O		MAN	2YR		2OST-24.1	Position Verification 31 days per Tech Specs
(2FWE*P23B) SUPPLY FROM SERVICE WATER															
2FWE*98	3	B	Active	6	Butterfly		24-3 (G-1)	LS	O		MAN	2YR		2OST-24.1	
SERVICE WATER ISOLATION															
2FWE*99	2	C	Active	4	Check		24-3 (B-10)	S	O/S		CV-S-LT	R	VROJ - 46	2OST-24.8A	
AUX FED TO SG 'A' CHECK											CV-O	CSD	VCSJ - 18	2OST-24.6A	
											CV-O	CSD	VCSJ - 18	2OST-24.6B	

SYSTEM NAME: Feedwater & Auxiliary Feedwater **SYSTEM NUMBER:** 24

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2FWE*FCV122	3	B/C	Active	6	Check/FCV	FCV	24-3 (E-5)	O/S	O/S		CV-O	R	VROJ - 47	2OST-24.4A	
(2FWE*P22) DISCHARGE CHECK AND RECIRCULATING VALVE											MAN-O	R	VROJ - 47		
											MAN-S	R	VROJ - 47		
											CV-S	CSD	VCSJ - 19	2OST-24.6B	
											CV-S	CSD	VCSJ - 19	2OST-24.6A	
											MAN-O	2YR		2OST-24.4	
2FWE*FCV123A	3	B/C	Active	4	Check/FCV	FCV	24-3 (F-6)	O/S	O/S		CV-O	CSD	VCSJ - 20	2OST-24.6A	
(2FWE*P23A) DISCHARGE CHECK AND RECIRCULATING VALVE											CV-S	CSD	VCSJ - 20	2OST-24.6B	
											MAN-O	CSD	VCSJ - 20	2OST-24.6A	
											MAN-S	CSD	VCSJ - 20		
											MAN-O	2YR		2OST-24.2	
2FWE*FCV123B	3	B/C	Active	4	Check/FCV	FCV	24-3 (G-6)	O/S	O/S		CV-O	CSD	VCSJ - 20	2OST-24.6B	
(2FWE*P23B) DISCHARGE CHECK AND RECIRCULATING VALVE											CV-S	CSD	VCSJ - 20	2OST-24.6A	
											MAN-O	CSD	VCSJ - 20	2OST-24.6B	
											MAN-S	CSD	VCSJ - 20		
											MAN-O	2YR		2OST-24.3	
2FWE*HCV100A	2	B	Active	3	Globe	HCV	24-3 (D-7)	O	O/S		ST-O	Q		2OST-47.3L	
21C SG AUX FEEDWATER THROTTLE VLV											ST-S	Q			
											RPV	2YR			
2FWE*HCV100B	2	B	Active	3	Globe	HCV	24-3 (E-7)	O	O/S		ST-O	Q		2OST-47.3G	
21C SG AUX FEEDWATER THROTTLE VLV											ST-S	Q			
											RPV	2YR			
2FWE*HCV100C	2	B	Active	3	Globe	HCV	24-3 (C-7)	O	O/S		ST-O	Q		2OST-47.3L	
21B SG AUX FEEDWATER THROTTLE VLV											ST-S	Q			
											RPV	2YR			
2FWE*HCV100D	2	B	Active	3	Globe	HCV	24-3 (C-7)	O	O/S		ST-O	Q		2OST-47.3G	
21B SG AUX FEEDWATER THROTTLE VLV											ST-S	Q			
											RPV	2YR			
2FWE*HCV100E	2	B	Active	3	Globe	HCV	24-3 (A-7)	O	O/S		ST-O	Q		2OST-47.3L	
21A SG AUX FEEDWATER THROTTLE VLV											ST-S	Q			
											RPV	2YR			
2FWE*HCV100F	2	B	Active	3	Globe	HCV	24-3 (B-7)	O	O/S		ST-O	Q		2OST-47.3G	
21A SG AUX FEEDWATER THROTTLE VLV											ST-S	Q			
											RPV	2YR			

BV Unit 2

VALVE TABLE

SYSTEM NAME: Feedwater & Auxiliary Feedwater — SYSTEM NUMBER: 24

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2FWE*RV101 (2FWE*P22) DISCHARGE RELIEF	3	C	Active	3x4	Relief	RV	24-3 (D-5)	S	O/S		SPT	10YR		2BVT 1.60.5	
2FWE*RV102 EMERGENCY WATER SUPPLY RELIEF	3	C	Active	0.75x1	Relief	RV	24-3 (E-2)	S	O/S		SPT	10YR		2BVT 1.60.5	
2FWS*28 FEED HEADER CHECK (2RCS*SG21A)	2	C	Active	16	Check		24-2A (F-7)	O	S		CV-S-LT CV-BDT-O	R NSO	VROJ - 45	2OST-24.8 ISTC-3550	 While maintaining "A" S/G level with main feedwater flow per L5 Log
2FWS*29 FEED HEADER CHECK (2RCS*SG21B)	2	C	Active	16	Check		24-2A (D-7)	O	S		CV-S-LT CV-BDT-O	R NSO	VROJ - 45	2OST-24.8 ISTC-3550	 While maintaining "B" S/G level with main feedwater flow per L5 Log
2FWS*30 FEED HEADER CHECK (2RCS*SG21C)	2	C	Active	16	Check		24-2A (B-7)	O	S		CV-S-LT CV-BDT-O	R NSO	VROJ - 45	2OST-24.8 ISTC-3550	 While maintaining "C" S/G level with main feedwater flow per L5 Log
2FWS*FCV478 21A SG MAIN FEED REG VALVE	3	B	Active	16	Globe	FCV	24-2A (F-3)	T	S	S	FS-S ST-S RPV	CSD CSD 2YR	VCSJ - 22 VCSJ - 22	2OST-1.10A	
2FWS*FCV479 21A SG BYPASS FW CONTROL VALVE	3	B	Active	6	Globe	FCV	24-2A (E-3)	S	S	S	FS-S ST-S RPV	Q Q 2YR		2OST-47.3K	
2FWS*FCV488 21B SG MAIN FEED REG VALVE	3	B	Active	16	Globe	FCV	24-2A (D-3)	T	S	S	FS-S ST-S RPV	CSD CSD 2YR	VCSJ - 22 VCSJ - 22	2OST-1.10A	
2FWS*FCV489 21B SG BYPASS FW CONTROL VALVE	3	B	Active	6	Globe	FCV	24-2A (C-3)	S	S	S	FS-S ST-S RPV	Q Q 2YR		2OST-47.3K	
2FWS*FCV498 21C SG MAIN FEED REG VALVE	3	B	Active	16	Globe	FCV	24-2A (B-3)	T	S	S	FS-S ST-S RPV	CSD CSD 2YR	VCSJ - 22 VCSJ - 22	2OST-1.10A	

SYSTEM NAME: Feedwater & Auxiliary Feedwater **SYSTEM NUMBER:** 24

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2FWS*FCV499 21C SG BYPASS FW CONTROL VALVE	3	B	Active	6	Globe	FCV	24-2A (A-3)	S	S	S	FS-S ST-S RPV	Q Q 2YR		2OST-47.3K	
2FWS*HYV157A 21A SG FEEDWATER ISOLATION VALVE	2	B	Active	16	Gate	HYV	24-2A (F-6)	O	S		ST-S RPV	CSD 2YR	VCSJ - 21	2OST-1.10A	
2FWS*HYV157B 21B SG FEEDWATER ISOLATION VALVE	2	B	Active	16	Gate	HYV	24-2A (D-6)	O	S		ST-S RPV	CSD 2YR	VCSJ - 21	2OST-1.10A	
2FWS*HYV157C 21C SG FEEDWATER ISOLATION VALVE	2	B	Active	16	Gate	HYV	24-2A (B-6)	O	S		ST-S RPV	CSD 2YR	VCSJ - 21	2OST-1.10A	

SYSTEM NAME: Steam Generator Blowdown **SYSTEM NUMBER:** 25

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2BDG*AOV100A1 STM GEN 21A BLOWDOWN OUTSIDE CNMT ISOLATION	2	B	Active	3	Globe	AOV	25-1 (G-4)	O	S	S	FS-S ST-S RPV	CSD CSD 2YR	VCSJ - 23 VCSJ - 23	2OST-1.10C	
2BDG*AOV100B1 STM GEN 21B BLOWDOWN OUTSIDE CNMT ISOLATION	2	B	Active	3	Globe	AOV	25-1 (E-4)	O	S	S	FS-S ST-S RPV	CSD CSD 2YR	VCSJ - 23 VCSJ - 23	2OST-1.10C	
2BDG*AOV100C1 STM GEN 21C BLOWDOWN OUTSIDE CNMT ISOLATION	2	B	Active	3	Globe	AOV	25-1 (B-4)	O	S	S	FS-S ST-S RPV	CSD CSD 2YR	VCSJ - 23 VCSJ - 23	2OST-1.10C	
2BDG*AOV101A1 STM GEN 21A BLOWDOWN INSIDE CNMT ISOLATION	2	B	Active	3	Globe	AOV	25-1 (G-2)	O	S	S	FS-S ST-S RPV	CSD CSD 2YR	VCSJ - 23 VCSJ - 23	2OST-1.10C	
2BDG*AOV101A2 STM GEN 21A BLOWDOWN INSIDE CNMT ISOLATION	2	B	Active	3	Globe	AOV	25-1 (G-3)	O	S	S	FS-S ST-S RPV	CSD CSD 2YR	VCSJ - 23 VCSJ - 23	2OST-1.10C	
2BDG*AOV101B1 STM GEN 21B BLOWDOWN INSIDE CNMT ISOLATION	2	B	Active	3	Globe	AOV	25-1 (E-2)	O	S	S	FS-S ST-S RPV	CSD CSD 2YR	VCSJ - 23 VCSJ - 23	2OST-1.10C	
2BDG*AOV101B2 STM GEN 21B BLOWDOWN INSIDE CNMT ISOLATION	2	B	Active	3	Globe	AOV	25-1 (E-3)	O	S	S	FS-S ST-S RPV	CSD CSD 2YR	VCSJ - 23 VCSJ - 23	2OST-1.10C	
2BDG*AOV101C1 STM GEN 21C BLOWDOWN INSIDE CNMT ISOLATION	2	B	Active	3	Globe	AOV	25-1 (B-2)	O	S	S	FS-S ST-S RPV	CSD CSD 2YR	VCSJ - 23 VCSJ - 23	2OST-1.10C	
2BDG*AOV101C2 STM GEN 21C BLOWDOWN INSIDE CNMT ISOLATION	2	B	Active	3	Globe	AOV	25-1 (B-3)	O	S	S	FS-S ST-S RPV	CSD CSD 2YR	VCSJ - 23 VCSJ - 23	2OST-1.10C	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Auxiliary Steam **SYSTEM NUMBER:** 27

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2ASS*AOV130A SUPPLY LINE TO AUXILIARY BLDG ISOL	3	B	Active	8	Globe	AOV	27A-1 (F-4)	O	S	S	FS-S ST-S RPV	Q Q 2YR		2OST-47.3O	
2ASS*AOV130B BACKUP ISOL OF STEAM SUPPLY TO AUXILIARY BLDG	3	B	Active	8	Globe	AOV	27A-1 (F-4)	O	S	S	FS-S ST-S RPV	Q Q 2YR		2OST-47.3O	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Service Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SWE*MOV116A	3	B	Active	30	Butterfly	MOV	30-1 (A-7)	S	O/S		DIAG-ST-O	3YR		2OST-30.1A	Per OMN-1
STBY SW PUMPS DISCH TO SWS A HDR											DIAG-ST-S	3YR			Per OMN-1
											RPV	3YR			Per OMN-1
											ET	18MO or R			Per OMN-1
2SWE*MOV116B	3	B	Active	30	Butterfly	MOV	30-1 (A-6)	S	O/S		ET	18MO or R		2OST-30.1B	Per OMN-1
STBY SW PUMPS DISCH TO SWS B HDR											DIAG-ST-O	10YR			Per OMN-1
											DIAG-ST-S	10YR			Per OMN-1
											RPV	10YR			Per OMN-1
2SWS*100	3	B	Active	3	Globe		30-2 (E-3)	T	S		MAN	2YR		2OST-47.3O	
[2SWS*TCV101B] Bypass															
2SWS*106	3	C	Active	30	Check		30-1 (A-7)	O	O/S		CV-O	R	VROJ - 49	2OST-30.13A	Per CVCM Program (see VROJ-49)
SW SUPPLY A HDR CHECK											CV-DIS	CVCM	VROJ - 49	1/2CMP-75-WAFER CHECK-1M	Sample disassembly and inspection frequency with [2SWS*107] per CVCM Program Plan 2SWS-CMP-1.
											PMT	CVCM	VROJ - 49	2OST-30.2	Partial stroke open after disassembly and inspection.
											PMT	CVCM	VROJ - 49	2OST-30.6A	Partial stroke open after disassembly and inspection.
											CV-O	(See VROJ49)	VROJ - 49		Per CVCM Program (see VROJ-49)
											CV-O	(See VROJ49)	VROJ - 49	2OST-30.2	Per CVCM Program (see VROJ-49)

SYSTEM NAME: Service Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SWS*107 SW SUPPLY B HDR CHECK	3	C	Active	30	Check		30-1 (A-6)	O	O/S		CV-O	R	VROJ - 49	2OST-30.13B	Per CVCM Program (see VROJ-49)
											CV-DIS	CVCM	VROJ - 49	1/2CMP-75-WAFER CHECK-1M	Sample disassembly and inspection frequency with [2SWS*106] per CVCM Program Plan 2SWS-CMP-1.
											PMT	CVCM	VROJ - 49	2OST-30.6B	Partial stroke open after disassembly and inspection.
											PMT	CVCM	VROJ - 49	2OST-30.3	Partial stroke open after disassembly and inspection.
											CV-O	(See VROJ49)	VROJ - 49		Per CVCM Program (see VROJ-49)
											CV-O	(See VROJ49)	VROJ - 49	2OST-30.6B	Per CVCM Program (see VROJ-49)
2SWS*111 DG HX (2EGS*E21A (E22A)) SUPPLY HDR CHK	3	C	Active	6	Check		30-2 (C-8)	S	O		CV-O	Q		2OST-36.1(1A)	
											CV-DIS	CVCM	VROJ - 50	1/2CMP-75-WAFER CHECK-1M	Sample disassembly and inspection frequency with [2SWS*112] per CVCM Program Plan 2SWS-CMP-2.
											PMT	CVCM	VROJ - 50	2OST-36.1(1A)	Partial stroke open after disassembly and inspection.
2SWS*112 DG HX (2EGS*E21B, (E22B)) SUPPLY HDR CHK	3	C	Active	6	Check		30-2 (E-8)	S	O		CV-O	Q		2OST-36.2(2A)	
											CV-DIS	CVCM	VROJ - 50	1/2CMP-75-WAFER CHECK-1M	Sample disassembly and inspection frequency with [2SWS*111] per CVCM Program Plan 2SWS-CMP-2.
											PMT	CVCM	VROJ - 50	2OST-36.2(2A)	Partial stroke open after disassembly and inspection.

SYSTEM NAME: Service Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SWS*142	3	B	Active	3	Gate		30-2 (A-1)	S	O		MAN	2YR		2OST-47.3M	
CONT RM COOLING COIL (2HVC*ACU201A) INLET ISOL															
2SWS*143	3	B	Active	3	Gate		30-2 (F-1)	S	O		MAN	2YR		2OST-47.3O	
CONT RM COOLING COIL (2HVC*ACU201B) INLET ISOL															
2SWS*486	3	C	Active	3	Check		30-1 (C-3)	S	O/S		CV-O-VAC	Q or CSD	VCSJ - 27	2OST-30.6A	
SW PP 21A VACUUM BKR											CV-S-LT	Q		2OST-30.2	
2SWS*487	3	C	Active	3	Check		30-1 (D-3)	S	O/S		CV-O-VAC	Q or CSD	VCSJ - 27	2OST-30.6B	
SW PP 21B VACUUM BKR											CV-S-LT	Q		2OST-30.3	
2SWS*488	3	C	Active	3	Check		30-1 (G-3)	S	O/S		CV-O-VAC	Q or CSD	VCSJ - 27	2OST-30.6B	
SW PP 21C VACUUM BKR											CV-O-VAC	Q or CSD	VCSJ - 27	2OST-30.6A	
											CV-S-LT	Q			
											CV-S-LT	Q		2OST-30.6B	
2SWS*57	3	C	Active	30	Check		30-1 (C-3)	O	O/S		CV-O	R	VROJ - 48	2OST-30.13A	
SW PP (2SWS*P21A) DISCH CHECK											CV-S-PR	Q or CSD	VCSJ - 24	2OST-30.6A	
											CV-O	(See VROJ48)	VROJ - 48	2OST-30.2	
2SWS*58	3	C	Active	30	Check		30-1 (D-4)	O	O/S		CV-O	R	VROJ - 48	2OST-30.13B	
SW PP (2SWS*P21B) DISCH CHECK											CV-S-PR	Q or CSD	VROJ - 24	2OST-30.6B	
											CV-O	(See VROJ48)	VROJ - 48	2OST-30.3	
2SWS*59	3	C	Active	30	Check		30-1 (G-3)	O	O/S		CV-O	R	VROJ - 48	2OST-30.13B	
SW PP (2SWS*P21C) DISCH CHECK											CV-O	R	VROJ - 48	2OST-30.13A	
											CV-S-PR	Q or CSD	VCSJ - 24	2OST-30.6A	
											CV-S-PR	Q or CSD	VCSJ - 24	2OST-30.6B	
											CV-O	(See VROJ48)	VROJ - 48	2OST-30.6A	
											CV-O	(See VROJ48)	VROJ - 48	2OST-30.6B	
2SWS*99	3	B	Active	3	Globe		30-2 (B-3)	T	S		MAN	2YR		2OST-47.3M	
[2SWS*TCV101A] Bypass															
2SWS*MOV102A	3	B	Active	30	Butterfly	MOV	30-1 (C-4)	O	O		DIAG-ST-O	3YR		2OST-30.6A	Per OMN-1
SW PP 21A HDR A DISCHARGE VALVE											RPV	3YR			Per OMN-1
											ET	18MO/CSD	VCSJ - 25		Per OMN-1

BV Unit 2

VALVE TABLE

SYSTEM NAME: Service Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SWS*MOV102B	3	B	Active	30	Butterfly	MOV	30-1 (D-4)	O	O		DIAG-ST-O	3YR		2OST-30.6B	Per OMN-1
SW PP 21B HDR B DISCHARGE VALVE											RPV	3YR			Per OMN-1
											ET	18MO/CSD	VCSJ - 25		Per OMN-1
2SWS*MOV102C1	3	B	Active	30	Butterfly	MOV	30-1 (G-4)	S	O		ET	18MO/CSD	VCSJ - 25	2OST-30.6A	Per OMN-1
SW PP 21C HDR A DISCHARGE VALVE											DIAG-ST-O	10YR			Per OMN-1
											RPV	10YR			Per OMN-1
2SWS*MOV102C2	3	B	Active	30	Butterfly	MOV	30-1 (G-4)	S	O		DIAG-ST-O	3YR		2OST-30.6B	Per OMN-1
SW PP 21C HDR B DISCHARGE VALVE											RPV	3YR			Per OMN-1
											ET	18MO/CSD	VCSJ - 25		Per OMN-1
2SWS*MOV103A	3	B	Active	24	Butterfly	MOV	30-1 (C-7)	S	O/S		ET	CSD or R		2OST-1.10D	Per OMN-1
RECIRC SPRAY HX'S SERVICE WTR SUPPLY HDR A ISOL VLV											ET	CSD or R		2OST-30.13A	Per OMN-1
											DIAG-ST-O	2RFO		2OST-1.10D	Per OMN-1
											DIAG-ST-S	2RFO			Per OMN-1
											RPV	2RFO			Per OMN-1
2SWS*MOV103B	3	B	Active	24	Butterfly	MOV	30-1 (C-6)	S	O/S		ET	CSD or R		2OST-1.10D	Per OMN-1
RECIRC SPRAY HX'S SERVICE WTR SUPPLY HDR B ISOL VLV											ET	CSD or R		2OST-30.13B	Per OMN-1
											DIAG-ST-O	6RFO		2OST-1.10D	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SWS*MOV104A	3	B	Active	16	Gate	MOV	30-3 (A-1)	O	O/S		ST-O	Q		2OST-47.3Q	(passive direction)
RECIRC SPRAY HX 21A COOLING WATER SUPPLY VALVE											ST-S	Q			
											RPV	2YR			
2SWS*MOV104B	3	B	Active	16	Gate	MOV	30-3 (E-1)	O	O/S		ST-O	Q		2OST-47.3O	(passive direction)
RECIRC SPRAY HX 21B COOLING WATER SUPPLY VALVE											ST-S	Q			
											RPV	2YR			
2SWS*MOV104C	3	B	Active	16	Gate	MOV	30-3 (C-1)	O	O/S		ST-O	Q		2OST-47.3Q	(passive direction)
RECIRC SPRAY HX 21C COOLING WATER SUPPLY VALVE											ST-S	Q			
											RPV	2YR			
2SWS*MOV104D	3	B	Active	16	Gate	MOV	30-3 (D-1)	O	O/S		ST-O	Q		2OST-47.3O	(passive direction)
RECIRC SPRAY HX 21D COOLING WATER SUPPLY VALVE											ST-S	Q			
											RPV	2YR			

BV Unit 2

VALVE TABLE

SYSTEM NAME: Service Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SWS*MOV105A	3	B	Active	16	Butterfly	MOV	30-3 (A-3)	O	O/S		ET	Q		2OST-47.3Q	Per OMN-1
RECIRC SPRAY HX 21A COOLING WATER DISCHARGE VALVE											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SWS*MOV105B	3	B	Active	16	Butterfly	MOV	30-3 (E-2)	O	O/S		ET	Q		2OST-47.3O	Per OMN-1
RECIRC SPRAY HX 21B COOLING WATER DISCHARGE VALVE											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SWS*MOV105C	3	B	Active	16	Butterfly	MOV	30-3 (C-2)	O	O/S		ET	Q		2OST-47.3Q	Per OMN-1
RECIRC SPRAY HX 21C COOLING WATER DISCHARGE VALVE											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SWS*MOV105D	3	B	Active	16	Butterfly	MOV	30-3 (D-2)	O	O/S		ET	Q		2OST-47.3O	Per OMN-1
RECIRC SPRAY HX 21D COOLING WATER DISCHARGE VALVE											DIAG-ST-O	6RFO			Per OMN-1 (passive direction)
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SWS*MOV106A	3	B	Active	30	Butterfly	MOV	30-1 (C-7)	O	O/S		ET	CSD or R		2OST-1.10D	Per OMN-1
CCP HX'S SERVICE WTR SUPPLY HDR A ISOL VLV											ET	CSD or R		2OST-30.13A	Per OMN-1
											DIAG-ST-O	6RFO		2OST-1.10D	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SWS*MOV106B	3	B	Active	30	Butterfly	MOV	30-1 (C-6)	O	O/S		ET	CSD or R		2OST-1.10D	Per OMN-1
CCP HX'S SERVICE WTR SUPPLY HDR B ISOL VLV											ET	CSD or R		2OST-30.13B	Per OMN-1
											DIAG-ST-O	6RFO		2OST-1.10D	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SWS*MOV107A	3	B	Active	24	Butterfly	MOV	30-1 (F-7)	O	S		ET	CSD or R	VCSJ - 26	2OST-1.10D	Per OMN-1
CCS HX SERV WTR SUPPLY HDR A ISOL VLV											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1

SYSTEM NAME: Service Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SWS*MOV107B	3	B	Active	24	Butterfly	MOV	30-1 (F-7)	O	S		ET	CSD or R	VCSJ - 26	2OST-1.10D	Per OMN-1
CCS HX SERV WTR SUPPLY HDR A ISOL VLV											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SWS*MOV107C	3	B	Active	24	Butterfly	MOV	30-1 (F-6)	O	S		ET	CSD or R	VCSJ - 26	2OST-1.10D	Per OMN-1
CCS HX SERV WTR SUPPLY HDR B ISOL VLV											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SWS*MOV107D	3	B	Active	24	Butterfly	MOV	30-1 (F-6)	O	S		ET	CSD or R	VCSJ - 26	2OST-1.10D	Per OMN-1
CCS HX SERV WTR SUPPLY HDR B ISOL VLV											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SWS*MOV113A	3	B	Active	6	Gate	MOV	30-2 (C-8)	S	O		ET	Q		2OST-47.3Q	Per OMN-1
EMER. GEN HX 21A SERV WTR HDR A COOLING WTR INLET VLV											DIAG-ST-O	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SWS*MOV113B	3	B/P	Passive	6	Gate	MOV	30-2 (E-8)	S	S		RPV	2YR		2OST-36.2(2A)	
EMER. GEN HX 21B SERV WTR HDR A COOLING WTR INLET VLV															
2SWS*MOV113C	3	B/P	Passive	6	Gate	MOV	30-2 (C-8)	S	S		RPV	2YR		2OST-36.1(1A)	
EMERG. GEN HX 21A SERV WTR HDR B COOLING WTR INLET VLV															
2SWS*MOV113D	3	B	Active	6	Gate	MOV	30-2 (E-8)	S	O		ET	Q		2OST-47.3O	Per OMN-1
EMERG GEN HX 21B SERV WTR HDR B COOLING WTR INLET VLV											DIAG-ST-O	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2SWS*MOV152-1	2	A	Active	8	Butterfly	MOV	29-4 (A-2)	O	S		LJ-C	SP		2BVT 1.47.5	Penet. #27 per 2OST-47.116
CNTMNT AIR RECIRC CLG COILS SUPPLY HDR ISOL MOV											RPV	6RFO/18MO		2OST-47.3Q	18 months per Tech Specs
											DIAG-ST-S	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
2SWS*MOV152-2	2	A	Active	8	Butterfly	MOV	29-4 (A-2)	O	S		LJ-C	SP		2BVT 1.47.5	Penet. #27 per 2OST-47.116
CNTMNT AIR RECIRC CLG COILS SUPPLY HDR ISOL MOV											RPV	6RFO/18MO		2OST-47.3S	18 months per Tech Specs
											DIAG-ST-S	6RFO		2OST-47.3O	Per OMN-1
											ET	18MO or R			Per OMN-1
2SWS*MOV153-1	2	A	Passive	8	Butterfly	MOV	29-4 (C-2)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #14 per 2OST-47.110
CNTMNT AIR RECIRC CLG COILS SUPPLY HDR ISOL MOV															

BV Unit 2

VALVE TABLE

SYSTEM NAME: Service Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SWS*MOV153-2	2	A	Passive	8	Butterfly	MOV	29-4 (C-2)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #14 per 2OST-47.110
CNTMNT AIR RECIRC CLG COILS SUPPLY HDR ISOL MOV															
2SWS*MOV154-1	2	A	Passive	8	Butterfly	MOV	29-4 (D-2)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #25 per 2OST-47.115
CNTMNT AIR RECIRC CLG COILS RETURN HDR ISOL MOV															
2SWS*MOV154-2	2	A	Passive	8	Butterfly	MOV	29-4 (D-2)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #25 per 2OST-47.115
CNTMNT AIR RECIRC CLG COILS RETURN HDR ISOL MOV															
2SWS*MOV155-1	2	A	Active	8	Butterfly	MOV	29-4 (G-2)	O	S		LJ-C	SP		2BVT 1.47.5	Penet. #21 per 2OST-47.113
CNTMNT AIR RECIRC CLG COILS RETURN HDR ISOL MOV											RPV	6RFO/18MO		2OST-47.3Q	18 months per Tech Specs.
											DIAG-ST-S	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
2SWS*MOV155-2	2	A	Active	8	Butterfly	MOV	29-4 (G-2)	O	S		LJ-C	SP		2BVT 1.47.5	Penet. #21 per 2OST-47.113
CNTMNT AIR RECIRC CLG COILS RETURN HDR ISOL MOV											RPV	6RFO/18MO		2OST-47.3S	18 months per Tech Specs
											DIAG-ST-S	6RFO		2OST-47.3O	Per OMN-1
											ET	18MO or R			Per OMN-1
2SWS*RV101A	3	C	Active	0.75x1	Relief	RV	30-3 (A-1)	S	O/S		SPT	10YR		2BVT 1.60.5	
Recirc Spray H/X 21A Inlet Relief															
2SWS*RV101B	3	C	Active	0.75x1	Relief	RV	30-3 (E-1)	S	O/S		SPT	10YR		2BVT 1.60.5	
Recirc Spray H/X 21B Inlet Relief															
2SWS*RV101C	3	C	Active	0.75x1	Relief	RV	30-3 (B-1)	S	O/S		SPT	10YR		2BVT 1.60.5	
Recirc Spray H/X 21C Inlet Relief															
2SWS*RV101D	3	C	Active	0.75x1	Relief	RV	30-3 (D-1)	S	O/S		SPT	10YR		2BVT 1.60.5	
Recirc Spray H/X 21D Inlet Relief															
2SWS*RV102A	3	C	Active	0.75	Relief	RV	30-3 (B-6)	S	O/S		SPT	10YR		2BVT 1.60.5	
"A" CCP H/X Relief															

BV Unit 2

VALVE TABLE

SYSTEM NAME: Service Water **SYSTEM NUMBER:** 30

Valve ID / Name	Class	Cat.	Active / Passive	Size (In.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2SWS*RV102B "B" CCP H/X Relief	3	C	Active	0.75x1	Relief	RV	30-3 (D-6)	S	O/S		SPT	10YR		2BVT 1.60.5	
2SWS*RV102C "C" CCP H/X Relief	3	C	Active	0.75	Relief	RV	30-3 (D-6)	S	O/S		SPT	10YR		2BVT 1.60.5	
2SWS*RV152 COOLING WATER TO CAR FAN COOLERS CONTAINMENT PEN 27 RELIEF VALVE	2	A/C	Active	0.75x1	Relief	RV	29-4 (A-2)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #27 per 2OST-47.116
											SPT	10YR		2BVT 1.60.5	
2SWS*RV153 COOLING WATER TO CAR FAN COOLERS CONTAINMENT PEN 14 RELIEF VALVE	2	A/C	Active	0.75x1	Relief	RV	29-4 (C-2)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #14 per 2OST-47.110
											SPT	10YR		2BVT 1.60.5	
2SWS*RV154 COOLING WATER TO CAR FAN COOLERS CONTAINMENT PEN 25 RELIEF VALVE	2	A/C	Active	0.75x1	Relief	RV	29-4 (D-2)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #25 per 2OST-47.115
											SPT	10YR		2BVT 1.60.5	
2SWS*RV155 COOLING WATER TO CAR FAN COOLERS CONTAINMENT PEN 21 RELIEF VALVE	2	A/C	Active	0.75x1	Relief	RV	29-4 (G-2)	S	O/S		LJ-C	SP		2BVT 1.47.5	Penet. #21 per 2OST-47.113
											SPT	10YR		2BVT 1.60.5	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Fire Protection **SYSTEM NUMBER:** 33

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2FPW*753	2	A/C	Active	4	Check		33-1D (F-4)	S	S		LJ-C	SP		2BVT 1.47.5	Penet. #101 per 2OST-47.148
RHS PUMPS-CABLE PENETRATION AREA DELUGE HDR CHECK											CV-ME	CSD	VCSJ - 28	2OST-1.10J	
2FPW*761	2	A/C	Active	6	Check		33-1D (D-4)	S	S		LJ-C	SP		2BVT 1.47.5	Penet. #99 per 2OST-47.147
CONTMT HOSE RACKS HDR CHECK											CV-ME	R	VROJ - 52	2OST-1.10J	
2FPW*AOV205	2	A	Active	4	Globe	AOV	33-1D (F-4)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #101 per 2OST-47.148
RHS PUMP DELUGE SYSTEM CNMT ISOL VLV											FS-S	Q		2OST-47.3P	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech Specs
2FPW*AOV206	2	A	Active	6	Globe	AOV	33-1D (D-4)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #99 per 2OST-47.147
CNMT HOSE RACK HDR ISOL VLV											FS-S	Q		2OST-47.3P	
											ST-S	Q			
											RPV	2YR/18MO			18 months per Tech Specs

BV Unit 2

VALVE TABLE

SYSTEM NAME: Compressed Air **SYSTEM NUMBER:** 34

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2IAC*22	2	A/C	Active	3	Check		34-3 (C-10)	O	S		LJ-C	SP		2BVT 1.47.5	Penet. #59 per 2OST-47.135
(2IAC-TK21) RECEIVER INLET CHECK											CV-S	R	VROJ - 53	2OST-1.10J	By observation of external weight arm to close
											CV-BDT-O	NSO		1STC-3550	Via instrument air supply to CNMT per PM (Maint Plan 239900)
2IAC*MOV130	2	A	Active	3	Plug	MOV	34-3 (C-10)	O	S		LJ-C	SP		2BVT 1.47.5	Penet. #59 per 2OST-47.135
CONTMT INSTRUMENT AIR ISOL VALVE											ET	CSD or R	VCSJ - 29	2OST-1.10H	Per OMN-1
											RPV	6RFO/18MO			18 months per Tech Specs
											DIAG-ST-S	6RFO			Per OMN-1
2IAC*MOV133	2	A	Active	4	Plug	MOV	34-3 (C-1)	O	S		LJ-C	SP		2BVT 1.47.5	Penet. #11 per 2OST-47.109
CONTMT INSTRUMENT AIR ISOL VALVE											RPV	6RFO/18MO		2OST-47.3R	18 months per Tech Specs
											DIAG-ST-S	6RFO		2OST-47.3L	Per OMN-1
											ET	18MO or R			Per OMN-1
2IAC*MOV134	2	A	Active	4	Plug	MOV	34-3 (C-1)	O	S		LJ-C	SP		2BVT 1.47.5	Penet. #11 per 2OST-47.109
CONTMT INSTRUMENT AIR ISOL VALVE											RPV	6RFO/18MO		2OST-47.3F	18 months per Tech Specs
											DIAG-ST-S	6RFO			Per OMN-1
											ET	18MO or R			Per OMN-1
2SAS*14	2	A	Passive	2	Globe		34-1B (C-6)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #42 per 2OST-47.120
SERVICE AIR MANIFOLD ISOL															
2SAS*15	2	A	Passive	2	Globe		34-1B (C-6)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #42 per 2OST-47.120
SERVICE AIR MANIFOLD ISOL															

SYSTEM NAME: 4KV Station Service **SYSTEM NUMBER:** 36

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2EGA*100 (2EGA-C21A) DISCH CHECK	3	C	Active	0.75	Check		36-3 (E-4)	S	S		CV-BDT-O CV-S-LT	Q Q		2OST-47.3L	
2EGA*101 (2EGA-C22A) DISCH CHECK	3	C	Active	0.75	Check		36-3 (F-4)	S	S		CV-BDT-O CV-S-LT	Q Q		2OST-47.3L	
2EGA*118 AIR START TANK 21A TO COMPRESSOR PRES SWITCH CLASS BREAK EXCESS FLOW CHECK VALVE	3	C	Active	0.5	Excess Flw Chk		36-3 (E-4)	O	S		CV-BDT-O CV-S	Q Q		2OST-47.3L	
2EGA*119 AIR START TANK 22A TO COMPRESSOR PRES SWITCH CLASS BREAK EXCESS FLOW CHECK VALVE	3	C	Active	0.5	Excess Flw Chk		36-3 (F-4)	O	S		CV-BDT-O CV-S	Q Q		2OST-47.3L	
2EGA*130 (2EGA-C21B) DISCH CHECK	3	C	Active	0.75	Check		36-3 (E-9)	S	S		CV-BDT-O CV-S-LT	Q Q		2OST-47.3F	
2EGA*131 (2EGA-C22B) DISCH CHECK	3	C	Active	0.75	Check		36-3 (F-9)	S	S		CV-BDT-O CV-S-LT	Q Q		2OST-47.3F	
2EGA*155 AIR START TANK 21B TO COMPRESSOR PRES SWITCH CLASS BREAK EXCESS FLOW CHECK VALVE	3	C	Active	0.5	Excess Flw Chk		36-1 (E-9)	O	S		CV-BDT-O CV-S	Q Q		2OST-47.3F	
2EGA*156 AIR START TANK 22B TO COMPRESSOR PRES SWITCH CLASS BREAK EXCESS FLOW CHECK VALVE	3	C	Active	0.5	Excess Flw Chk		36-1 (F-9)	O	S		CV-BDT-O CV-S	Q Q		2OST-47.3F	
2EGA*RV205 (2EGA*TK21A) RELIEF	3	C	Active	0.5	Relief	RV	36-3 (E-4)	S	O/S		SPT	10YR		2BVT 1.60.5	
2EGA*RV206 (2EGA*TK21B) RELIEF	3	C	Active	0.5	Relief	RV	36-3 (E-9)	S	O/S		SPT	10YR		2BVT 1.60.5	
2EGA*RV207 (2EGA*TK22A) RELIEF	3	C	Active	0.5	Relief	RV	36-3 (F-4)	S	O/S		SPT	10YR		2BVT 1.60.5	
2EGA*RV208 (2EGS*TK22B) RELIEF	3	C	Active	0.5	Relief	RV	36-3 (F-9)	S	O/S		SPT	10YR		2BVT 1.60.5	

SYSTEM NAME: 4KV Station Service SYSTEM NUMBER: 36

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Normal	Position Safety	Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2EGF*10 (2EGF*STR42) OUTLET CHECK	3	C	Active	3	Check		36-1 (E-7)	S	O/S		CV-O CV-S	Q Q		2OST-36.2(2A)	
2EGF*7 (2EGF*STR39) OUTLET CHECK	3	C	Active	3	Check		36-1 (F-1)	S	O/S		CV-O CV-S	Q Q		2OST-36.1(1A)	
2EGF*8 (2EGF*STR41) OUTLET CHECK	3	C	Active	3	Check		36-1 (F-6)	S	O/S		CV-O CV-S	Q Q		2OST-36.2(2A)	
2EGF*9 (2EGF*STR40) OUTLET CHECK	3	C	Active	3	Check		36-1 (E-1)	S	O/S		CV-O CV-S	Q Q		2OST-36.1(1A)	
2EGO*106 DG 2-2 LUBE OIL STRAINER (2EGO*STR22B) INLET ISOL	3	B	Active	4	Gate		36-5B (F-8)	LO	S		MAN	2YR		2OST-47.3F	
2EGO*107 DG 2-1 LUBE OIL STRAINER (2EGO*STR22A) INLET ISOL	3	B	Active	4	Gate		36-5A (F-8)	LO	S		MAN	2YR		2OST-47.3L	
2EGO*108 DG 2-2 LUBE OIL STRAINER (2EGO*STR22B) OUTLET ISOL	3	B	Active	4	Gate		36-5B (E-8)	LO	S		MAN	2YR		2OST-47.3F	
2EGO*109 DG 2-1 LUBE OIL STRAINER (2EGO*STR22A) OUTLET ISOL	3	B	Active	4	Gate		36-5A (E-8)	LO	S		MAN	2YR		2OST-47.3L	
2EGO*114 DG 2-2 LUBE OIL STRAINER (2EGO*STR24B) INLET ISOL	3	B	Active	4	Gate		36-5B (F-7)	S	O		MAN	2YR		2OST-47.3F	
2EGO*115 DG 2-1 LUBE OIL STRAINER (2EGO*STR24A) INLET ISOL	3	B	Active	4	Gate		36-5A (F-7)	S	O		MAN	2YR		2OST-47.3L	
2EGO*116 DG 2-2 LUBE OIL STRAINER (2EGO*STR24B) OUTLET ISOL	3	B	Active	4	Gate		36-5B (E-7)	S	O		MAN	2YR		2OST-47.3F	
2EGO*117 DG 2-1 LUBE OIL STRAINER (2EGE*STR24A) OUTLET ISOL	3	B	Active	4	Gate		36-5A (E-7)	S	O		MAN	2YR		2OST-47.3L	

BV Unit 2

VALVE TABLE

SYSTEM NAME: Control Area Ventilation SYSTEM NUMBER: 44A

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2HVC*MOD201A CONTROL ROOM OUTSIDE AIR INTAKE DAMPER	3	B	Active	36	Butterfly	MOD	44A-2 (D-2)	O	S		ST-S RPV	Q 2YR		2OST-47.3I	
2HVC*MOD201B CONTROL ROOM OUTSIDE AIR INTAKE DAMPER	3	B	Active	36	Butterfly	MOD	44A-2 (D-2)	O	S		ST-S RPV	Q 2YR		2OST-47.3G	
2HVC*MOD201C CONTROL ROOM AIR EXHAUST DAMPER	3	B	Active	36	Butterfly	MOD	44A-2 (C-2)	S	S		ST-S RPV	Q 2YR		2OST-47.3I	
2HVC*MOD201D CONTROL ROOM AIR EXHAUST DAMPER	3	B	Active	36	Butterfly	MOD	44A-2 (C-2)	S	S		ST-S RPV	Q 2YR		2OST-47.3G	
2HVC*MOD204A CONTROL ROOM EMERGENCY SUPPLY FAN INTAKE DAMPER	3	B	Active	8	Butterfly	MOD	44A-2 (F-2)	S	O		ST-O RPV	Q 2YR		2OST-47.3I	
2HVC*MOD204B CONTROL ROOM EMERGENCY SUPPLY FAN INTAKE DAMPER	3	B	Active	8	Butterfly	MOD	44A-2 (G-2)	S	O		ST-O RPV	Q 2YR		2OST-47.3G	

SYSTEM NAME: Containment Area Ventilation **SYSTEM NUMBER:** 44C

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2HVR*DMP206	2	A	Passive	8	Butterfly	DMP	44C-2 (D-6)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #91 per 2OST-47.141
CONTAINMENT PURGE VACUUM BREAK DAMPER											RPV	2YR		2OST-47.141	
2HVR*MOD23A	2	A	Active	42	Butterfly	MOD	44C-2 (B-5)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #90 per 2OST-47.140
CNMT. PURGE DISCHARGE ISOL											ET	CSD or R	VCSJ - 30	2OST-1.10B	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2HVR*MOD23B	2	A	Active	42	Butterfly	MOD	44C-2 (B-7)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #90 per 2OST-47.140
CNMT PURGE DISCH ISOL											ET	CSD or R	VCSJ - 30	2OST-1.10B	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2HVR*MOD25A	2	A	Active	42	Butterfly	MOD	44C-2 (C-5)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #91 per 2OST-47.141
CNMT PURGE SUPPLY ISOL											ET	CSD or R	VCSJ - 30	2OST-1.10B	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1
2HVR*MOD25B	2	A	Active	42	Butterfly	MOD	44C-2 (C-7)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #91 per 2OST-47.141
CNMT PURGE SUPPLY ISOL											ET	CSD or R	VCSJ - 30	2OST-1.10B	Per OMN-1
											DIAG-ST-S	6RFO			Per OMN-1
											RPV	6RFO			Per OMN-1

BV Unit 2

VALVE TABLE

SYSTEM NAME: Post DBA Hydrogen Control **SYSTEM NUMBER:** 46

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2HCS*110	2	A	Passive	2	Ball		46-1 (D-2)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #88 per 2OST-47.139
RECOMBINER 21A B/U CNMT ISOL											RPV	2YR		2OST-45.4	RPV of Reach Rod
2HCS*111	2	A	Passive	2	Ball		46-1 (G-2)	LS	S		LJ-C	SP		2BVT 1.47.5	Penet. #87 per 2OST-47.138
RECOMBINER 21B B/U CNMT ISOL											RPV	2YR		2OST-45.4	RPV of Reach Rod
2HCS*MOV116	2	A	Passive	2	Ball	MOV	46-1 (D-1)	S	S		LJ-C	SP		2BVT 1.47.5	Penet. #88 per 2OST-47.139
RECOMBINER 21A RETURN TO CNMT ISOL											RPV	2YR		2OST-47.3P	
2HCS*MOV117	2	A	Passive	2	Ball	MOV	46-1 (G-1)	S	S		LJ-C	SP		2BVT 1.47.5	Penet. #87 per 2OST-47.138
RECOMBINER 21B RETURN TO CNMT ISOL											RPV	2YR		2OST-47.3J	
2HCS*SOV114A	2	A	Active	2	Globe	SOV	46-1 (B-2)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #93 per 2OST-47.143
CNMT ISOL TO RECOMBINER 21A											RPV	SP	VRR - 03	2OST-47.143	
											FS-S	Q		2OST-47.3P	
											ST-O	Q			
											ST-S	Q			
2HCS*SOV114B	2	A	Passive	2	Globe	SOV	46-1 (F-2)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #92 per 2OST-47.142
CNMT ISOL TO RECOMBINER 21B											RPV	SP	VRR - 03	2OST-47.142	
2HCS*SOV115A	2	A	Active	2	Globe	SOV	46-1 (C-2)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #93 per 2OST-47.143
BACKUP CNMT ISOL TO RECOMBINER 21A											RPV	SP	VRR - 03	2OST-47.143	
											FS-S	Q		2OST-47.3P	
											ST-O	Q			
											ST-S	Q			
2HCS*SOV115B	2	A	Passive	2	Globe	SOV	46-1 (F-2)	S	S	S	LJ-C	SP		2BVT 1.47.5	Penet. #92 per 2OST-47.142
BACKUP CNMT ISOL TO RECOMBINER 21B											RPV	SP	VRR - 03	2OST-47.142	
2HCS*SOV133A	2	A	Active	0.375	Globe	SOV	46-1 (A-1)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #105-B per 2OST-47.151
H2 ANALYZER (2HCS*HA100A) OUTLET INSIDE CNMT ISOL											RPV	SP	VRR - 03	2OST-47.151	
											FS-S	Q		2OST-47.3P	
											ST-O	Q			
											ST-S	Q			

BV Unit 2

VALVE TABLE

SYSTEM NAME: Post DBA Hydrogen Control **SYSTEM NUMBER:** 46

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2HCS*SOV133B	2	A	Active	0.375	Globe	SOV	46-1 (D-1)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #97-B per 2OST-47.146
H2 ANALYZER (2HCS*HA100B) OUTLET INSIDE CNMT ISOL											RPV	SP	VRR - 03	2OST-47.146	
											FS-S	Q		2OST-47.3J	
											ST-O	Q			
											ST-S	Q			
2HCS*SOV134A	2	A	Active	0.375	Globe	SOV	46-1 (A-3)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #105-B per 2OST-47.151
H2 ANALYZER (2HCS*HA100A) OUTLET OUTSIDE CNMT ISOL											RPV	SP	VRR - 03	2OST-47.151	
											FS-S	Q		2OST-47.3P	
											ST-O	Q			
											ST-S	Q			
2HCS*SOV134B	2	A	Active	0.375	Globe	SOV	46-1 (D-3)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #97-B per 2OST-47.146
H2 ANALYZER (2HCS*HA100B) OUTLET OUTSIDE CNMT ISOL											RPV	SP	VRR - 03	2OST-47.146	
											FS-S	Q		2OST-47.3J	
											ST-O	Q			
											ST-S	Q			
2HCS*SOV135A	2	A	Active	0.375	Globe	SOV	46-1 (E-1)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #57-C per 2OST-47.134
H2 ANALYZER (2HCS*HA100B) INLET INSIDE CNMT ISOL											RPV	SP	VRR - 03	2OST-47.134	
											FS-S	Q		2OST-47.3J	
											ST-O	Q			
											ST-S	Q			
2HCS*SOV135B	2	A	Active	0.375	Globe	SOV	46-1 (E-3)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #57-C per 2OST-47.134
H2 ANALYZER (2HCS*HA100B) INLET OUTSIDE CNMT ISOL											RPV	SP	VRR - 03	2OST-47.134	
											FS-S	Q		2OST-47.3J	
											ST-O	Q			
											ST-S	Q			
2HCS*SOV136A	2	A	Active	0.375	Globe	SOV	46-1 (B-1)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #55-C per 2OST-47.129
H2 ANALYZER (2HCS*HA100A) INLET INSIDE CNMT ISOL											RPV	SP	VRR - 03	2OST-47.129	
											FS-S	Q		2OST-47.3P	
											ST-O	Q			
											ST-S	Q			

BV Unit 2

VALVE TABLE

SYSTEM NAME: Post DBA Hydrogen Control **SYSTEM NUMBER:** 46

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2HCS*SOV136B	2	A	Active	0.375	Globe	SOV	46-1 (B-3)	S	O/S	S	LJ-C	SP		2BVT 1.47.5	Penet. #55-C per 2OST-47.129
H2 ANALYZER (2HCS*HA100A) INLET OUTSIDE CNMT ISOL											RPV	SP	VRR - 03	2OST-47.129	
											FS-S	Q		2OST-47.3P	
											ST-O	Q			
											ST-S	Q			

BV Unit 2

VALVE TABLE

SYSTEM NAME: Containment **SYSTEM NUMBER:** 47

Valve ID / Name	Class	Cat.	Active / Passive	Size (in.)	Valve Type	Actuator Type	Drawing & Coord	Position Normal	Position Safety	Position Fail-Safe	Required Test	Frequency	Code Dev.	Procedure	Remarks
2PHS*100 (2PHS*PAL1) ESCAPE HATCH OUTER DOOR EQUALIZING VLV	2	A	Passive	1.5	Gate		47-1 (E-4)	S	S		LTJ	SP		2BVT 1.47.8	
2PHS*101 (2PHS*PAL1) ESCAPE HATCH CONTAINMENT DR EQUAL VALVE	2	A	Passive	1.5	Gate		47-1 (E-2)	S	S		LJ-C	SP		2BVT 1.47.5	Penet. Personnel Airlock per 2OST-47.155
2PHS*110 (2PHS*PAL1) MANUAL EQUAL VALVE OUTER DR ATMOS SIDE	2	A	Passive	1.5	Ball		47-1 (E-4)	S	S		LTJ	SP		2BVT 1.47.8	
2PHS*111 (2PHS*PAL1) MANUAL EQUAL VLV OUTER DR AIR LCK CHMB SD	2	A	Passive	1.5	Ball		47-1 (E-4)	S	S		LTJ	SP		2BVT 1.47.8	
2PHS*112 (2PHS*PAL1) MANUAL EQUAL VLV CONT DR AIR LCK CHMB SD	2	A	Passive	1.5	Ball		47-1 (E-2)	S	S		LJ-C	SP		2BVT 1.47.5	Penet. Personnel Airlock per 2OST-47.155
2PHS*113 (1PHS*PAL1) MANUAL EQUAL VLV CONT DOOR CONT SIDE	2	A	Passive	1.5	Ball		47-1 (E-2)	S	S		LJ-C	SP		2BVT 1.47.5	Penet. Personnel Airlock per 2OST-47.155
2PHS*201 (2PHS*EAL1) EMERGENCY AIR LOCK EQUAL VLV- OUTER DOOR	2	A	Passive	2	Gate		47-1 (B-9)	S	S		LTJ	SP		2BVT 1.47.10	
2PHS*202 (2PHS*EAL1) EMERGENCY AIR LOCK EQUAL VLV - CONT DOOR	2	A	Passive	2	Gate		47-1 (B-8)	S	S		LJ-C	SP		2BVT 1.47.5	Penet. Equip. Hatch Airlock per 2OST-47.156