TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT

Site Standard Practice

SSP-8.06, Attachment 1

INSERVICE TESTING PROGRAM

Revision 0

UNIT 1, FIRST INSERVICE INTERVAL

QUALITY RELATED

PREPARED BY: Gary L. Johnson

SPONSORING ORGANIZATION: Technical Support - NSS Systems

APPROVED BY: [signature] Date: 07/05/95

Effective Date: 07/19/95

LEVEL OF USE: N/A

REVISION LOG

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REVISION OR CHANGE NUMBER	EFFECTIVE DATE	AFFECTED PAGE NUMBER	DESCRIPTION OF REVISION/CHANGE
0	07/19/95	All	Initial issue. Replaces Appendix F of SSP-8.06. Revision bars are provided to identify changes from Appendix F as it existed in SSP-8.06, Revision 3, through CN-5. Corrected source note 1 to NRC Violation 390/95-05-02 to reference IFI 95-05-01. This was originally presented to TVA as a potential violation, but when the final report was issued, the item was issued as an IFI rather than a violation. Revised Table 2 to reflect revised valve functions.
CN-1	08/04/95	17, 22, 23, 25, 20, 21, and 54a	Delete the PV requirements from valves 1-FCV-67-9-A, 1-FCV-67-9-B, 1-FCV-67-10-A, 1-FCV-67-10-B, 2-FCV-67-9-A, 2-FCV-67-9-B, 2-FCV-67-10-A, and 2-FCV-67-10-B. These valves do not have remote position indicators and the test is therefore not required. Add Request for Relief PV-15 to reflect the fact that we have not been able to find a method to stroke time test valves 0-FSV-32-61-A and 0-FSV-32-87-B. Correct the UNIDs for valves 0-FSV-32-61-A and 0-FSV-32-87-B to read 0-FSV-67-1221-A and 0-FSV-67-1223-B, respectively, as required by DCN S-36569-A. Correct the direction of testing for valves 1-FCV-43-201-A, -202-A, -207-B, -208-B, -433-A, -434-A, -435-B, and -436-B in response to WBPER940067. Correct a spacing error on page 20 and 21. Change the category of valves 1-FCV-43-54D-B, 1-FCV-43-55-A, and 1-FCV-43-56D-B from A-Act to B-Act to correctly reflect the valves function.
CN-2	08/11/95	2, 14, 16	Added source note 3 to valves 1-CKV-3-861-B, 1-CKV-3-862-A, 1-CKV-3-921-B, and 1-CKV-3-922-A. Also deleted a duplicate header from page 16. The line "Drawing Number 1-47W865-5" was repeated.
CN-3	08/14/95	2, 15, 43, 53, 55	Corrected information provided in the Proposed Alternative and Frequency of Proposed Alternative for relief request PV-13. Incorporated DCN M-36871-A which removes the Containment Isolation signal from 1-FCV-26-241, -242, -244, and -245, deenergizes the valves and locks them in position. Revise PV-03 to reintroduce the use of ultrasonic flow measurement devices as described by WBPER950417.

REVISION LOG

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REVISION OR CHANGE NUMBER	EFFECTIVE DATE	AFFECTED PAGE NUMBER	DESCRIPTION OF REVISION/CHANGE
CN-4	09/22/95	2, 8, 11, 12, 17, 21, 23, 26, 27, 28, 29	Revised the proposed alternative described in the introductory text to match that described in PV-09. Revised Table 1 to reflect the reintroduction of PV-03 to all chilled water pumps. Corrected the inadvertent deletion of reference to PV-05 from some sampling valves. Corrected a spacing error on page 21. Corrected direction of testing for 1-FCV-67-147-T. Added valves 1-RFV-72-40 and 1-RFV-72-41 in reponse to DCN W-36588-B. Deleted the requirement to part stoke test the MSIVs in response to NUREG-1482. Deleted the requirement to stroke time test 1-FCV-70-153-B in response to DCN S-36173-A which changed it to a normally open valve and DCN S-37278-A which deenergized and locked it in position.
CN-5	10/27/95	2, 14, 25, 31, 54a	Deleted 1-CKV-3-820 and 1-CKV-3-821 in response to DCN M-38902-A which removed the internals from the valves. Added 1-FSV-68-396 and 1-FSV-68-397 to Request for Relief PV-15
CN-6	11/10/95	2, 2a, 22, 23, 25, 38	Deleted valves 1-FCV-67-22-A, 1-FCV-67-24-B, 1-FCV-67-81-A, 1-FCV-67-82-B, 1-FCV-67-147-T, 2-FCV-67-22-A, 2-FCV-67-24-B, 2-FCV-67-81-A, 2-FCV-67-82-B, 2-FCV-67-147-T, 1-FCV-70-2-A and 1-FCV-70-3-B

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1.0 INTRODUCTION

Under the provisions of 10CFR50.55a, Inservice Testing (IST) of pumps and valves is required to be performed in accordance with Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code and applicable Addenda (ASME Section XI). As required by 10CFR50.55a, the Edition of ASME Section XI to be applied at Watts Bar Nuclear Plant (WBN) for IST during the first Inservice Interval is the 1989 Edition. The 1989 Edition of ASME Section XI in turn invokes ANSI/ASME Operations and Maintenance (OM) Standard, 1987 Edition with Addenda through 1988a, Part 6 for IST of pumps and Part 10 for IST of valves. This Summary Description identifies the pumps and valves for which IST will be performed at WBN unit 1 to comply with the requirements of 10CFR50.55a. The testing required by this program will be accomplished through the WBN Surveillance Testing Program.

2.0 PUMP INSERVICE TESTING PROGRAM

Except for relief requested under the provisions of 10CFR50.55a, the IST Program for pumps shall be conducted in accordance with ASME/ANSI OM Standard, part 6, 1987 Edition with Addenda through OM-1988a as required by Subsection IWP of Section XI of the Boiler and Pressure Vessel Code, 1989 Edition. Table 1 summarizes the IST Program for pumps at WBN. Each Inservice Test Quantity to be measured and reference to related relief requests is listed. Specific details of the relief requests are provided in Table 4 and summarized in the following.

2.1 Pump Vibration Limits (PV-01)

OM-6, Table 3, requires that pump vibration levels be limited by a rise above reference value (2.5 times the reference value to enter the alert scheduling range and 6 times the reference value to enter the required action range) and also by an absolute vibration limit (0.325 inches per second peak velocity [IPS] to enter the alert scheduling range and 0.700 IPS to enter the Required Action Range). The rise above the reference value criteria, when applied to pumps which have very low reference values for vibration, results in penalizing smooth operating pumps. A significant percentage of WBN's pumps will enter the alert scheduling range with vibration levels less than 0.1 IPS. By other widely accepted industrial standards, these levels would be considered smooth. Relief is therefore requested to apply a minimum reference value of 0.1 IPS. Pumps whose vibration levels are below this minimum value will be treated as if their reference value were 0.1 IPS. The application of this minimum reference value will be reviewed on a case by case basis, including any manufacturer's recommendations on acceptable vibration levels. Pumps whose vibration levels are above this minimum value will be treated as required by OM-6, Table 3.

2.2 Boric Acid Transfer and Train B Main Control Room Chilled Water Pump Testing (PV-03)

The Boric Acid Transfer Pumps are only equipped with a flow measurement device in the line going to the Charging Pump suction header. Use of this line during operation results in a significant addition of negative reactivity into the reactor. The use of portable clamp-on type flow measurement devices in the piping which does not go to the Charging Pump suction header results in an instrument accuracy of 3% rather than 2%. Relief is therefore requested to accept the additional 1% of inaccuracy in the flow measurement instrumentation for quarterly testing. Once per refueling cycle, the pumps will be tested while pumping to the charging pump suction header at full flow through a line containing a flow measurement device that meets the OM-10 requirements.

These pumps are equipped with multiple speed induction motors which have the capability to run at a nominal 1750 RPM speed, the "SLOW" operating condition, or at a nominal 3550 RPM speed, the "FAST" operating condition. This is accomplished by changing the number of poles used to drive the motors from four at the "SLOW" condition to two at the "FAST" condition. Since the motors perform and function in the same manner as a single speed induction motor at either operating condition and do not have the capability of making speed adjustments beyond that available by changing the number of poles used to drive the motors, the pumps are considered to be multiple speed, not variable speed. Thus these pumps are not required to be adjusted to a reference value for speed (RPM) as required by OM-6, paragraph 5.2(a). The operating condition, either "FAST" or "SLOW", will be verified.

2.2 Boric Acid Transfer and Train B Main Control Room Chilled Water Pump Testing (PV-03) (continued)

The chilled water pumps are equipped with an "Annubar" type flow measurement device. During Preoperational testing, it was discovered that the installed primary flow element for the Train B Main Control Room Chilled Water Pump did not provide reliable, repeatable readings of pump flow. It is possible to install instrumentation on this primary element that meets the OM-6 requirements for accuracy. However, since the primary element has proven unreliable, the readings obtained from this instrumentation would also be unreliable. Relief is therefore requested to permit the use of ultrasonic flow measurement instrumentation having an accuracy of ±3% of full scale for measurement of flow for these pumps. This test is normally conducted at a flow rate corresponding to the minimum required accident flow for these pumps.

2.3 ERCW Screen Wash Pump and Discharge Check Valve Testing (PV-04)

The ERCW Screen Wash Pumps and their associated discharge check valves do not have flow instrumentation installed to allow measurement of flow and the configuration of the installed piping precludes the use of portable clamp-on type flow measurement devices. Relief is therefore requested to accept visual verification that the flow delivered through the spray nozzles in the traveling water screens provides coverage of the screen spray area and adequately flushes away debris present on the screen. Pressure and vibration data on the pump will be collected and analyzed in accordance with OM-6.

3.0 VALVE INSERVICE TESTING PROGRAM

Except for relief requested under the provisions of 10CFR50.55a, the IST Program for valves shall be conducted in accordance with ASME/ANSI OM Standard, Part 10, 1987 Edition with Addenda through OM-1988a as required by Subsection IWV of Section XI of the ASME Boiler and Pressure Vessel Code, 1989 Edition. Valves in WBN's safety related systems were reviewed and categorized. Valves which were categorized as active in any category and passive valves categorized in Category A or B are listed in Table 2. Justifications for testing at a frequency other than once per three months are listed numerically in Table 3. Relief Requests are listed numerically in Table 4.

3.1 Thermal Relief Valves

Some safety related systems, particularly those containing heat exchangers, have been provided with thermal relief valves (TRV). These TRVs are small capacity relief valves intended to relieve pressure due to thermal expansion of fluid in an isolated component. It is extremely unlikely that the component isolation valves used to isolate affected components will have zero leakage. Since the flow required to relieve pressure due to thermal expansion is so small, a very minute amount of seat leakage through an isolation valve serves the same purpose as the TRV. Many of the isolation valves across which these TRVs are placed are butterfly valves which are not anticipated to seal tight enough to require TRV actuation. The function of these valves is to protect equipment that is in a standby mode, that is, the equipment is not actively in service for accident mitigation or shutdown. Therefore, these valves are not considered to have an accident mitigation function and are not required to function to achieve or maintain the cold shutdown condition. Therefore, the thermal relief valves are considered to be C-Passive and are not tested in the Inservice Testing Program. These valves are, however, included in an Augmented Inservice Testing (AIST) Program that utilizes the requirements of OM-1.

3.2 Thermal Expansion Check Valves

Several containment penetrations have been fitted with normally closed check valves designed to open to pass flow created by thermal expansion of fluid in the penetration. The quantity of thermal expansion flow is so small that any opening of the check valve will allow it to pass its maximum required accident flow. Thus, the thermal expansion check valves have been categorized AC-Passive. These valves will be leak tested in the closed position at each refueling. However, these valves will not be tested to open.

3.3 Corrective Action

ANSI/ASME OM-6, paragraph 6.2, states "All test data shall be analyzed within 96 hours after completion of a test. Watts Bar Technical Specifications regarding corrective actions are more restrictive than those identified in ANSI/ASME OM-6, paragraph 6.2. By the Technical Specification definition of OPERABLE, no grace period is allowed before a device that is not capable of performing its specified function is declared inoperable. WBN will follow the more restrictive requirements of the Technical Specifications. This action exceeds the requirements of Section XI and OM-6.

3.4 Emergency Diesel Systems

The inservice operability testing of pumps and valves associated with the emergency diesels are excluded from the ASME Section XI Inservice Testing Program since these components do not contain water, steam or radioactive material. Therefore, in accordance with Regulatory Guide 1.26, they are not required to be considered as Code Class components. These components are an integral part of the emergency diesel system and are functionally tested monthly. Thus, the functional operability testing of these components is performed at a frequency greater than that required by Part 10 for either pumps or valves. Additionally, the diesel generator air start system valves and the diesel fuel oil system pumps and valves necessary to support operability of the emergency diesels are included in an Augmented Inservice Testing (AIST) Program which utilizes the requirements of OM-6 and OM-10. Failure of these components to perform their intended function will be identified either by the failure of the associated emergency diesel to meet its operability testing requirements or by the testing performed as part of the AIST Program.

3.5 Fail Safe Actuators

Valves which have a fail safe actuator are exercised using that actuator. In most cases, the nature of the control circuitry used to stroke the valve is such that normal testing causes the fail safe actuator to operate the valve. Thus, the fail safe actuator is regularly tested when the valve is tested. In those cases where the fail safe actuator is not the normal source for operation of the valve, valve testing is performed using both the normal means of operation and the fail safe actuator.

3.6 Passive Valves

As specified in OM-10, Table 1, passive valves have no testing requirements other than verification of the accuracy of remote position indicators for valves so equipped and/or seat leakage testing if categorized as A-Passive. The attached testing program provides for verification of the accuracy of the remote position indicators of passive valves which are in a flow path which is required to perform a safety function in order to mitigate the consequences of an accident, achieve the cold shutdown condition, or maintain the cold shutdown condition. Provisions are also included for seat leakage testing of Category A-Passive valves. Passive valves which are within a non-safety related flow path are considered to be outside the scope the IST program and are not tested as part of this program.

WBN also has valves originally equipped with a remote position indicator, and which are within or provide a flow boundary for a safety related flow path, but have had their remote position indication disabled. These valves have been placed in their safety required position and administratively locked in place with the power supply breaker locked open. This action was taken to mitigate potential non-conservative action by the valves in the event of a fire (10CFR50 Appendix R). Since locking open the power breaker for these valves also disables the remote position indication, these valves are not considered to be equipped with remote position indication and are not tested for the accuracy of the indicators. Where plant procedures (Abnormal Operating Instructions and Emergency Operating Instructions) call for the restoration of power to these valves in order to change the valves position, the valve has been classified as active and will be tested in accordance with the attached program, including testing of the remote position indicators.

3.7 Backseat Testing of Category C-Active and AC-Active Check Valves

Category C-Active and AC-Active check valves which have a safety function to travel to the closed position are periodically tested to verify the closing function. This verification is accomplished by either: visual observation, an electrical signal initiated by a position indicating device, observation of appropriate pressure indication in the system, leak testing, disassembly/inspection using the sampling program described in Position 2 of Generic Letter 89-04, or other positive means. This action meets the requirements of Position 3 of Generic Letter 89-04.

3.8 Category A Valves

Valves at Watts Bar which have been categorized in Category A are either pressure isolation valves (PIV) or containment isolation valves (CIV).

A. Containment Isolation Valves (PV-05)

Containment isolation valves falling within the scope of ASME Section XI are tested in accordance with ANSI/ASME OM-10, paragraph 4.2.2. In accordance with subparagraph 4.2.2.2, these valves are tested in accordance with 10CFR50, Appendix J, CIV test program rather than the requirements of ANSI/ASME OM-10. Paragraph 50.55a(b)(2)(vii) of 10CFR50.55a requires that paragraph 4.2.2.3(e) of ANSI/ASME OM-10 be applied to CIVs in addition to the requirements of 10CFR50, Appendix J. ANSI/ASME OM-10, paragraph 4.2.2.3(e) requires the establishment of individual leakage rates. For valves performing a containment isolation function, individual valve leak rates are not in themselves significant. The pertinent leak rate criterion for CIVs is that the total leak rate for all penetrations and valves be less than that allowed by Appendix J. In recognition of the fact that a single valve should not be allowed to approach the Appendix J limit, administrative measures are provided whereby, after appropriate review, individual valve leak rates can be accepted which exceed this working limit, up to but not more than the current margin between the actual containment leak rate and 0.6 L_a.

B. Pressure Isolation Valves

Pressure isolation valves will be tested in accordance with ANSI/ASME OM Standard, part 10, paragraph 4.2.2. Some pressure isolation valves are associated with the Primary Coolant Pressure Boundary. In addition to the requirements of paragraph 4.2.2, these valves will also be tested in accordance with the Watts Bar Technical Specifications regarding permissible leakage from the reactor coolant system.

3.9 Setpoint Testing of Safety and Relief Valves

Setpoint testing of Safety and relief valves will be conducted in accordance with the requirements of the ASME OM Standard, Part 1, 1987 Edition with Addenda through 1988a.

3.10 Valve Disassembly in Lieu of Full Stroke Testing (PV-07, PV-08, PV-10, PV-11, PV-13, and PV-14)

Certain valves at WBN are not capable of practically being full stroke tested. The number of valves and their location make disassembly of each individual valve impractical and burdensome. Relief is therefore requested to apply the alternative to full stroke testing discussed in Generic letter 89-04. This involves grouping the valves in groups of not more than 4 valves based on valve manufacturer, design parameters and physical environment factors. One valve per group is then disassembled each refueling outage on a rotating basis and inspected. During disassembly, the valve will be rigorously examined, including manual exercising the disc through a full stroke. Where possible, part stroke testing will be performed following disassembly.

3.11 Testing of the ERCW Air Release Check Valves (PV-09)

The ERCW pumps are equipped with inverted check valves to ensure that the pump column drains down when the pump stops. This allows the pump to start without attempting to accelerate the column of water in the pump column, thus reducing starting current and the likelihood of overcurrent conditions. The valves also close to provide a flow boundary after the pump is started. These check valves pass air, which is a compressible fluid. The rules of OM-10 were not written with this in mind. Additionally, Generic Letter 89-04 requires full stroke to open testing of check valves to quantify the flow and ensure that it equals or exceeds the minimum required functional flow. For these valves, flow rate is not steady state but rises to a maximum and then decreases as the driving force of the water in the pump column reaches river elevation. Thus there is no practical method to determine the flow rate through these valves. Attempts to evaluate valve opening by timing column drain down have not been successful. The point in time the valve opens is easily identifiable by audible methods, but the point in time at which column drain down is completed is very subjective. Relief is therefore requested to accept verification that the valve opens and vents the pump column of water. The closing function of the valve will be demonstrated each pump test.

3.12 Testing of Vacuum Relief Valves (PV-12)

OM-1 requires that the setpoint of relief valves be determined to within +2% to -1%. The valves installed as vacuum relief valves are very similar in design to a spring loaded check valve. They operate in response to the difference in pressure forces acting on the two sides of the disc or the 'pallet' as the valve manufacturer calls it. The force which causes this valve to open corresponds to an approximate pressure differential of 0.15 psi. Meeting the OM-1 tolerances would require measuring pressure differences as small as 0.0015 psid. This is a very small differential pressure and would be very difficult to establish, control and measure to the accuracy required by OM-1. Relief is requested to accept the manufacturer's recommended method of verifying proper operation of this valve. This involves measuring via a force gage the additional force necessary to cause the valve pallet to move from the full closed condition with no differential pressure present across the valve. This force is to be within the specified range. The tools used to measure this force are calibrated to $\pm 1\%$ accuracy. Although this is within the absolute tolerance required by the reference paragraph of OM-1, the measurement is of the force required to open the valve and not the pressure at which it opens. Additionally, since the setpoint is verified without causing fluid to flow through the valve, the requirement for a minimum accumulator volume during testing is not applicable.

3.13 Testing in Conjunction with Cold Shutdowns

OM-10, paragraph 4.2.1.2(g) and 4.3.2.2(g), provides for the suspension of performance of tests identified to be performed in conjunction with cold shutdowns providing certain conditions are met. These conditions include beginning testing within 48 hours of entering the cold shutdown condition and continuing in a contiguous manner until either the unit is ready to return to power or all testing is completed. Section 3.1.1.1 of NUREG 1482 indicates testing during cold shutdown should be controlled in a sequential manner. WBN will exercise the provisions of paragraph 4.2.1.2(g) and 4.3.2.2(g) of OM-10 and incorporate the recommendation of NUREG 1482 regarding sequential control of testing during cold shutdown. Therefore, cold shutdown testing may be suspended, even though all tests identified to be performed in conjunction with cold shutdowns have not been completed, when the unit is ready to return to power and all provisions of OM-10 and the recommendation of NUREG 1482 have been met.

Additionally, some tests identified to be performed in conjunction with cold shutdowns are not performable during mode 5 operation. These tests are performed in operational mode 3 or 4 either while shutting the unit down or while returning the unit to power operation. Although these tests are not performed in mode 5 (cold shutdown), they are considered to be tests performed in conjunction with cold shutdown because they cannot be performed unless the unit is removed from mode 1, power operation.

3.14 Testing of Solenoid Actuated Pilot Valves

Many WBN diaphragm actuated line valves are operated by a solenoid actuated pilot valve that cycles either to supply air to the diaphragm actuator or to vent air from the actuator. Such pilot valves are considered part of the actuator and their function is adequately demonstrated when the process line valve is exercised. Such pilot valves are not individually exercised or stroke timed independent of the diaphragm actuated line valve.

4.0 ABBREVIATIONS AND SYSTEM NUMBERS

4.1 Abbreviations

ΔP	Differential Pressure
ACTR	Valve Actuator
AJ	Local leak rate test in accordance with 10CFR50, Appendix J
ANG	Angle body valve
APOSI	The position to which a valve must travel to fulfill its specific function. This is the position to which valves are exercised during their exercising test.
B	Indicates a valve which has a safety function in both the open and the closed position.
BT	Bench test of safety or relief valve to determine its setpoint
BTFY	Butterfly valve
BYV	Bypass Valve
C	When contained in the APOSI column in Table 2, indicates a valve whose function is to travel from the open to the closed position. This is the direction the valve will be exercised. When contained in the TESTS column in Table 2, indicates a check valve test. When so used it will also include a number from Section 4.3 to indicate the type of test and the frequency of performance.
CIV	Containment isolation valve
CKV	Check valve
CLASS	ASME Code Class
COORD	Drawing coordinates where valve/pump is located
CYL	Air, hydraulic or other high pressure fluid cylinder actuator
DIAPH	Diaphragm
E	Indicates a valve that has no designated position for that function (APosi or NPosi). The valve may be in either position.
FCV	Flow Control Valve
FS	Fail Safe Actuator Test
FSV	Flow Solenoid Valve
ISV	Isolation Valve
LK	Seat leakage measurement test in accordance with OM-10
MOV	Motor operated actuator
NPOSI	Position in which a valve is assumed to be prior to being called upon to perform its function. This may not be the position in which a valve is shown on the TVA Flow Diagrams (47W800 series drawings).
N	Non-ASME Section III component performing a safety function requiring IST.
O	Open
P	Discharge pressure of a positive displacement pump
PV	Verification of accurate indication of valve position once per two years.
Q	When contained in Table 1, indicates a Quarterly frequency. When contained in the TESTS column of Table 2, indicates an exercising test of a power operated category A or B valve. Is followed by a number from Section 4.3 to indicate the test and frequency.
SFV	Safety or relief valve
SIZE	Nominal valve diameter in inches
SOL	Solenoid actuator
SYS	TVA system identification number. See 4.2 following for system numbers and corresponding names.
TYPE	Valve body type
VIB	Vibration measurement

4.2 System Identification Numbers

01	Main Steam	62	Chemical and Volume Control
02	Condensate	63	Safety Injection
03	Feedwater	67	Essential Raw Cooling Water
26	High Pressure Fire Protection	68	Reactor Coolant
30	Ventilation	70	Component Cooling
31	Chilled Water	72	Containment Spray
32	Control Air	74	Residual Heat Removal
33	Service Air	77	Waste Disposal
43	Sampling	78	Spent Fuel Cooling
52	System Test Facility	81	Primary Water
59	Demineralized Water	84	Flood Mode Boration
61	Ice Condenser Containment	90	Radiation Monitoring

4.3 Test Code Identifications

	Once Per Quarter	In Conjunction with Cold Shutdowns	Once Per Refueling
Cat A/B - Full Stroke Cat C - Full Stroke open	1	2	3
Cat A/B - Part Stroke Cat C - Part Stroke Open	4	5	6
Cat C - Full Stroke Closed	7	8	9
Disassembly in lieu of full stroke exercising	0		

Table 1, Summary Listing of Pumps

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SYS	PUMP	CLASS	DRAWING	COORD	SPEED	FLOW	P/ΔP	VIB
3	1-PMP-3-118-A	3	1-47W803-2	F-5	(1)	Q	Q	PV-01
	1-PMP-3-126-B	3	1-47W803-2	F-6	(1)	Q	Q	PV-01
	1-PMP-3-1A-S	3	1-47W803-2	H-6	Q	Q	Q	PV-01
31	0-PMP-31-80-A	N	1-47W865-3	E-9	(1)	PV-03	Q	PV-01
	0-PMP-31-96A-B	N	1-47W865-3	E-4	(1)	PV-03	Q	PV-01
	0-PMP-31-128/1-A	N	1-47W865-7	F-9	(1)	PV-03	Q	PV-01
	0-PMP-31-129/1-B	N	1-47W865-7	F-4	(1)	PV-03	Q	PV-01
	0-PMP-31-36/1-A	N	1-47W865-8	E-9	(1)	PV-03	Q	PV-01
	0-PMP-31-49/1-B	N	1-47W865-8	E-3	(1)	PV-03	Q	PV-01
62	1-PMP-62-108-A	2	1-47W809-1	G-9	(1)	Q	Q	PV-01
	1-PMP-62-104-B	2	1-47W809-1	F-9	(1)	Q	Q	PV-01
	1-PMP-62-230-A	3	1-47W809-5	F-7	(1)	PV-03	Q	PV-01
	1-PMP-62-232-B	3	1-47W809-5	F-7	(1)	PV-03	Q	PV-01
63	1-PMP-63-10-A	2	1-47W811-1	F-9	(1)	Q	Q	PV-01
	1-PMP-63-15-B	2	1-47W811-1	E-9	(1)	Q	Q	PV-01
67	0-PMP-67-28-A	3	1-47W845-1	E-8	(1)	Q	Q	PV-01
	0-PMP-67-32-A	3	1-47W845-1	E-7	(1)	Q	Q	PV-01
	0-PMP-67-36-A	3	1-47W845-1	F-7	(1)	Q	Q	PV-01
	0-PMP-67-40-A	3	1-47W845-1	F-8	(1)	Q	Q	PV-01
	0-PMP-67-47-B	3	1-47W845-1	F-4	(1)	Q	Q	PV-01
	0-PMP-67-51-B	3	1-47W845-1	F-5	(1)	Q	Q	PV-01
	0-PMP-67-55-B	3	1-47W845-1	E-5	(1)	Q	Q	PV-01
	0-PMP-67-59-B	3	1-47W845-1	E-4	(1)	Q	Q	PV-01
	1-PMP-67-431-A	N	1-47W845-1	G-6	(1)	PV-04	Q	PV-01
	1-PMP-67-440-B	N	1-47W845-1	G-4	(1)	PV-04	Q	PV-01
	2-PMP-67-437-A	N	1-47W845-1	G-8	(1)	PV-04	Q	PV-01
	2-PMP-67-447-B	N	1-47W845-1	G-6	(1)	PV-04	Q	PV-01
70	1-PMP-70-46-A	3	1-47W859-1	C-8	(1)	Q	Q	PV-01
	1-PMP-70-38-A	3	1-47W859-1	D-8	(1)	Q	Q	PV-01
	0-PMP-70-51-S	3	1-47W859-1	D-8	(1)	Q	Q	PV-01
72	1-PMP-72-27-A	2	1-47W812-1	D-7	(1)	Q	Q	PV-01
	1-PMP-72-10-B	2	1-47W812-1	B-7	(1)	Q	Q	PV-01
74	1-PMP-74-10-A	2	1-47W810-1	F-8	(1)	Q	Q	PV-01
	1-PMP-74-20-B	2	1-47W810-1	C-8	(1)	Q	Q	PV-01

Notes:

(1) Per OM-6, paragraph 4.6.3, rotational speed measurements are only required for variable speed pumps. These pumps are powered by synchronous or induction motors.

Table 2, Summary Listing of Valves

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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
Drawing Number 1-47W801-1												
1-FCV-1-4-T	1	2	C-3	B-Act	32	GLOBE	CYL	O	C	Q2 FS PV	AF-01	None
1-FCV-1-11-T	1	2	E-3	B-Act	32	GLOBE	CYL	O	C	Q2 FS PV	AF-01	None
1-FCV-1-22-T	1	2	F-3	B-Act	32	GLOBE	CYL	O	C	Q2 FS PV	AF-01	None
1-FCV-1-29-T	1	2	C-3	B-Act	32	GLOBE	CYL	O	C	Q2 FS PV	AF-01	None
1-FCV-1-147-A	1	2	C-3	B-Act	2	GLOBE	DIAPH	O	C	Q2 FS PV	AF-03	None
1-FCV-1-148-B	1	2	E-3	B-Act	2	GLOBE	DIAPH	O	C	Q2 FS PV	AF-03	None
1-FCV-1-149-A	1	2	F-3	B-Act	2	GLOBE	DIAPH	O	C	Q2 FS PV	AF-03	None
1-FCV-1-150-B	1	2	A-3	B-Act	2	GLOBE	DIAPH	O	C	Q2 FS PV	AF-03	None
1-PCV-1-5-T	1	2	C-2	B-Act	6	GLOBE	DIAPH	C	O	Q2 FS PV	AF-04	None
1-PCV-1-12-T	1	2	D-2	B-Act	6	GLOBE	DIAPH	C	O	Q2 FS PV	AF-04	None
1-PCV-1-23-T	1	2	F-2	B-Act	6	GLOBE	DIAPH	C	O	Q2 FS PV	AF-04	None
1-PCV-1-30-T	1	2	A-2	B-Act	6	GLOBE	DIAPH	C	O	Q2 FS PV	AF-04	None
1-ISV-1-619	1	2	C-2	B-Act	6	GATE	MAN	O	C	Q2	AF-04	None
1-ISV-1-620	1	2	D-2	B-Act	6	GATE	MAN	O	C	Q2	AF-04	None
1-ISV-1-621	1	2	F-2	B-Act	6	GATE	MAN	O	C	Q2	AF-04	None
1-ISV-1-622	1	2	A-2	B-Act	6	GATE	MAN	O	C	Q2	AF-04	None
1-SFV-1-512	1	2	F-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-513	1	2	F-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-514	1	2	F-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-515	1	2	F-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-516	1	2	F-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-517	1	2	D-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-518	1	2	D-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-519	1	2	D-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-520	1	2	D-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-521	1	2	D-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-522	1	2	B-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-523	1	2	B-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-524	1	2	B-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-525	1	2	B-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-526	1	2	B-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-527	1	2	A-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-528	1	2	A-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-529	1	2	A-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-530	1	2	A-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
1-SFV-1-531	1	2	A-2	C-Act	6x10	SFV	SELF	C	O	BT	None	None
Drawing Number 1-47W801-2												
1-FCV-1-7-B	1	2	D-4	B-Act	4	GATE	SOL	O	C	Q1 FS PV	None	None
1-FCV-1-14-A	1	2	E-4	B-Act	4	GATE	SOL	O	C	Q1 FS PV	None	None
1-FCV-1-25-B	1	2	G-4	B-Act	4	GATE	SOL	O	C	Q1 FS PV	None	None
1-FCV-1-32-A	1	2	B-4	B-Act	4	GATE	SOL	O	C	Q1 FS PV	None	None
1-FCV-1-181-A	1	2	D-2	B-Act	4	GATE	SOL	O	C	Q1 FS PV	None	None

Table 2, Summary Listing of Valves
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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
1-FCV-1-182-B	1	2	F-2	B-Act	4	GATE	SOL	O	C	Q1 FS PV	None	None
1-FCV-1-183-A	1	2	H-2	B-Act	4	GATE	SOL	O	C	Q1 FS PV	None	None
1-FCV-1-184-B	1	2	B-2	B-Act	4	GATE	SOL	O	C	Q1 FS PV	None	None
Drawing Number 1-47W804-1												
1-CKV-2-667	2	N	G-2	C-Act	2.5	CKV	SELF	C	O	C0 C4	AF-05	None
Drawing Number 1-47W803-1												
1-CKV-3-508	3	2	F-2	C-Act	16	CKV	SELF	O	C	C8	AF-06	None
1-CKV-3-509	3	2	E-2	C-Act	16	CKV	SELF	O	C	C8	AF-06	None
1-CKV-3-510	3	2	C-2	C-Act	16	CKV	SELF	O	C	C8	AF-06	None
1-CKV-3-511	3	2	B-2	C-Act	16	CKV	SELF	O	C	C8	AF-06	None
1-CKV-3-638	3	2	A-3	AC-Act	6	CKV	SELF	O	C	C8 LK	AF-07	None
1-CKV-3-644[2]	3	2	A-1	C-Act	6	CKV	SELF	O	C	C0	None	PV-14
1-CKV-3-645[2]	3	2	A-1	C-Act	6	CKV	SELF	O	C	C0	None	PV-14
1-CKV-3-652	3	2	C-2	AC-Act	6	CKV	SELF	O	C	C8 LK	AF-07	None
1-CKV-3-655[2]	3	2	C-1	C-Act	6	CKV	SELF	O	C	C0	None	PV-14
1-CKV-3-656[2]	3	2	C-1	C-Act	6	CKV	SELF	O	C	C0	None	PV-14
1-CKV-3-669	3	2	D-2	AC-Act	6	CKV	SELF	O	C	C8 LK	AF-07	None
1-CKV-3-670[2]	3	2	D-1	C-Act	6	CKV	SELF	O	C	C0	None	PV-14
1-CKV-3-678	3	2	E-2	AC-Act	6	CKV	SELF	O	C	C8 LK	AF-07	None
1-CKV-3-679[2]	3	2	F-1	C-Act	6	CKV	SELF	O	C	C0	None	PV-14
1-FCV-3-33-A	3	2	C-3	B-Act	16	GATE	MOV	O	C	Q2 PV	AF-06	None
1-FCV-3-35	3	*	C-4	B-Act	16	ANG	DIAPH	O	C	Q2 FS PV	AF-06	None
1-FCV-3-35A	3	N	C-4	B-Act	6	GLOBE	DIAPH	O	C	Q2 FS PV	AF-06	None
1-FCV-3-47-B	3	2	E-3	B-Act	16	GATE	MOV	O	C	Q2 PV	AF-06	None
1-FCV-3-48	3	*	E-4	B-Act	16	ANG	DIAPH	O	C	Q2 FS PV	AF-06	None
1-FCV-3-48A	3	N	D-4	B-Act	6	GLOBE	DIAPH	O	C	Q2 FS PV	AF-06	None
1-FCV-3-87-A	3	2	F-3	B-Act	16	GATE	MOV	O	C	Q2 PV	AF-06	None
1-FCV-3-90	3	*	F-4	B-Act	16	ANG	DIAPH	O	C	Q2 FS PV	AF-06	None
1-FCV-3-90A	3	N	F-4	B-Act	6	GLOBE	DIAPH	O	C	Q2 FS PV	AF-06	None
1-FCV-3-100-B	3	2	B-3	B-Act	16	GATE	MOV	O	C	Q2 PV	AF-06	None
1-FCV-3-103	3	*	B-4	B-Act	16	ANG	DIAPH	O	C	Q2 FS PV	AF-06	None
1-FCV-3-103A	3	N	A-4	B-Act	6	GLOBE	DIAPH	O	C	Q2 FS PV	AF-06	None
1-FCV-3-185	3	2	C-2	B-Act	2	GLOBE	DIAPH	O	C	Q2 FS PV	AF-06	None
1-FCV-3-186	3	2	E-2	B-Act	2	GLOBE	DIAPH	O	C	Q2 FS PV	AF-06	None
1-FCV-3-187	3	2	F-2	B-Act	2	GLOBE	DIAPH	O	C	Q2 FS PV	AF-06	None
1-FCV-3-188	3	2	A-2	B-Act	2	GLOBE	DIAPH	O	C	Q2 FS PV	AF-06	None
1-FCV-3-236	3	2	C-3	B-Act	6	GATE	DIAPH	O	C	Q2 FS PV	AF-06	None
1-FCV-3-239	3	2	D-3	B-Act	6	GATE	DIAPH	O	C	Q2 FS PV	AF-06	None
1-FCV-3-242	3	2	E-3	B-Act	6	GATE	DIAPH	O	C	Q2 FS PV	AF-06	None
1-FCV-3-245	3	2	A-3	B-Act	6	GATE	DIAPH	O	C	Q2 FS PV	AF-06	None

*ASME Section III, Class 3 valve installed in a non-ASME Code Class piping system.

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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
Drawing Number 1-47W803-2												
1-CKV-1-891-S	1	2	C-8	C-Act	4	CKV	SELF	C	B	C0 C2 C4	AF-08	PV-07
1-CKV-1-892-S	1	2	A-8	C-Act	4	CKV	SELF	C	B	C0 C2 C4	AF-08	PV-07
1-FCV-1-15-A	1	2	C-8	B-Act	4	GATE	MOV	O	C	Q1 PV	None	None
1-FCV-1-16-A	1	2	A-8	B-Act	4	GATE	MOV	C	O	Q1 PV	None	None
1-FCV-1-17-A	1	2	C-7	B-Act	4	GATE	MOV	O	C	Q2 PV	AF-02	None
1-FCV-1-18-B	1	2	C-7	B-Act	4	GATE	MOV	O	C	Q2 PV	AF-02	None
1-FCV-1-51-S	1	2	H-6	B-Act	4	GATE	Note 1	B	B	Q1 PV	None	None
1-CKV-3-805-A	3	3	F-5	C-Act	8	CKV	SELF	B	B	C2 C4 C7	AF-07	None
1-CKV-3-806-B	3	3	F-6	C-Act	8	CKV	SELF	B	B	C2 C4 C7	AF-07	None
1-CKV-3-810-S	3	3	G-3	C-Act	10	CKV	SELF	B	B	C2 C4 C7	AF-07	None
1-CKV-3-814-A	3	3	G-5	C-Act	1.5	CKV	SELF	B	B	C1 C7	None	None
1-CKV-3-815-B	3	3	G-6	C-Act	1.5	CKV	SELF	B	B	C1 C7	None	None
1-CKV-3-818-S	3	3	G-6	C-Act	1.5	CKV	SELF	B	B	C1 C7	None	None
1-CKV-3-830-B[3]	3	2	G-8	C-Act	4	CKV	SELF	B	B	C0 C2	AF-07	PV-14
1-CKV-3-831-A[3]	3	2	E-8	C-Act	4	CKV	SELF	B	B	C0 C2	AF-07	PV-14
1-CKV-3-832-A[3]	3	2	D-8	C-Act	4	CKV	SELF	B	B	C0 C2	AF-07	PV-14
1-CKV-3-833-B[3]	3	2	B-8	C-Act	4	CKV	SELF	B	B	C0 C2	AF-07	PV-14
1-CKV-3-861-B[3]	3	2	G-10	C-Act	4	CKV	SELF	B	B	C0 C5	None	PV-07
1-CKV-3-862-A[3]	3	2	E-10	C-Act	4	CKV	SELF	B	B	C0 C5	None	PV-07
1-CKV-3-864-S	3	3	H-6	C-Act	6	CKV	SELF	C	O	C2	AF-07	None
1-CKV-3-871-S[3]	3	2	F-8	C-Act	4	CKV	SELF	B	B	C0 C2	AF-07	PV-14
1-CKV-3-872-S[3]	3	2	E-8	C-Act	4	CKV	SELF	B	B	C0 C2	AF-07	PV-14
1-CKV-3-873-S[3]	3	2	C-8	C-Act	4	CKV	SELF	B	B	C0 C2	AF-07	PV-14
1-CKV-3-874-S[3]	3	2	A-8	C-Act	4	CKV	SELF	B	B	C0 C2	AF-07	PV-14
1-CKV-3-921-B[3]	3	2	G-10	C-Act	4	CKV	SELF	B	B	C0 C5	None	PV-07
1-CKV-3-922-A[3]	3	2	F-10	C-Act	4	CKV	SELF	B	B	C0 C5	None	PV-07
1-FCV-3-116A-A	3	3	F-5	B-Act	4	GATE	MOV	C	O	Q1 PV	None	None
1-FCV-3-116B-A	3	3	F-5	B-Act	4	GATE	MOV	C	O	Q1 PV	None	None
1-FCV-3-126A-B	3	3	F-7	B-Act	4	GATE	MOV	C	O	Q1 PV	None	None
1-FCV-3-126B-B	3	3	F-7	B-Act	4	GATE	MOV	C	O	Q1 PV	None	None
1-FCV-3-136A-A	3	3	H-4	B-Act	6	GATE	MOV	C	O	Q1 PV	None	None
1-FCV-3-136B-A	3	3	H-4	B-Act	6	GATE	MOV	C	O	Q1 PV	None	None
1-FCV-3-179A-B	3	3	H-4	B-Act	6	GATE	MOV	C	O	Q1 PV	None	None
1-FCV-3-179B-B	3	3	H-4	B-Act	6	GATE	MOV	C	O	Q1 PV	None	None
1-LCV-3-148-B	3	3	G-8	B-Act	4	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-LCV-3-148A-B	3	3	G-8	B-Act	2	ANG	DIAPH	C	O	Q1 FS PV	None	None
1-LCV-3-156-A	3	3	E-8	B-Act	4	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-LCV-3-156A-A	3	3	E-8	B-Act	2	ANG	DIAPH	C	O	Q1 FS PV	None	None

Note 1: This valve has a motor operator for normal open/close functions and a spring actuator for closure on a trip.

Table 2, Summary Listing of Valves
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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
1-LCV-3-164-A	3	3	D-8	B-Act	4	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-LCV-3-164A-A	3	3	C-8	B-Act	2	ANG	DIAPH	C	O	Q1 FS PV	None	None
1-LCV-3-171-B	3	3	B-8	B-Act	4	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-LCV-3-171A-B	3	3	B-8	B-Act	2	ANG	DIAPH	C	O	Q1 FS PV	None	None
1-LCV-3-172-A	3	3	F-8	B-Act	3	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-LCV-3-173-B	3	3	E-8	B-Act	3	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-LCV-3-174-B	3	3	C-8	B-Act	3	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-LCV-3-175-A	3	3	B-8	B-Act	3	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-PCV-3-122[1]	3	3	F-5	B-Act	4	GLOBE	DIAPH	C	O	Q1 FS	None	None
1-PCV-3-132[1]	3	3	F-6	B-Act	4	GLOBE	DIAPH	C	O	Q1 FS	None	None
Drawing Number 1-47W850-9												
1-CKV-26-1260	26	2	B-9	AC-Pas	4	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-26-1296	26	2	B-3	AC-Pas	4	CKV	SELF	C	C	AJ	None	PV-05
1-FCV-26-240-A	26	2	B-9	A-Act	4	GATE	MOV	O	C	Q1 AJ PV	None	PV-05
1-FCV-26-243-A	26	2	B-3	A-Act	4	GATE	MOV	O	C	Q1 AJ PV	None	PV-05
Drawing Number 1-47W866-1												
1-FCV-30-7-A	30	2	C-1	A-Act	24	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-8-B	30	2	C-2	A-Act	24	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-9-B	30	2	C-1	A-Act	24	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-10-A	30	2	C-2	A-Act	24	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-14-A	30	2	E-1	A-Act	24	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-15-B	30	2	E-2	A-Act	24	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-16-B	30	2	E-1	A-Act	24	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-17-A	30	2	E-2	A-Act	24	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-19-B	30	2	G-1	A-Act	12	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-20-A	30	2	G-2	A-Act	12	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-37-B	30	2	D-10	A-Act	8	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-40-A	30	2	D-9	A-Act	8	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-50	30	2	C-9	A-Act	24	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-51	30	2	C-10	A-Act	24	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-52	30	2	C-9	A-Act	24	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-53	30	2	C-10	A-Act	24	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-56	30	2	E-9	A-Act	24	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-57	30	2	E-10	A-Act	24	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-58	30	2	G-9	A-Act	12	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-59	30	2	G-10	A-Act	12	BTFY	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FSV-30-134-B	30	2	F-9	A-Act	0.5	GATE	SOL	O	C	Q1 FS AJ PV	None	PV-05
1-FSV-30-135-A	30	2	F-10	A-Act	0.5	GATE	SOL	O	C	Q1 FS AJ PV	None	PV-05

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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
Drawing Number 1-47W865-3												
0-CKV-31-2193	31	N	E-8	B-Act	6	CKV	SELF	C	O	C1	None	None
0-CKV-31-2235	31	N	E-3	B-Act	6	CKV	SELF	C	O	C1	None	None
0-RFV-31-2210	31	N	C-8	C-Act	1x1	SFV	SELF	C	O	BT	None	None
0-RFV-31-2252	31	N	C-3	C-Act	1x1	SFV	SELF	C	O	BT	None	None
Drawing Number 1-47W865-5												
1-CKV-31-3378	31	2	F-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-31-3392	31	2	E-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-31-3407	31	2	C-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-31-3421	31	2	B-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05
1-FCV-31-305-B	31	2	B-7	A-Act	2	GLOBE	SELF	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-31-306-A	31	2	B-7	A-Act	2	GLOBE	DIAPH	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-31-308-A	31	2	C-7	A-Act	2	GLOBE	DIAPH	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-31-309-B	31	2	C-7	A-Act	2	GLOBE	DIAPH	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-31-326-A	31	2	E-7	A-Act	2	GLOBE	DIAPH	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-31-327-B	31	2	E-7	A-Act	2	GLOBE	DIAPH	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-31-329-B	31	2	F-7	A-Act	2	GLOBE	DIAPH	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-31-330-A	31	2	F-7	A-Act	2	GLOBE	DIAPH	O	C	Q1 FS AJ PV	None	PV-05
Drawing Number 1-47W865-7												
0-CKV-31-2307	31	N	F-8	C-Act	6	CKV	SELF	C	O	C1	None	None
0-CKV-31-2364	31	N	F-3	C-Act	6	CKV	SELF	C	O	C1	None	None
0-RFV-31-2326	31	N	D-8	C-Act	1X1	SFV	SELF	C	O	BT	None	None
0-RFV-31-2383	31	N	D-3	C-Act	1X1	SFV	SELF	C	O	BT	None	None
Drawing Number 1-47W865-8												
0-CKV-31-2607	31	N	E-8	C-Act	6	CKV	SELF	C	O	C1	None	None
0-CKV-31-2649	31	N	E-2	C-Act	6	CKV	SELF	C	O	C1	None	None
0-RFV-31-2623	31	N	D-10	C-Act	1X1	SFV	SELF	C	O	BT	None	None
0-RFV-31-2665	31	N	D-4	C-Act	1X1	SFV	SELF	C	O	BT	None	None
Drawing Number 1-47W848-1												
1-BYV-32-288	32	2	A-9	A-Pas	2	GLOBE	MAN	C	C	AJ	None	PV-05
1-BYV-32-298-A	32	2	C-9	A-Pas	2	GLOBE	MAN	C	C	AJ	None	PV-05
1-BYV-32-308-B	32	2	D-9	A-Pas	2	GLOBE	MAN	C	C	AJ	None	PV-05
1-CKV-32-293	32	2	A-9	AC-Act	2	CKV	SELF	O	C	C8 AJ	AF-09	PV-05
1-CKV-32-303-A	32	2	C-9	AC-Act	2	CKV	SELF	O	C	C8 AJ	AF-09	PV-05
1-CKV-32-313-B	32	2	D-9	AC-Act	2	CKV	SELF	O	C	C8 AJ	AF-09	PV-05
1-FCV-32-80-A	32	2	C-9	A-Act	2	GLOBE	DIAPH	O	C	Q2 AJ FS PV	AF-09	PV-05
1-FCV-32-102-B	32	2	D-9	A-Act	2	GLOBE	DIAPH	O	C	Q2 AJ FS PV	AF-09	PV-05
1-FCV-32-110-A	32	2	A-9	A-Act	2	GLOBE	DIAPH	O	C	Q2 AJ FS PV	AF-09	PV-05
Drawing Number 1-47W846-2												
1-ISV-33-713	33	2	F-5	A-Pas	2	DIAPH	MAN	C	C	AJ	None	PV-05
1-ISV-33-714	33	2	F-6	A-Pas	2	DIAPH	MAN	C	C	AJ	None	PV-05

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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
Drawing Number 1-47W625-1												
1-FCV-43-2-B	43	2	D-3	A-Act	0.375	GATE	SOL	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-3-A	43	2	D-5	A-Act	0.375	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-11-B	43	2	B-2	A-Act	0.375	GATE	SOL	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-12-A	43	2	B-4	A-Act	0.375	GATE	SOL	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-22-B	43	2	F-5	A-Act	0.375	GATE	SOL	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-23-A	43	2	D-5	A-Act	0.375	GATE	SOL	O	C	Q1 AJ FS PV	None	PV-05
Drawing Number 1-47W625-2												
1-FCV-43-34-B	43	2	B-2	A-Act	0.375	GATE	SOL	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-35-A	43	2	C-4	A-Act	0.375	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-54D-B	43	2	C-7	B-Act	0.375	GATE	DIAPH	O	C	Q1 FS PV	None	None
1-FCV-43-55-A	43	2	C-6	B-Act	0.375	GATE	DIAPH	O	C	Q1 FS PV	None	None
1-FCV-43-56D-B	43	2	C-7	B-Act	0.375	GATE	DIAPH	O	C	Q1 FS PV	None	None
1-FCV-43-58-A	43	2	C-6	B-Act	0.375	GATE	DIAPH	O	C	Q1 FS PV	None	None
1-FCV-43-59D-B	43	2	D-8	B-Act	0.375	GATE	DIAPH	O	C	Q1 FS PV	None	None
1-FCV-43-61-A	43	2	D-7	B-Act	0.375	GATE	DIAPH	O	C	Q1 FS PV	None	None
1-FCV-43-63D-B	43	2	E-9	B-Act	0.375	GATE	DIAPH	O	C	Q1 FS PV	None	None
1-FCV-43-64-A	43	2	E-8	B-Act	0.375	GATE	DIAPH	O	C	Q1 FS PV	None	None
Drawing Number 1-47W625-7												
1-FCV-43-75-B	43	2	E-7	A-Act	0.375	GATE	SOL	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-77-A	43	2	E-8	A-Act	0.375	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
Drawing Number 1-47W625-11												
1-FCV-43-201-A[3]	43	2	F-5	A-Act	0.375	GATE	SOL	C	O	Q1 AJ FS PV	None	PV-05
1-FCV-43-202-A[3]	43	2	F-5	A-Act	0.375	GATE	SOL	C	O	Q1 AJ FS PV	None	PV-05
1-FCV-43-207-B[3]	43	2	D-6	A-Act	0.375	GATE	SOL	C	O	Q1 AJ FS PV	None	PV-05
1-FCV-43-208-B[3]	43	2	C-6	A-Act	0.375	GATE	SOL	C	O	Q1 AJ FS PV	None	PV-05
1-FCV-43-433-A[3]	43	2	F-4	A-Act	0.375	GATE	SOL	C	O	Q1 AJ FS PV	None	PV-05
1-FCV-43-434-A[3]	43	2	F-4	A-Act	0.375	GATE	SOL	C	O	Q1 AJ FS PV	None	PV-05
1-FCV-43-435-B[3]	43	2	D-5	A-Act	0.375	GATE	SOL	C	O	Q1 AJ FS PV	None	PV-05
1-FCV-43-436-B[3]	43	2	C-5	A-Act	0.375	GATE	SOL	C	O	Q1 AJ FS PV	None	PV-05
Drawing Number 1-47W625-15												
1-CKV-43-834	43	2	H-5	AC-Pas	0.375	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-43-841	43	2	A-10	AC-Pas	0.375	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-43-883	43	2	G-5	AC-Pas	0.375	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-43-884	43	2	A-9	AC-Pas	0.375	CKV	SELF	C	C	AJ	None	PV-05
1-FSV-43-250-A	43	2	D-1	A-Pas	0.375	GATE	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-251-A	43	2	C-1	A-Pas	0.375	GATE	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-287-A	43	2	B-8	A-Pas	0.375	GATE	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-288-A	43	2	B-8	A-Pas	0.375	GATE	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-307-A	43	2	B-9	A-Pas	0.375	GATE	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-309-B	43	2	D-2	A-Pas	0.375	GATE	SOL	C	C	AJ PV	None	PV-05

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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
1-FSV-43-310-B	43	2	C-2	A-Pas	0.375	GATE	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-318-B	43	2	B-9	A-Pas	0.375	GATE	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-319-B	43	2	B-9	A-Pas	0.375	GATE	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-325-B	43	2	B-10	A-Pas	0.375	GATE	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-341-B	43	2	H-6	A-Pas	0.375	GATE	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-342-A	43	2	G-6	A-Pas	0.375	GATE	SOL	C	C	AJ PV	None	PV-05
Drawing Number 47W331-3												
1-ISV-52-500	52	2	H-2	A-Pas	0.75	GATE	MAN	C	C	AJ	None	PV-05
1-ISV-52-501	52	2	H-2	A-Pas	0.75	GATE	MAN	C	C	AJ	None	PV-05
1-ISV-52-502	52	2	H-2	A-Pas	0.75	GATE	MAN	C	C	AJ	None	PV-05
1-ISV-52-503	52	2	H-2	A-Pas	0.75	GATE	MAN	C	C	AJ	None	PV-05
1-ISV-52-504	52	2	H-2	A-Pas	0.75	GATE	MAN	C	C	AJ	None	PV-05
1-ISV-52-505	52	2	H-2	A-Pas	0.75	GATE	MAN	C	C	AJ	None	PV-05
1-ISV-52-506	52	2	H-2	A-Pas	0.75	GATE	MAN	C	C	AJ	None	PV-05
1-ISV-52-507	52	2	H-2	A-Pas	0.75	GATE	MAN	C	C	AJ	None	PV-05
Drawing Number 1-47W856-1												
1-ISV-59-522	59	2	F-2	A-Pas	2	BALL	MAN	C	C	AJ	None	PV-05
1-ISV-59-698	59	2	F-2	A-Pas	2	DIAPH	MAN	C	C	AJ	None	PV-05
Drawing Number 1-47W814-2												
1-CKV-61-533	61	2	B-7	AC-Pas	0.375	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-61-658	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-659	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-660	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-661	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-662	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-663	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-664	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-665	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-666	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-667	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-668	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-669	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-670	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-671	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-672	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-673	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-674	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-675	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-676	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-677	61	N	D-12	C-Act	12	CKV	SELF	C	O	C3	AF-10	None
1-CKV-61-680	61	2	B-7	AC-Pas	0.375	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-61-692	61	2	F-11	AC-Pas	0.375	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-61-745	61	2	G-9	AC-Pas	0.375	CKV	SELF	C	C	AJ	None	PV-05
1-FCV-61-96-A	61	2	E-11	A-Act	2	DIAPH	DIAPH	O	C	Q1 FS AJ PV	None	PV-05

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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
1-FCV-61-97-B	61	2	E-11	A-Act	2	DIAPH	DIAPH	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-61-110-A	61	2	G-9	A-Act	2	DIAPH	DIAPH	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-61-122-B	61	2	G-9	A-Act	2	DIAPH	DIAPH	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-61-191-A	61	2	A-6	A-Act	4	DIAPH	DIAPH	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-61-192-B	61	2	A-7	A-Act	4	DIAPH	DIAPH	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-61-193-A	61	2	B-6	A-Act	4	DIAPH	DIAPH	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-61-194-B	61	2	B-7	A-Act	4	DIAPH	DIAPH	O	C	Q1 FS AJ PV	None	PV-05
Drawing Number 1-47W809-1												
1-CKV-62-504-S	62	2	H-10	C-Act	8	CKV	SELF	C	B	C3 C8	AF-11	None
1-CKV-62-523-A[2]	62	2	G-9	AC-Act	2	CKV	SELF	C	B	C1 C7 LK	None	None
1-CKV-62-525-A[2]	62	2	G-9	AC-Act	4	CKV	SELF	O	B	C3 C4 C7 LK	AF-11	None
1-CKV-62-530-B[2]	62	2	F-9	AC-Act	2	CKV	SELF	C	B	C1 C7 LK	None	None
1-CKV-62-532-B[2]	62	2	F-9	AC-Act	4	CKV	SELF	O	B	C3 C4 C7 LK	AF-11	None
1-CKV-62-639-S	62	2	C-7	AC-Pas	0.75	CKV	SELF	C	C	AJ	None	PV-05
1-FCV-62-61-B	62	2	B-7	A-Act	4	GATE	MOV	O	C	Q2 AJ PV	AF-14	PV-05
1-FCV-62-63-A	62	2	B-8	A-Act	4	GATE	MOV	O	C	Q2 AJ PV	AF-14	PV-05
1-FCV-62-72-A	62	2	A-5	A-Act	2	GLOBE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-62-73-A	62	2	A-4	A-Act	2	GLOBE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-62-74-A	62	2	A-4	A-Act	2	GLOBE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-62-76-A	62	2	A-5	A-Act	2	GLOBE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-62-77-B	62	2	A-7	A-Act	2	GLOBE	DIAPH	O	C	Q2 AJ FS PV	AF-15	PV-05
1-FCV-62-83	62	2	A-8	B-Pas	2	GLOBE	DIAPH	O	C	PV	None	None
1-FCV-62-89	62	2	D-8	B-Pas	3	GLOBE	DIAPH	O	C	PV	None	None
1-FCV-62-90-A	62	2	D-8	B-Act	3	GATE	MOV	O	C	Q2 PV	AF-15	None
1-FCV-62-91-B	62	2	D-8	B-Act	3	GATE	MOV	O	C	Q2 PV	AF-15	None
1-FCV-62-93[3]	62	2	F-9	B-Pas	3	GLOBE	DIAPH	E	E	PV	None	None
1-FCV-62-125	62	2	B-10	B-Pas	0.75	GLOBE	DIAPH	C	C	PV	None	None
1-FCV-62-1228-A[3]	62	2	C-10	B-Act	1	GLOBE	DIAPH	O	C	Q2 FS PV	AF-16	None
1-FCV-62-1229-B[3]	62	2	C-10	B-Act	1	GLOBE	DIAPH	O	C	Q2 FS PV	AF-16	None
1-LCV-62-118-A	62	2	A-12	B-Pas	3	3-WAY	DIAPH	E	E	PV	None	None
1-LCV-62-132-A	62	2	D-10	B-Act	4	GATE	MOV	O	C	Q2 PV	AF-16	None
1-LCV-62-133-B	62	2	D-10	B-Act	4	GATE	MOV	O	C	Q2 PV	AF-16	None
1-LCV-62-135-A	62	2	H-10	B-Act	8	GATE	MOV	C	O	Q2 PV	AF-16	None
1-LCV-62-136-B	62	2	H-10	B-Act	8	GATE	MOV	C	O	Q2 PV	AF-16	None
1-PCV-62-81	62	2	A-10	B-Pas	2	GLOBE	DIAPH	O	C	PV	None	None
1-RFV-62-505-S	62	2	F-10	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
1-RFV-62-518-S	62	2	E-9	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
1-RFV-62-636-S	62	2	B-6	C-Act	2x3	SFV	SELF	C	O	BT	None	None
1-RFV-62-649-S	62	2	C-9	C-Act	2x3	SFV	SELF	C	O	BT	None	None
1-RFV-62-662-S	62	2	A-3	AC-Act	2x3	SFV	SELF	C	O	BT AJ	None	PV-05
1-RFV-62-675-S	62	2	B-10	C-Act	2x3	SFV	SELF	C	O	BT	None	None
1-RFV-62-688-S	62	2	D-9	C-Act	3x4	SFV	SELF	C	O	BT	None	None
1-RFV-62-1220	62	2	F-10	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None

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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
1-RFV-62-1221	62	2	G-10	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
1-RFV-62-1222	62	2	E-9	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
Drawing Number 1-47W809-2												
1-CKV-62-930	62	3	B-4	C-Act	3	CKV	SELF	C	O	C3	AF-13	None
1-FCV-62-138-B	62	3	A-4	B-Act	3	GLOBE	MOV	C	O	Q1 PV	None	None
Drawing Number 1-47W809-3												
1-RFV-62-955	62	2	C-11	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
1-RFV-62-1079	62	2	C-12	C-Act	4	SFV	SELF	C	O	BT	None	PV-12
2-RFV-62-955	62	2	C-7	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
2-RFV-62-1079	62	2	C-7	C-Act	4	SFV	SELF	C	O	BT	None	PV-12
Drawing Number 1-47W809-5												
1-CKV-62-1052-A	62	3	F-8	C-Act	2	CKV	SELF	C	O	C1 C7	None	None
1-CKV-62-1052-B	62	3	F-7	C-Act	2	CKV	SELF	C	O	C1 C7	None	None
Drawing Number 1-47W811-1												
1-CKV-63-502-S	63	2	F-10	C-Act	12	CKV	SELF	C	O	C3 C8	AF-18	None
1-CKV-63-510-S	63	2	D-10	C-Act	8	CKV	SELF	C	B	C3 C4 C8	AF-11	None
1-CKV-63-524-A[2]	63	2	F-8	AC-Act	4	CKV	SELF	C	B	C3 C4 C7 LK	AF-11	None
1-CKV-63-526-B[2]	63	2	D-8	AC-Act	4	CKV	SELF	C	B	C3 C4 C7 LK	AF-11	None
1-CKV-63-528-A[2]	63	2	F-8	AC-Act	0.75	CKV	SELF	C	B	C1 C7 LK	None	None
1-CKV-63-530-B[2]	63	2	D-8	AC-Act	0.75	CKV	SELF	C	B	C1 C7 LK	None	None
1-CKV-63-543-A	63	1	F-3	AC-Act	2	CKV	SELF	C	B	C3 LK	AF-11	None
1-CKV-63-545-A	63	1	F-3	AC-Act	2	CKV	SELF	C	B	C3 LK	AF-11	None
1-CKV-63-547-B	63	1	E-3	AC-Act	2	CKV	SELF	C	B	C3 LK	AF-11	None
1-CKV-63-549-B	63	1	E-3	AC-Act	2	CKV	SELF	C	B	C3 LK	AF-11	None
1-CKV-63-551-S	63	1	H-1	AC-Act	2	CKV	SELF	C	B	C3 LK	AF-11	None
1-CKV-63-553-S	63	1	H-3	AC-Act	2	CKV	SELF	C	B	C3 LK	AF-11	None
1-CKV-63-555-S	63	1	G-3	AC-Act	2	CKV	SELF	C	B	C3 LK	AF-11	None
1-CKV-63-557-S	63	1	G-2	AC-Act	2	CKV	SELF	C	B	C3 LK	AF-11	None
1-CKV-63-558-B	63	1	E-2	AC-Act	6	CKV	SELF	C	B	C3 LK	AF-11	None
1-CKV-63-559-B	63	1	E-1	AC-Act	6	CKV	SELF	C	B	C3 LK	AF-11	None
1-CKV-63-560-S	63	1	F-1	AC-Act	10	CKV	SELF	C	B	C0 C5 LK	None	PV-08
1-CKV-63-561-S	63	1	D-1	AC-Act	10	CKV	SELF	C	B	C0 C5 LK	None	PV-08
1-CKV-63-562-S	63	1	E-2	AC-Act	10	CKV	SELF	C	B	C0 C5 LK	None	PV-08
1-CKV-63-563-S	63	1	F-2	AC-Act	10	CKV	SELF	C	B	C0 C5 LK	None	PV-08
1-CKV-63-581-S	63	1	C-6	AC-Act	3	CKV	SELF	C	O	C3 LK	AF-11	None
1-CKV-63-586-S	63	1	E-1	AC-Act	1.5	CKV	SELF	C	O	C3 LK	AF-11	None
1-CKV-63-587-S	63	1	D-2	AC-Act	1.5	CKV	SELF	C	O	C3 LK	AF-11	None
1-CKV-63-588-S	63	1	E-2	AC-Act	1.5	CKV	SELF	C	O	C3 LK	AF-11	None
1-CKV-63-589-S	63	1	F-2	AC-Act	1.5	CKV	SELF	C	O	C3 LK	AF-11	None
1-CKV-63-622-S	63	1	D-1	AC-Act	10	CKV	SELF	C	B	C0 LK	None	PV-08
1-CKV-63-623-S	63	1	D-1	AC-Act	10	CKV	SELF	C	B	C0 LK	None	PV-08
1-CKV-63-624-S	63	1	D-3	AC-Act	10	CKV	SELF	C	B	C0 LK	None	PV-08
1-CKV-63-625-S	63	1	D-3	AC-Act	10	CKV	SELF	C	B	C0 LK	None	PV-08
1-CKV-63-632-A	63	1	H-2	AC-Act	6	CKV	SELF	C	B	C3 C5 LK	AF-18	None

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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
1-CKV-63-633-B	63	1	G-1	AC-Act	6	CKV	SELF	C	B	C3 C5 LK	AF-18	None
1-CKV-63-634-A	63	1	G-3	AC-Act	6	CKV	SELF	C	B	C3 C5 LK	AF-18	None
1-CKV-63-635-B	63	1	G-1	AC-Act	6	CKV	SELF	C	B	C3 C5 LK	AF-18	None
1-CKV-63-640-S	63	1	G-3	AC-Act	8	CKV	SELF	C	B	C3 C5 LK	AF-18	None
1-CKV-63-641-S	63	1	F-1	AC-Act	6	CKV	SELF	C	B	C3 C5 LK	AF-18	None
1-CKV-63-643-S	63	1	F-3	AC-Act	8	CKV	SELF	C	B	C3 C5 LK	AF-18	None
1-CKV-63-644-S	63	1	D-2	AC-Act	6	CKV	SELF	C	B	C3 C5 LK	AF-18	None
1-CKV-63-725	63	2	E-8	C-Act	2	CKV	SELF	C	B	C0	AF-17	None
1-FCV-63-1-A	63	2	E-10	B-Act	14	GATE	MOV	O	C	Q2 PV	AF-19	None
1-FCV-63-3-A	63	2	E-8	B-Act	2	GLOBE	MOV	O	C	Q2 PV	AF-20	None
1-FCV-63-4-B	63	2	E-8	B-Act	2	GLOBE	MOV	O	C	Q1 PV	None	None
1-FCV-63-5-B	63	2	D-10	B-Act	6	GATE	MOV	O	C	Q2 PV	AF-19	None
1-FCV-63-6-B	63	2	F-10	B-Act	4	GATE	MOV	C	O	Q1 PV	None	None
1-FCV-63-7-A	63	2	F-10	B-Act	4	GATE	MOV	C	O	Q1 PV	None	None
1-FCV-63-8-A	63	2	H-9	B-Act	8	GATE	MOV	C	O	Q2 PV	AF-21	None
1-FCV-63-11-B	63	2	H-9	B-Act	8	GATE	MOV	C	O	Q2 PV	AF-21	None
1-FCV-63-22-B	63	2	E-6	B-Act	4	GATE	MOV	O	C	Q2 PV	AF-22	None
1-FCV-63-23-B	63	2	E-7	A-Act	1	GLOBE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-63-25-B	63	2	B-7	B-Act	4	GATE	MOV	C	O	Q2 PV	AF-23	None
1-FCV-63-26-A	63	2	B-7	B-Act	4	GATE	MOV	C	O	Q2 PV	AF-23	None
1-FCV-63-47-A	63	2	E-10	B-Act	6	GATE	MOV	O	C	Q1 PV	None	None
1-FCV-63-48-B	63	2	E-10	B-Act	6	GATE	MOV	O	C	Q1 PV	None	None
1-FCV-63-67-B	63	1	B-5	B-Act	10	GATE	MOV	O	C	Q2 PV	AF-24	None
1-FCV-63-71-A	63	2	D-6	A-Act	0.75	GLOBE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-63-72-A	63	2	H-7	B-Act	18	GATE	MOV	C	O	Q2 PV	AF-25	None
1-FCV-63-73-B	63	2	H-7	B-Act	18	GATE	MOV	C	O	Q2 PV	AF-25	None
1-FCV-63-80-A	63	1	B-4	B-Act	10	GATE	MOV	O	C	Q2 PV	AF-24	None
1-FCV-63-84-B	63	2	C-6	A-Act	0.75	GLOBE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-63-93-A	63	2	G-7	B-Act	8	GATE	MOV	O	C	Q2 PV	AF-26	None
1-FCV-63-94-B	63	2	G-7	B-Act	8	GATE	MOV	O	C	Q2 PV	AF-26	None
1-FCV-63-98-B	63	1	B-3	B-Act	10	GATE	MOV	O	C	Q2 PV	AF-24	None
1-FCV-63-118-A	63	1	B-1	B-Act	10	GATE	MOV	O	C	Q2 PV	AF-24	None
1-FCV-63-152-A	63	2	F-7	B-Act	4	GATE	MOV	O	C	Q1 PV	None	None
1-FCV-63-153-B	63	2	E-7	B-Act	4	GATE	MOV	O	C	Q1 PV	None	None
1-FCV-63-156-A	63	2	F-6	B-Act	4	GATE	MOV	C	O	Q1 PV	None	None
1-FCV-63-157-B	63	2	D-6	B-Act	4	GATE	MOV	C	O	Q1 PV	None	None
1-FCV-63-172-B	63	2	F-6	B-Act	12	GATE	MOV	C	O	Q2 PV	AF-26	None
1-FCV-63-175-B	63	2	E-8	B-Act	2	GLOBE	MOV	O	C	Q1 PV	None	None
1-FCV-63-185	63	2	E-6	B-Act	0.75	GLOBE	DIAPH	O	C	Q1 PV FS	None	None
1-RFV-63-511-S	63	2	E-10	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
1-RFV-63-534-A	63	2	E-7	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
1-RFV-63-535-S	63	2	E-7	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
1-RFV-63-536-B	63	2	D-7	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
1-RFV-63-577-S	63	2	A-7	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
1-RFV-63-602-S	63	2	A-2	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None

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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
1-RFV-63-603-S	63	2	A-3	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
1-RFV-63-604-S	63	2	A-4	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
1-RFV-63-605-S	63	2	A-6	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
1-RFV-63-626-A	63	2	G-7	C-Act	2x3	SFV	SELF	C	O	BT	None	None
1-RFV-63-627-B	63	2	F-7	C-Act	2x3	SFV	SELF	C	O	BT	None	None
1-RFV-63-637-S	63	2	F-7	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
1-RFV-63-835	63	2	E-10	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
Drawing Number 1-47W830-6												
1-FCV-63-64-A	63	2	B-6	A-Act	1	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-68-305-A	68	2	G-7	A-Act	0.75	GLOBE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-CKV-68-849	68	2	G-7	AC-Act	1	CKV	SELF	O	C	C8 AJ	AF-33	PV-05
1-CKV-63-868	63	2	B-7	AC-Act	1	CKV	SELF	O	C	C8 AJ	AF-33	PV-05
Drawing Number 1-47W845-1												
0-CKV-67-502A-A	67	3	E-8	C-Act	2	CKV	SELF	B	B	C1 C7	None	PV-09
0-CKV-67-502B-A	67	3	E-6	C-Act	2	CKV	SELF	B	B	C1 C7	None	PV-09
0-CKV-67-502C-A	67	3	F-6	C-Act	2	CKV	SELF	B	B	C1 C7	None	PV-09
0-CKV-67-502D-A	67	3	F-8	C-Act	2	CKV	SELF	B	B	C1 C7	None	PV-09
0-CKV-67-502E-B	67	3	F-4	C-Act	2	CKV	SELF	B	B	C1 C7	None	PV-09
0-CKV-67-502F-B	67	3	F-6	C-Act	2	CKV	SELF	B	B	C1 C7	None	PV-09
0-CKV-67-502G-B	67	3	E-6	C-Act	2	CKV	SELF	B	B	C1 C7	None	PV-09
0-CKV-67-502H-B	67	3	E-4	C-Act	2	CKV	SELF	B	B	C1 C7	None	PV-09
0-CKV-67-503A-A	67	3	E-8	C-Act	20	CKV	SELF	B	B	C1 C7	None	None
0-CKV-67-503B-A	67	3	D-7	C-Act	20	CKV	SELF	B	B	C1 C7	None	None
0-CKV-67-503C-A	67	3	F-7	C-Act	20	CKV	SELF	B	B	C1 C7	None	None
0-CKV-67-503D-A	67	3	F-8	C-Act	20	CKV	SELF	B	B	C1 C7	None	None
0-CKV-67-503E-B	67	3	F-4	C-Act	20	CKV	SELF	B	B	C1 C7	None	None
0-CKV-67-503F-B	67	3	F-5	C-Act	20	CKV	SELF	B	B	C1 C7	None	None
0-CKV-67-503G-B	67	3	E-5	C-Act	20	CKV	SELF	B	B	C1 C7	None	None
0-CKV-67-503H-B	67	3	E-4	C-Act	20	CKV	SELF	B	B	C1 C7	None	None
1-CKV-67-508A-A	67	3	C-10	C-Act	8	CKV	SELF	O	C	C0	None	PV-10
1-CKV-67-508B-B	67	3	C-5	C-Act	8	CKV	SELF	O	C	C0	None	PV-10
1-CKV-67-513A-A	67	3	C-10	C-Act	8	CKV	SELF	C	O	C1	None	None
1-CKV-67-513B-B	67	3	C-5	C-Act	8	CKV	SELF	C	O	C1	None	None
1-CKV-67-940A-A	67	N	H-6	C-Act	3	CKV	SELF	C	O	C1	None	PV-04
1-FCV-67-9A-A	67	3	G-9	B-Act	4	BALL	MOV	C	O	Q1	None	None
1-FCV-67-9B-A	67	3	H-9	B-Act	4	BALL	MOV	C	O	Q1	None	None
1-FCV-67-10A-B	67	3	F-3	B-Act	4	BALL	MOV	C	O	Q1	None	None
1-FCV-67-10B-B	67	3	F-3	B-Act	4	BALL	MOV	C	O	Q1	None	None
1-FCV-67-65-B	67	3	C-5	B-Act	8	BTFY	MOV	C	O	Q1 PV	None	None
1-FCV-67-68-A	67	3	C-10	B-Act	8	BTFY	MOV	C	O	Q1 PV	None	None
2-CKV-67-508A-A	67	3	C-5	C-Act	8	CKV	SELF	O	C	C0	None	PV-10

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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
2-CKV-67-508B-B	67	3	C-10	C-Act	8	CKV	SELF	O	C	C0	None	PV-10
2-CKV-67-513A-A	67	3	C-8	C-Act	8	CKV	SELF	C	O	C1	None	None
2-CKV-67-513B-B	67	3	C-4	C-Act	8	CKV	SELF	C	O	C1	None	None
2-CKV-67-935B-B	67	N	H-6	C-Act	3	CKV	SELF	C	O	C1	None	PV-04
2-FCV-67-9A-A	67	3	G-9	B-Act	4	BALL	MOV	C	O	Q1	None	None
2-FCV-67-9B-B	67	3	F-9	B-Act	4	BALL	MOV	C	O	Q1	None	None
2-FCV-67-10A-B	67	3	G-3	B-Act	4	BALL	MOV	C	O	Q1	None	None
2-FCV-67-10B-B	67	3	H-3	B-Act	4	BALL	MOV	C	O	Q1	None	None
2-FCV-67-65-B	67	3	C-3	B-Act	8	BTFY	MOV	C	O	Q1 PV	None	None
2-FCV-67-68-A	67	3	C-8	B-Act	8	BTFY	MOV	C	O	Q1 PV	None	None
Drawing Number 1-47W845-2												
0-FCV-67-144	67	3	C-6	B-Act	16	GLOBE	MOV	O	C	Q1 PV	None	None
0-FCV-67-152-B	67	3	C-6	B-Act	24	BTFY	MOV	B	B	Q1 PV	None	None
1-FCV-67-123-B	67	3	D-9	B-Act	18	BTFY	MOV	C	O	Q1 PV	None	None
1-FCV-67-124-B	67	3	E-8	B-Act	18	BTFY	MOV	C	O	Q1 PV	None	None
1-FCV-67-125-A	67	3	C-9	B-Act	18	BTFY	MOV	C	O	Q1 PV	None	None
1-FCV-67-126-A	67	3	D-7	B-Act	18	BTFY	MOV	C	O	Q1 PV	None	None
1-FCV-67-143	67	3	C-8	B-Act	12	GLOBE	MOV	B	B	Q1 PV	None	None
Drawing Number 1-47W845-3												
1-CKV-67-575A-A	67	2	H-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-67-575B-B	67	2	E-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-67-575C-A	67	2	G-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-67-575D-B	67	2	D-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-67-580A-A	67	2	C-7	AC-Act	2	CKV	SELF	O	C	C7 AJ	None	PV-05
1-CKV-67-580B-B	67	2	B-7	AC-Act	2	CKV	SELF	O	C	C7 AJ	None	PV-05
1-CKV-67-580C-A	67	2	B-7	AC-Act	2	CKV	SELF	O	C	C7 AJ	None	PV-05
1-CKV-67-580D-B	67	2	A-7	AC-Act	2	CKV	SELF	O	C	C7 AJ	None	PV-05
1-CKV-67-585A-A	67	2	D-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-67-585B-B	67	2	B-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-67-585C-A	67	2	C-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-67-585D-B	67	2	A-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-67-1054A-A	67	2	H-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-67-1054B-B	67	2	E-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-67-1054C-A	67	2	G-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05

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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
1-CKV-67-1054D-B	67	2	D-7	AC-Pas	0.5	CKV	SELF	C	C	AJ	None	PV-05
1-FCV-67-83-A	67	2	H-8	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-87-A	67	2	H-7	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-88-B	67	2	H-8	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-89-B	67	2	H-7	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-91-A	67	2	G-8	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-95-A	67	2	F-7	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-96-B	67	2	F-8	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-97-B	67	2	G-7	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-99-A	67	2	F-8	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-103-B	67	2	E-7	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-104-A	67	2	E-8	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-105-A	67	2	F-7	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-107-B	67	2	E-8	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-111-B	67	2	D-7	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-112-A	67	2	D-8	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-113-A	67	2	E-7	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-130-A	67	2	C-8	A-Act	2	PLUG	MOV	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-131-B	67	2	C-8	A-Act	2	PLUG	MOV	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-133-A	67	2	B-8	A-Act	2	PLUG	MOV	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-134-B	67	2	C-8	A-Act	2	PLUG	MOV	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-138-B	67	2	B-8	A-Act	2	PLUG	MOV	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-139-A	67	2	B-8	A-Act	2	PLUG	MOV	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-141-B	67	2	A-8	A-Act	2	PLUG	MOV	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-142-A	67	2	A-8	A-Act	2	PLUG	MOV	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-295-A	67	2	C-7	A-Act	2	PLUG	MOV	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-296-A	67	2	C-7	A-Act	2	PLUG	MOV	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-297-B	67	2	B-7	A-Act	2	PLUG	MOV	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-298-B	67	2	A-7	A-Act	2	PLUG	MOV	O	C	Q1 AJ PV	None	PV-05
Drawing Number 1-47W845-4												
1-FCV-67-162	67	3	B-4	B-Act	2	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-FCV-67-164	67	3	B-6	B-Act	2	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-FCV-67-176	67	3	D-4	B-Act	1.5	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-FCV-67-182	67	3	D-6	B-Act	1.5	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-FCV-67-184	67	3	D-4	B-Act	1.5	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-FCV-67-186	67	3	D-6	B-Act	1.5	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-FCV-67-213	67	3	A-4	B-Act	1.5	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-FCV-67-215	67	3	B-6	B-Act	1.5	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-FCV-67-342	67	3	G-4	B-Act	2	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-FCV-67-344	67	3	G-6	B-Act	2	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-FCV-67-346	67	3	F-4	B-Act	1.5	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-FCV-67-348	67	3	F-6	B-Act	1.5	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-FCV-67-350	67	3	F-4	B-Act	1.5	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-FCV-67-352	67	3	F-6	B-Act	1.5	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
1-FCV-67-354	67	3	G-4	B-Act	1.5	GLOBE	DIAPH	C	O	Q1 FS PV	None	None

Table 2, Summary Listing of Valves
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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
1-FCV-67-356	67	3	G-6	B-Act	1.5	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
0-FSV-67-1223-B	67	3	B-12	B-Act	1	GATE	SOL	C	O	Q1 FS	None	PV-15
Drawing Number 1-47W845-5												
0-FCV-67-205-A	67	3	H-2	B-Act	4	BTFY	MOV	O	C	Q1 PV	None	None
0-FCV-67-208-B	67	3	H-3	B-Act	4	BTFY	MOV	O	C	Q1 PV	None	None
Drawing Number 1-47W845-7												
0-FSV-67-1221-A	67	3	A-10	B-Act	1	GATE	SOL	C	O	Q1 FS	None	PV-15
2-FCV-67-217	67	3	C-4	B-Act	2	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
2-FCV-67-219	67	3	C-6	B-Act	2	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
2-FCV-67-336	67	3	A-4	B-Act	1	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
2-FCV-67-338	67	3	A-6	B-Act	1	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
2-FCV-67-354	67	3	F-4	B-Act	1.5	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
2-FCV-67-356	67	3	F-6	B-Act	1.5	GLOBE	DIAPH	C	O	Q1 FS PV	None	None
Drawing Number 1-47W625-8												
1-FCV-68-307-A	68	2	G-2	A-Act	0.375	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-68-308-B	68	2	F-1	A-Act	0.375	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
Drawing Number 1-47W813-1												
1-CKV-68-559-S	68	2	H-4	C-Act	4	CKV	SELF	C	B	C0	AF-17	None
1-FCV-68-22	68	2	B-8	B-Pas	0.375	GLOBE	DIAPH	O	O	PV	None	None
1-FCV-68-332-B	68	1	C-2	B-Act	3	GATE	MOV	O	C	Q1 PV	None	None
1-FCV-68-333-A	68	1	B-2	B-Act	3	GATE	MOV	O	C	Q1 PV	None	None
1-FSV-68-394-A	68	2	F-7	B-Act	1	GLOBE	SOL	C	O	Q2 FS PV	AF-28	None
1-FSV-68-395-B	68	2	G-7	B-Act	1	GLOBE	SOL	C	O	Q2 FS PV	AF-28	None
1-FSV-68-396-B	68	2	F-5	B-Act	1	GLOBE	SOL	C	O	Q2 FS PV	AF-28	PV-15
1-FSV-68-397-A	68	2	G-6	B-Act	1	GLOBE	SOL	C	O	Q2 FS PV	AF-28	PV-15
1-PCV-68-334-B	68	1	C-1	B-Act	3	GLOBE	SOL	C	O	Q2 FS PV	AF-28	None
1-PCV-68-340A-A	68	1	B-1	B-Act	3	GLOBE	SOL	C	O	Q2 FS PV	AF-28	None
1-RFV-68-563-S	68	1	A-3	C-Act	6x6	SFV	SELF	C	O	BT	None	None
1-RFV-68-564-S	68	1	A-2	C-Act	6x6	SFV	SELF	C	O	BT	None	None
1-RFV-68-565-S	68	1	A-2	C-Act	6x6	SFV	SELF	C	O	BT	None	None
Drawing Number 1-47W859-1												
0-CKV-70-504-B	70	3	D-7	C-Act	16	CKV	SELF	B	B	C1 C7	None	None
0-FCV-70-197-A	70	3	B-5	B-Act	20	BTFY	MOV	O	C	Q1 PV	None	None
1-CKV-70-504A-A	70	3	B-7	C-Act	16	CKV	SELF	B	B	C1 C7	None	None
1-CKV-70-504B-S	70	3	C-7	C-Act	16	CKV	SELF	B	B	C1 C7	None	None
1-FCV-70-66	70	3	E-3	B-Act	2	ANG	DIAPH	O	C	Q1 FS PV	None	None
1-RFV-70-538-S	70	3	E-3	C-Act	3x4	SFV	SELF	C	O	BT	None	None
1-RFV-70-539-S	70	3	E-3	C-Act	3	SFV	SELF	C	O	BT	None	PV-12
2-FCV-70-66	70	3	E-3	B-Act	2	ANG	DIAPH	O	C	Q1 FS PV	None	None

Table 2, Summary Listing of Valves
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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
Drawing Number 1-47W859-2												
1-CKV-70-679	70	2	H-3	AC-Act	3	CKV	SELF	O	C	C8 AJ	AF-29	PV-05
1-CKV-70-681A	70	2	G-8	C-Act	2	CKV	SELF	O	C	C0	None	PV-11
1-CKV-70-681B	70	2	F-8	C-Act	2	CKV	SELF	O	C	C0	None	PV-11
1-CKV-70-681C	70	2	F-8	C-Act	2	CKV	SELF	O	C	C0	None	PV-11
1-CKV-70-681D	70	2	H-8	C-Act	2	CKV	SELF	O	C	C0	None	PV-11
1-CKV-70-682A	70	2	G-8	C-Act	2	CKV	SELF	O	C	C0	None	PV-11
1-CKV-70-682B	70	2	F-8	C-Act	2	CKV	SELF	O	C	C0	None	PV-11
1-CKV-70-682C	70	2	E-8	C-Act	2	CKV	SELF	O	C	C0	None	PV-11
1-CKV-70-682D	70	2	H-9	C-Act	2	CKV	SELF	O	C	C0	None	PV-11
1-CKV-70-687	70	2	H-9	AC-Pas	0.75	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-70-698	70	2	E-9	AC-Pas	0.75	CKV	SELF	C	C	AJ	None	PV-05
1-CKV-70-790	70	2	G-3	AC-Pas	0.75	CKV	SELF	C	C	AJ	None	PV-05
1-FCV-70-85-B	70	2	D-10	A-Act	6	BTFY	DIAPH	O	C	Q1 AJ PV	None	PV-05
1-FCV-70-87-B	70	2	H-9	A-Act	3	GATE	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-70-89-B	70	2	E-9	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-70-90-A	70	2	F-10	A-Act	3	GATE	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-70-92-A	70	2	E-10	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-70-100-A	70	2	G-3	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-70-133-A	70	3	H-3	B-Act	3	GATE	MOV	O	C	Q2 PV	AF-29	None
1-FCV-70-134-B	70	2	H-3	A-Act	3	GATE	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-70-140-B	70	2	G-3	A-Act	6	BTFY	MOV	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-70-143-A	70	2	E-3	A-Act	6	BTFY	MOV	O	C	Q1 AJ PV	None	PV-05
1-FCV-70-183-A	70	2	C-9	B-Act	3	GATE	MOV	O	C	Q1 PV	None	None
1-FCV-70-215-A	70	3	A-8	B-Act	3	GATE	MOV	O	C	Q1 PV	None	None
1-RFV-70-703	70	2	E-5	AC-Act	3x4	SFV	SELF	C	O	BT AJ	None	PV-05
1-RFV-70-835	70	3	H-6	C-Act	0.75	SFV	SELF	C	O	BT	None	None
Drawing Number 1-47W859-4												
1-FCV-70-156-A	70	3	F-4	B-Act	18	BTFY	MOV	C	O	Q1 PV	None	None
Drawing Number 1-47W812-1												
1-CKV-72-506-A	72	2	C-10	C-Act	12	CKV	SELF	C	O	C0 C4 C7	None	PV-13
1-CKV-72-507-B	72	2	B-10	C-Act	12	CKV	SELF	C	O	C0 C4 C7	None	PV-13
1-CKV-72-524-A	72	2	D-6	C-Act	10	CKV	SELF	C	O	C0 C4	None	PV-13
1-CKV-72-525-B	72	2	A-6	C-Act	10	CKV	SELF	C	O	C0 C4	None	PV-13
1-CKV-72-548-A	72	2	D-2	C-Act	10	CKV	SELF	C	O	C0	None	PV-13
1-CKV-72-549-B	72	2	A-2	C-Act	10	CKV	SELF	C	O	C0	None	PV-13
1-CKV-72-562-A	72	2	F-2	C-Act	8	CKV	SELF	C	O	C0	None	PV-13
1-CKV-72-563-B	72	2	E-2	C-Act	8	CKV	SELF	C	O	C0	None	PV-13
1-FCV-72-2-B	72	2	A-3	A-Act	10	GATE	MOV	C	O	Q1 AJ PV	None	PV-05
1-FCV-72-13-B	72	2	B-6	B-Act	2	GLOBE	MOV	C	O	Q1 PV	None	None

Table 2, Summary Listing of Valves
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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
1-FCV-72-21-B	72	2	B-10	B-Act	12	GATE	MOV	O	C	Q1 PV	None	None
1-FCV-72-22-A	72	2	C-10	B-Act	12	GATE	MOV	O	C	Q1 PV	None	None
1-FCV-72-34-A[3]	72	2	C-6	B-Act	2	GLOBE	MOV	C	O	Q1 PV	None	None
1-FCV-72-39-A	72	2	C-3	A-Act	10	GATE	MOV	C	O	Q1 AJ PV	None	PV-05
1-FCV-72-40-A	72	2	F-3	A-Act	8	GATE	MOV	C	O	Q2 AJ PV	AF-31	PV-05
1-FCV-72-41-B	72	2	E-3	A-Act	8	GATE	MOV	C	O	Q2 AJ PV	AF-31	PV-05
1-FCV-72-44-A	72	2	G-3	B-Act	12	GATE	MOV	C	O	Q2 PV	AF-25	None
1-FCV-72-45-B	72	2	H-3	B-Act	12	GATE	MOV	C	O	Q2 PV	AF-25	None
1-RFV-72-40	72	2	F-3	AC-Act	0.75x1	SFV	SELF	C	O	BT AJ	None	PV-05
1-RFV-72-41	72	2	E-3	AC-Act	0.75x1	SFV	SELF	C	O	BT AJ	None	PV-05
1-RFV-72-508-A	72	2	C-9	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
1-RFV-72-509-B	72	2	A-9	C-Act	0.75x1	SFV	SELF	C	O	BT	None	None
Drawing Number 1-47W810-1												
1-CKV-74-514-A	74	2	F-8	C-Act	8	CKV	SELF	C	B	C3 C4 C8	AF-18	None
1-CKV-74-515-B	74	2	C-8	C-Act	8	CKV	SELF	C	B	C3 C4 C8	AF-18	None
1-CKV-74-544-A	74	2	F-5	C-Act	8	CKV	SELF	C	B	C3 C5 C7	AF-18	None
1-CKV-74-545-B	74	2	C-5	C-Act	8	CKV	SELF	C	B	C3 C5 C7	AF-18	None
1-FCV-74-1-A	74	1	G-2	A-Act	14	GATE	MOV	C	O	Q2 LK PV	AF-32	None
1-FCV-74-2-B	74	1	G-3	A-Act	14	GATE	MOV	C	O	Q2 LK PV	AF-32	None
1-FCV-74-3-A	74	2	F-9	B-Act	14	GATE	MOV	O	C	Q1 PV	None	None
1-FCV-74-8-A	74	1	G-3	A-Act	10	GATE	MOV	C	O	Q2 LK PV	AF-32	None
1-FCV-74-9-B	74	1	G-2	A-Act	10	GATE	MOV	C	O	Q2 LK PV	AF-32	None
1-FCV-74-12-A	74	2	G-7	B-Act	3	GLOBE	MOV	O	C	Q1 PV	None	None
1-FCV-74-21-B	74	2	C-9	B-Act	14	GATE	MOV	O	C	Q1 PV	None	None
1-FCV-74-24-B	74	2	B-6	B-Act	3	GLOBE	MOV	O	C	Q1 PV	None	None
1-FCV-74-33-A	74	2	E-4	B-Act	8	GATE	MOV	O	C	Q2 PV	AF-26	None
1-FCV-74-35-B	74	2	C-4	B-Act	8	GATE	MOV	O	C	Q2 PV	AF-26	None
1-RFV-74-505-S	74	2	H-3	C-Act	3x4	SFV	SELF	C	O	BT	None	None
Drawing Number 1-47W830-1												
1-FCV-77-9-B	77	2	D-1	A-Act	3	DIAPH	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-77-10-A	77	2	E-1	A-Act	3	DIAPH	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-77-16-B	77	2	B-5	A-Act	0.75	DIAPH	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-77-17-A	77	2	B-6	A-Act	0.75	DIAPH	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-77-18-B	77	2	B-5	A-Act	1	DIAPH	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-77-19-A	77	2	B-5	A-Act	1	DIAPH	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-77-20-A	77	2	C-5	A-Act	1	DIAPH	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
Drawing Number 1-47W851-1												
1-FCV-77-127-B	77	2	F-7	A-Act	2	PLUG	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-77-128-A	77	2	F-7	A-Act	2	PLUG	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-RFV-77-2875	77	2	F-7	AC-Act	2	SFV	SELF	C	B	BT AJ	None	PV-05

Table 2, Summary Listing of Valves
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VALVE NUMBER	SYS	CLASS	COORD	CAT	SIZE	TYPE	ACTR	NPOSI	APOSI	TESTS	ALT. FREQ. JUST.	REL. REQ. NUM.
Drawing Number 1-47W855-1												
1-ISV-78-557	78	2	G-7	A-Pas	4	DIAPH	MAN	C	C	AJ	None	PV-05
1-ISV-78-558	78	2	G-8	A-Pas	4	DIAPH	MAN	C	C	AJ	None	PV-05
1-ISV-78-560	78	2	H-8	A-Pas	6	DIAPH	MAN	C	C	AJ	None	PV-05
1-ISV-78-561	78	2	H-7	A-Pas	6	DIAPH	MAN	C	C	AJ	None	PV-05
Drawing Number 1-47W819-1												
1-CKV-81-502	81	2	F-4	AC-Act	3	CKV	MAN	O	C	C8 AJ	AF-34	PV-05
1-FCV-81-12-A	81	2	F-4	A-Act	3	DIAPH	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
Drawing Number 1-47W809-7												
1-ISV-84-530-S	84	2	F-7	A-Pas	1	GLOBE	MAN	C	C	AJ	None	PV-05
Drawing Number 1-47W610-90-3												
1-FCV-90-107-A	90	2	A-9	A-Act	1.5	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-108-B	90	2	C-8	A-Act	1.5	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-109-B	90	2	C-8	A-Act	1.5	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-110-B	90	2	C-8	A-Act	1.5	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-111-A	90	2	D-9	A-Act	1.5	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-113-A	90	2	A-5	A-Act	1.5	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-114-B	90	2	C-4	A-Act	1.5	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-115-B	90	2	C-4	A-Act	1.5	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-116-B	90	2	C-4	A-Act	1.5	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-117-A	90	2	D-5	A-Act	1.5	GATE	DIAPH	O	C	Q1 AJ FS PV	None	PV-05

Table 3, Alternative Frequency Justifications
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ALTERNATIVE FREQUENCY JUSTIFICATION AF-01

I. **Affected Component(s)** - 1-FCV-1-4-T, 1-FCV-1-11-T, 1-FCV-1-22-T, 1-FCV-1-29-T (1-47W801-1)

II. **Function of Affected Component(s)** - Closes to interrupt loss of SG inventory through a ruptured main steam line. Provides flow boundary isolation between the seismically qualified and non-seismically qualified portions of the main steam system.

III. **Basis for Alternative Frequency** - Closing these valves causes a loss of main steam flow from one steam generator causing steam generator level transient, any one of which will cause a unit trip and safety injection. Valves are equipped with part stroke capability, however, even a part stroke exercise increases the risk of a valve closure when the unit is operating (Reference NUREG-1482, paragraph 4.2.4).

IV. **Proposed Alternative Frequency** - Full stroke exercise to the closed position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-02

I. **Affected Component(s)** - 1-FCV-1-17-A, 1-FCV-1-18-B (1-47W803-2)

II. **Function of Affected Component(s)** - Closes to prevent blowdown of main steam in the event of failure of the steam driven auxiliary feedwater pump or of the main steam piping to the pump.

III. **Basis for Alternative Frequency** - Testing these valves to close completely isolates the steam driven auxiliary feedwater pump from its source of steam. Failure of either valve to reopen will cause a complete loss of auxiliary feedwater for the loss of all AC power or station blackout accidents.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the closed position in conjunction with cold shutdown, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-03

I. **Affected Component(s)** - 1-FCV-1-147-A, 1-FCV-1-148-B, 1-FCV-1-149-A, 1-FCV-1-150-B (1-47W801-1)

II. **Function of Affected Component(s)** - Closes to interrupt loss of SG inventory through a ruptured main steam line and to provide flow boundary isolation between the seismically qualified and non-seismically qualified portions of the main steam system during the startup phase of plant operation when the valves are open to provide steam line warming.

III. **Basis for Alternative Frequency** - The control circuitry for these valves has been modified to require the valves to be deenergized when unit startup is complete. The valves are then maintained in the deenergized and closed condition during power operation. This modification was made to alleviate 10CFR50 Appendix R fire interactions from causing the valves to come open in a spurious fashion. Since the only time period in which these valves serve an active function is during startup, it is not prudent to restore power to the valve and place the valve, which is normally maintained in its fail safe condition, in other than its safe condition.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the closed position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-04

I. **Affected Component(s)** - 1-PCV-01-5-T, 1-PCV-01-12-T, 1-PCV-01-23-T, 1-PCV-01-30-T, 1-ISV-1-619, 1-ISV-1-620, 1-ISV-1-621, 1-ISV-1-622 (1-47W801-1)

Table 3, Alternative Frequency Justifications
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II. **Function of Affected Component(s)** - The PCVs open to mitigate steam generator pressure transients and modulate control steam generator temperature by controlling the pressure. The ISVs are closed manually to isolate a failed PCV.

III. **Basis for Alternative Frequency** - Opening the PCVs during power operation will cause a steam generator level and pressure transient. Either of these could result in a unit trip and unnecessary initiation of the safety injection system. Failure of the manual valves to reopen would result in causing a unit shutdown due to an inoperable PCV.

IV. **Proposed Alternative Frequency** - Full stroke exercise the PCVs to the open position and the ISVs to the closed position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-05

I. **Affected Component(s)** - 1-CKV-2-667 (1-47W804-1)

II. **Function of Affected Component(s)** - Opens to pass minimum flow protection flow for simultaneous operation of all three auxiliary feedwater pumps.

III. **Basis for Alternative Frequency** - To test this valve all three auxiliary feedwater pumps must be operated simultaneously and verified to be delivering their respective minimum recirculation flow rates through this check valve. Since this will include operation of AFW pump 1A-S, the unit must be in at least mode 3 in order to provide steam to run AFW pump 1A-S. Simultaneous testing of all three AFW pumps would be a very cumbersome task. Since this valve is considerably oversized for the quantity of flow it must pass (a 2.5 inch check valve needing to pass about 100 gpm) the additional complexity of trying to simultaneously test all three pumps is deemed to be an unnecessary burden.

IV. **Proposed Alternative Frequency** - Part stroke exercise the valve to the open position as a part of each individual pump test and disassemble and inspect the valve once per refueling in accordance with the provisions of Part 10, paragraph 4.3.2.4(c) to demonstrate the full stroke open capability.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-06

I. **Affected Component(s)** - 1-CKV-3-508, 1-CKV-3-509, 1-CKV-3-510, 1-CKV-3-511, 1-FCV-3-33-A, 1-FCV-3-35, 1-FCV-3-35A, 1-FCV-3-47-B, 1-FCV-3-48, 1-FCV-3-48A, 1-FCV-3-87-A, 1-FCV-3-90, 1-FCV-3-90A, 1-FCV-3-100-B, 1-FCV-3-103, 1-FCV-3-103A, 1-FCV-3-185, 1-FCV-3-186, 1-FCV-3-187, 1-FCV-3-188, 1-FCV-3-236, 1-FCV-3-239, 1-FCV-3-242, 1-FCV-3-245 (1-47W803-1)

II. **Function of Affected Component(s)** - Closes to interrupt main feedwater to prevent a rapid primary side cooldown in the event of a main steam line break and or to prevent loss of steam generator water inventory in the event of a break in the main feedwater line before the isolation valve. (Valves 1-FCV-3-185, 1-FCV-3-186, 1-FCV-3-187 and 1-FCV-3-188 are normally closed and are only open during the startup sequence.)

III. **Basis for Alternative Frequency** - Exercising these valves during power operation causes a loss of feedwater to the Steam Generator they supply causing a steam generator level transient which could result in unit trip and unnecessary safety injection system actuation. Valves are not designed with part stroke capability.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the closed position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

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ALTERNATIVE FREQUENCY JUSTIFICATION AF-07

I. **Affected Component(s)** - 1-CKV-3-638, 1-CKV-3-652, 1-CKV-3-669, 1-CKV-3-678 (1-47W803-1) 1-CKV-3-805-A, 1-CKV-3-806-B, 1-CKV-3-810-S, 1-CKV-3-830-B, 1-CKV-3-831-A, 1-CKV-3-832-A, 1-CKV-3-833-B, 1-CKV-3-864-S, 1-CKV-3-871-S, 1-CKV-3-872S, 1-CKV-3-873-S, 1-CKV-3-874-S (1-47W803-2)

II. **Function of Affected Component(s)** - All except 1-CKV-3-638, 1-CKV-3-652, 1-CKV-3-669, and 1-CKV-3-678 open to admit auxiliary feedwater to the steam generators during loss of main feedwater. Valves 1-CKV-3-638, 1-CKV-3-652, 1-CKV-3-669, and 1-CKV-3-678 backseat to prevent auxiliary feedwater from flowing down the feedwater bypass line away from the steam generators. Valves 1-CKV-3-805-A, 1-CKV-3-806-B and 1-CKV-3-810-S also close when the Condensate Storage Tank is exhausted to provide a flow boundary for ERCW going to the pump suction.

III. **Basis for Alternative Frequency** - The only way to exercise these valves is to run the auxiliary feedwater pumps at full flow to the steam generators while manually overriding the steam generator level control valves. Backseating valves 1-CKV-3-638, 1-CKV-3-652, 1-CKV-3-669 and 1-CKV-3-678 results in a loss of flow of heated water in the feedwater bypass line. The resulting introduction of cold water into the steam generator will cause undesirable thermal fatigue cycles on the feedwater piping and SG feedwater nozzles and will cause level transients due to SG shrink which could result in unit trip and unnecessary actuation of the safety injection system. Valves 1-CKV-3-805-A, 1-CKV-3-806-B and 1-CKV-3-810-S will be backseated quarterly.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the open position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns. Full stroke exercise valves 1-CKV-3-805-A, 1-CKV-3-806-B, and 1-CKV-3-810-S to the closed position quarterly. Full stroke exercising of valves 1-CKV-3-830-B, 1-CKV-3-831-A, 1-CKV-3-832-A, 1-CKV-3-833-B, 1-CKV-3-871-S, 1-CKV-3-872S, 1-CKV-3-873-S, and 1-CKV-3-874-S to the closed position is addressed by PV-14.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-08

I. **Affected Component(s)** - 1-CKV-1-891-S, 1-CKV-1-892-S (1-47W803-2)

II. **Function of Affected Component(s)** - Opens to admit steam flow to the turbine for auxiliary feedwater pump 1A-S. Closes to prevent loss of steam through a failed steam line/steam generator.

III. **Basis for Alternative Frequency** - The only way to get these valves fully open is to run the steam driven auxiliary feedwater pump at full flow to the steam generators. To do this requires manually overriding the steam generator auxiliary level control valves. Overriding these valves to allow full flow auxiliary feedwater pump operation results in bypassing the normal steam generator level control system. It also causes a loss of flow in the feedwater bypass line which will further upset the normal steam generator level and feedwater flow controls. This could result in a unit trip and unnecessary actuation of the safety injection system.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the open position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdown. Full stroke exercising to the closed position is described in Relief Request PV-07

ALTERNATIVE FREQUENCY JUSTIFICATION AF-09

I. **Affected Component(s)** - 1-CKV-32-293, 1-CKV-32-303-A, 1-CKV-32-313B, 1-FCV-32-80-A,1-FCV-32-102-B, 1-FCV-32-110-A (1-47W848-1)

II. **Function of Affected Component(s)** - Closes to provide containment isolation

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III. **Basis for Alternative Frequency** - Exercising these valves to the closed position interrupts the air supply to a number of critical instruments and valves inside containment. Failure of these valves to reopen could cause unstable operation and unit trip by allowing all of the valves and instruments to assume their failed condition.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the closed position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-10

I. **Affected Component(s)** - 1-CKV-61-658, 1-CKV-61-659, 1-CKV-61-660, 1-CKV-61-661, 1-CKV-61-662, 1-CKV-61-663, 1-CKV-61-664, 1-CKV-61-665, 1-CKV-61-666, 1-CKV-61-667, 1-CKV-61-668, 1-CKV-61-669, 1-CKV-61-670, 1-CKV-61-671, 1-CKV-61-672, 1-CKV-61-673, 1-CKV-61-674, 1-CKV-61-675, 1-CKV-61-676, 1-CKV-61-677 (1-47W814-2)

II. **Function of Affected Component(s)** - Opens during ice melt portion of an accident to drain water into lower compartment to prevent water level in the ice storage compartment from interfering with the operation of the lower inlet doors.

III. **Basis for Alternative Frequency** - Valves are installed on the end of the ice condenser drains inside the biological shield in the lower compartment. Radiation levels in this area during operation prevent entry. The drains are located some distance from the floor, requiring the construction of scaffolding to reach. Therefore it is impractical to try to test the valves during a cold shutdown.

IV. **Proposed Alternative Frequency** - Full stroke open exercise the valve using a mechanical exerciser during refueling outages.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-11

I. **Affected Component(s)** - 1-CKV-62-504-S, 1-CKV-62-525-A, 1-CKV-62-532-B (1-47W809-1)
1-CKV-63-510-S, 1-CKV-63-524-A, 1-CKV-63-526-B, 1-CKV-63-543-A, 1-CKV-63-545-A, 1-CKV-63-547-B, 1-CKV-63-549-B, 1-CKV-63-551-S, 1-CKV-63-553-S, 1-CKV-63-555-S, 1-CKV-63-557-S, 1-CKV-63-558-B, 1-CKV-63-559-B, 1-CKV-63-581-S, 1-CKV-63-586-S, 1-CKV-63-587-S, 1-CKV-63-588-S, 1-CKV-63-589-S (1-47W811-1)

II. **Function of Affected Component(s)** - Valves are part of the Emergency Core Cooling System (ECCS). Open to admit flow from the refueling water storage tank through their respective ECCS pumps to the reactor vessel during accidents involving loss of primary system inventory. Several of the valves also close to provide a flow boundary (i.e., prevent reverse flow through a shutdown pump, provide second isolation to RWST during recirculation phase operation)

III. **Basis for Alternative Frequency** - The centrifugal charging pumps cannot be run at full flow through their associated valves without causing undesirable RCS temperature and/or boron concentration changes resulting in changes in reactivity during operations which could result in a plant trip and subsequent safety injection actuation or causing undesirable thermal cyclic stresses which would eventually use all of the design basis for thermal cycles due to a Safety Injection. The safety injection pumps do not develop sufficient head to deliver to the reactor vessel during normal operation. Letdown capacity precludes testing during Mode 5 without compromising cold over pressure protection provisions. Part stroke testing of valves not in the normal seal injection flow path or pump minimum flow test lines during shutdown with the vessel head attached will require controlling flow manually using a hand operated valve. This presents an undesirable challenge to the cold over pressure protection provisions. Full stroke exercising 1-CKV-62-504-S or 1-CKV-63-510-S to the closed position renders both trains of their respective systems inoperable.

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IV. **Proposed Alternative Frequency** - Full stroke exercise to the open position at refueling. Part stroke exercise those valves in the normal seal injection flow path or pump minimum flow test flow path to the open position once per quarter. Full stroke exercise valves 1-CKV-62-504-S and 1-CKV-63-510-S to the closed position in conjunction with cold shutdowns, but not more often than once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-12

AF-12 has been withdrawn.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-13

I. **Affected Component(s)** - 1-CKV-62-930 (1-47W809-2)

II. **Function of Affected Component(s)** - Opens to pass emergency boration flow to the CCP suction.

III. **Basis for Alternative Frequency** - Passing the emergency boration flow through this valve during operation results in undesirable boration of the RCS. This could cause undesirable changes in rod position to compensate for the negative reactivity insertion. Testing during cold shutdown would also cause a negative reactivity insertion which could adversely affect the length of time required to dilute to an operating boron concentration or adversely the reactivity balance during shutdown conditions.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the open position once per refueling cycle.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-14

I. **Affected Component(s)** - 1-FCV-62-61-B, 1-FCV-62-63-A (1-47W809-1)

II. **Function of Affected Components** - Closes to provide containment isolation.

III. **Basis for Alternative Frequency** - Exercising valves during operation would cause loss of seal water return and potentially damage the reactor coolant pump seals causing high seal losses with resultant maintenance, contamination and clean up problems.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the closed position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-15

I. **Affected Component(s)** - 1-FCV-62-77-B, 1-FCV-62-90-A, 1-FCV-62-91-B (1-47W809-1)

II. **Function of Affected Components** - 1-FCV-62-90-A and 1-FCV-62-91-B close to isolate the normal charging and letdown lines during a safety injection. 1-FCV-62-77-B closes to provide containment isolation.

III. **Basis for Alternative Frequency** - As described in the Westinghouse letter to TVA, WAT-D-8347 (RIMS T33 911231 810), isolation of the charging and letdown lines during operation can result in a thermal transient at the charging nozzle of from 500 degrees F to 70 degrees F in a two to five minute period. This results in an increase in the fatigue usage factor beyond that assumed for the original design analysis of these systems.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the closed position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

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ALTERNATIVE FREQUENCY JUSTIFICATION AF-16

I. **Affected Component(s)** - 1-FCV-62-1228-A, 1-FCV-62-1229-B, 1-LCV-62-132-A, 1-LCV-62-133-B, 1-LCV-62-135-A, 1-LCV-62-136-B (1-47W809-1)

II. **Function of Affected Component(s)** - The LCVs change position to realign charging pump suction from the Volume Control Tank to the RWST during safety injection. The FCVs are normally open to vent hydrogen from the charging pump suction but change position to provide a flow boundary during safety injection.

III. **Basis for Alternative Frequency** - Cycling these valves during operation results in the charging pumps taking suction from the RWST for normal charging requirements. This will result in addition of borated water which has a different boron concentration than that in the reactor coolant system since the likelihood of both the RWST and the RCS being at the same boron concentration at the same time is very small. The change in boron concentration in the RCS caused by charging from the RWST during testing would cause unstable unit operation, especially if any of the valves fail to return to their normal position. The FCVs are electrically interlocked with the LCVs in such a manner that if they are stroked independently of the LCVs, position indication and consequently the ability to time the valves is lost.

IV. **Proposed Alternative Frequency** - Full stroke exercise 1-FCV-62-1228-A, 1-FCV-62-1229-B, 1-LCV-62-132-A and 1-LCV-62-133-B to the closed position and 1-LCV-62-135-A and 1-LCV-62-136-B to the open position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-17

I. **Affected Component(s)** - 1-CKV-63-725 (1-47W811-1)
1-CKV-68-559-S (1-47W813-1)

II. **Function of Affected Component(s)** - Opens to pass flow from safety and relief valves located upstream from it. 1-CKV-63-725 also closes to prevent flow of safety valves downstream of it from reaching the valves upstream of it. 1-CKV-68-559-B also closes to prevent outflow from the Pressurizer Relief Tank.

III. **Basis for Alternative Frequency** - No practical means exists to full stroke open or close either of these valves without adversely affecting the over pressure protection capability of both trains of a safety system.

IV. **Proposed Alternative Frequency** - Disassemble and inspect each of the valves once per refueling.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-18

I. **Affected Component(s)** - 1-CKV-63-502-S, 1-CKV-63-632-A, 1-CKV-63-633-B, 1-CKV-63-634-A, 1-CKV-63-635-B, 1-CKV-63-640-S, 1-CKV-63-641-S, 1-CKV-63-643-S, 1-CKV-63-644-S (1-47W811-1)
1-CKV-74-514-A, 1-CKV-74-515-B, 1-CKV-74-544-A, 1-CKV-74-545-B (1-47W810-1)

II. **Function of Affected Component(s)** - Opens to admit flow from the RHR pumps to the reactor during LOCA or post LOCA recovery. Valves 1-CKV-74-544-A and 1-CKV-74-545-B also close to prevent dead heading the weaker pump when at minimum flow (i.e., when RCS pressure is at or near the pressure available during minimum flow operation) during all modes except shutdown cooling. Valves 1-CKV-74-514-A and 1-CKV-74-515-B also close to prevent recirculation of RHR flow through a tripped pump during the shutdown cooling mode when both trains are in service.

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III. **Basis for Alternative Frequency** - The RHR pumps do not develop sufficient head to open the valves during power operation. With the RHR pump suction being supplied from the normal loop 4 suction path during shutdown and discharging to a closed vessel, the pumps cannot develop sufficient flow to satisfy the full flow requirements for the check valves. In order to achieve full flow, the vessel must be open and the pump suction taken from the RWST. Valves 1-CKV-74-514-A and 1-CKV-74-515-B cannot be exposed to the pressure of a running RHR pump during plant operation without opening 1-HCV-74-36 and 1-HCV-74-37. Opening these valves or backseating 1-CKV-63-502S adversely affects both trains of a safety system. Valves 1-CKV-74-514-A and 1-CKV-74-515-B are the only valves affected by this Alternative Frequency Justification which can be part stoke opened by the pump minimum flow recirculation flow path. Valves 1-CKV-74-544-A and 1-CKV-74-545-B can only be back seated during operation. While in shut down conditions, the valve alignments necessary to backseat these valves adversely affects both trains of a safety system.

IV. **Proposed Alternative Frequency** - Part stroke exercise 1-CKV-74-514-A and 1-CKV-74-515-B to the open position once per quarter during the pump test on the minimum flow recirculation flow path. Part stroke exercise the remaining valves, which are not in the pump minimum flow recirculation flow path, to the open position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns. Full stroke exercise to the open position during refueling outages. Full stroke exercise 1-CKV-74-544-A and 1-CKV-74-545-B to the closed position quarterly during operation. Full stroke exercise 1-CKV-63-502-S, 1-CKV-74-514-A and 1-CKV-74-515-B to the closed position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-19

I. **Affected Component(s)** - 1-FCV-63-1-A, 1-FCV-63-5-B (1-47W811-1)

II. **Function of Affected Component(s)** - Closes when the associated pump suction (either RHR or SIS) is transferred from the RWST to the containment sump following a LOCA.

III. **Basis for Alternative Frequency** - Exercising valve during operation results in losing suction from RWST to both trains of a safety system. If valve fails to reopen both trains of the affected safety system would be made inoperable.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the closed position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-20

I. **Affected Component(s)** - 1-FCV-63-3-A (1-47W811-1)

II. **Function of Affected Component(s)** - Valve is closed to prevent flow to the RWST during the recirculation phase of a LOCA.

III. **Basis for Alternative Frequency** - Exercising valve during operation results in isolating the recirculation line to both trains of safety injection pumps. Failure of the valve to reopen would make both trains of a safety system inoperable.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the closed position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-21

I. **Affected Component(s)** - 1-FCV-63-8-A, 1-FCV-63-11-B (1-47W811-1)

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II. **Function of Affected Component(s)** - Opened to establish suction flow path to safety injection and/or centrifugal charging pumps during the recirculation phase of a LOCA.

III. **Basis for Alternative Frequency** - Both valves are electrically interlocked with the safety injection pump recirculation isolation valves 1-FCV-63-3-A, 1-FCV-63-4-B and 1-FCV-63-175-B in such a manner that both trains of safety injection will have their minimum flow recirculation path isolated to cycle either valve. Isolation of these recirculation paths adversely affects both trains of a safety system and could cause failure of both trains.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the open position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-22

I. **Affected Component(s)** - 1-FCV-63-22-B (1-47W811-1)

II. **Function of Affected Component(s)** - Closed when safety injection pumps are placed on hot leg recirculation after a LOCA.

III. **Basis for Alternative Frequency** - Exercising valve during operation isolates both trains of safety injection from their normal flow path to the cold legs. Failure of the valve to reopen results in total loss of system function.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the closed position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-23

I. **Affected Component(s)** - 1-FCV-63-25-B, 1-FCV-63-26-A (1-47W811-1)

II. **Function of Affected Component(s)** - Valves are part of the Emergency Core Cooling System (ECCS) and open to admit flow from the centrifugal charging pumps to the reactor vessel during accidents involving loss of primary system pressure.

III. **Basis for Alternative Frequency** - Normal charging header pressure exceeds the pressure downstream of the check valves associated with these FCVs. If the FCVs are opened for testing, the pressure in the charging header will initiate flow through the high head safety injection system piping. This will:

1. Cause pressurizer level transients, due to the additional water being added to the RCS, which will cause unstable operation and may result in unit trip and subsequent initiation of the entire safety injection system.

2. Cause a thermal stress transient in the associated piping which will have to be counted as one of the limited number of safety injection system actuations permitted during the design life of the plant.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the open position in conjunction with cold shutdowns, but not more often than once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-24

I. **Affected Component(s)** - 1-FCV-63-67-B, 1-FCV-63-80-A, 1-FCV-63-98-B, 1-FCV-63-118-A (1-47W811-1)

II. **Function of Affected Component(s)** - Valves are normally open and allow the accumulators to function as a passive component. However, during accidents which do not involve loss of primary system integrity the valves must close to isolate the accumulators from the RCS and allow the RCS to be depressurized to the RHR cut-in pressure in order to continue cooldown to the cold shutdown condition.

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III. **Basis for Alternative Frequency** - These valves are normally open with power to the breaker removed. Failure of a valve to reopen would leave the plant in a degraded condition.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the closed position in conjunction with cold shutdowns, but not more often than once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-25

I. **Affected Component(s)** - 1-FCV-63-72-A, 1-FCV-63-73-B (1-47W811-1)
1-FCV-72-44-A, 1-FCV-72-45-B (1-47W812-1)

II. **Function of Affected Component(s)** - Opens to allow safety related systems to take suction from containment sump.

III. **Basis for Alternative Frequency** - Opening these valves will allow water from safety related systems (including the RWST) to gravity flow into the containment sump adversely affecting multiple safety related systems.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the open position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-26

I. **Affected Component(s)** - 1-FCV-63-93-A, 1-FCV-63-94-B, 1-FCV-63-172-B (1-47W811-1)
1-FCV-74-33-A, 1-FCV-74-35-B (1-47W810-1)

II. **Function of Affected Component(s)** - All except 1-FCV-63-172-B are open during ECCS injection mode to allow either train of RHR to provide injection flow to all four RHR injection lines. They close to establish the flow boundary during the hot leg recirculation phase of a LOCA. 1-FCV-63-172B is normally closed and remains closed during the injection phase of a LOCA but opens to initiate hot leg recirculation.

III. **Basis for Alternative Frequency** - Closing any one of the four normally open valves causes operation in an unanalyzed condition by isolating two of the four cold legs. Opening 1-FCV-63-172-B would require closure of 1-FCV-74-33-A and 1-FCV-63-35-B to avoid having RHR aligned to hot leg injection and cold leg injection simultaneously. Since these valves cannot be closed without affecting both trains of RHR, 1-FCV-63-172-B cannot be opened.

IV. **Proposed Alternative Frequency** - Full stroke exercise 1-FCV-63-93-A, 1-FCV-63-94-B, 1-FCV-74-33-A, and 1-FCV-74-35-B to the closed position and 1-FCV-63-172-B to the open position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-27

Alternative Frequency Justification AF-27 has been withdrawn.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-28

I. **Affected Component(s)** - 1-FSV-68-394-A, 1-FSV-68-395-B, 1-FSV-68-396-B, 1-FSV-68-397-A, 1-PCV-68-340A-A, 1-PCV-68-334-B (1-47W813-1)

II. **Function of Affected Component(s)** - The PCVs are power operated relief valves on the pressurizer which open to control overpressure conditions during startup and shutdown. The FSVs open to provide a reactor head vent.

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III. **Basis for Alternative Frequency** - These valve are required to seat against full operational pressure with the down stream side at the pressure of the Pressurizer Relief Tank. The valves are solenoid-to-open and spring-to-close valves. This type valve has shown a tendency to not reseat sufficiently to preclude excessive seat leakage after cycling. Therefore, cycling the valves during operation introduces the potential of creating an unacceptable leak from the RCS.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the open position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-29

I. **Affected Component(s)** - 1-FCV-67-83-A, 1-FCV-67-87-A, 1-FCV-67-88-B, 1-FCV-67-89-B, 1-FCV-67-91-A, 1-FCV-67-95-A, 1-FCV-67-96-B, 1-FCV-67-97-B, 1-FCV-67-99-B, 1-FCV-67-103-B, 1-FCV-67-104-A, 1-FCV-67-105-A, 1-FCV-67-107-B, 1-FCV-67-111-B, 1-FCV-67-112-A, 1-FCV-67-113-A (1-47W845-3) 1-CKV-70-679, 1-FCV-70-87-B, 1-FCV-70-89-B, 1-FCV-70-90-A, 1-FCV-70-92-A, 1-FCV-70-100-A, 1-FCV-70-133-A, 1-FCV-70-134-B, 1-FCV-70-140-B (1-47W859-2)

II. **Function of Affected Component(s)** - Containment isolation, except for valve 1-FCV-70-133-A which closes to provide a second train of isolation to interrupt a potential source of dilution water to the containment sump.

III. **Basis for Alternative Frequency** - Exercising these valves during operation causes a loss of flow to the equipment being supplied with cooling water (control rod drive coolers, reactor coolant pump motor coolers, reactor coolant pump oil coolers and reactor coolant pump thermal barrier coolers). Failure of these valves to reopen could result in damage to the equipment being cooled.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the closed position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-30

AF-30 has been withdrawn

ALTERNATIVE FREQUENCY JUSTIFICATION AF-31

I. **Affected Component(s)** - 1-FCV-72-40-A, 1-FCV-72-41-B (1-47W812-1)

II. **Function of Affected Component(s)** - Opens to admit RHR pump flow to the RHR Spray Headers

III. **Basis for Alternative Frequency** - These valves are electrically interlocked with containment sump valves 1-FCV-63-72-A and 1-FCV-63-73-B in such a manner that the sump valves must be opened to allow the spray valves to open. The sump valves cannot be opened for testing during operation. (See AF-25)

Table 3, Alternative Frequency Justifications
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IV. **Proposed Alternative Frequency** - Full stroke exercise to the open position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-32

I. **Affected Component(s)** - 1-FCV-74-1-A, 1-FCV-74-2-B, 1-FCV-74-8-A, 1-FCV-74-9-B (1-47W810-1)

II. **Function of Affected Component(s)** - Opens to provide decay heat removal for cooling to the cold shutdown condition.

III. **Basis for Alternative Frequency** - Exercising the valve during operation would result in overpressurizing the RHR piping, causing a loss of both trains of a safety system.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the open position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-33

I. **Affected Component(s)** - 1-CKV-68-849, 1-CKV-63-868 (1-47W830-6)

II. **Function of Affected Component(s)** - Closes to provide Containment Isolation

III. **Basis for Alternative Frequency** - Cycling these valves during power operation interrupts the nitrogen supply inside containment to a number of components and systems. Additionally personnel radiation exposure and valve inaccessibility prohibit quarterly exercising of these valves.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the closed position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-34

I. **Affected Component(s)** - 1-CKV-81-502 (1-47W819-1)

II. **Function of Affected Component(s)** - Closes to provide Containment Isolation

III. **Basis for Alternative Frequency** - Cycling this valve results in loss of primary water to the RCP stand pipes and PRT. Also this valve is physically located in the number 4 accumulator room in the reactor building. Access to this area will be limited during operation due to radiation exposures.

IV. **Proposed Alternative Frequency** - Full stroke exercise to the closed position in conjunction with cold shutdowns, not to exceed once per quarter in the event of frequent cold shutdowns.

Table 4, Requests for Relief
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I. **Relief Request Number** - PV-01

II. **Affected System(s)** - All systems containing safety related pumps.

III. **Affected Component(s)** - All pumps in the scope of the IST program

IV. **ASME Code Class** - 2 and 3

V. **Category** - Active

VI. **Function of Affected Component(s)** - Supply fluid flow to various plant systems

VII. **Impractical Requirement** - OM Standard, Part 6, table 3a - Table 3a requires centrifugal and vertical line shaft pumps which operate at ≥600 RPM to observe an Alert Range of the lesser of $>2.5\ V_{REF}$ to $6\ V_{REF}$ or >0.325 to 0.70 in/sec and a Required Action Range of the lesser of $>6\ V_{REF}$ or >0.70 in/sec.

VIII. **Basis for Granting Relief** - The OM-6 requirements do not provide for pumps which have extremely low levels of vibration. For example, the WBN 1B-B Safety Injection pump outboard bearing vibration is approximately 0.014 in/sec. Based on the OM-6 ranges, this reference value would result in entry into the Alert range at 0.035 in/sec and into the Required Action Range at 0.084 in/sec. By the standards listed below, these vibration levels are considered acceptable. Based on current vibration data, the application of the OM-6 ranges would result in a significant percentage of the WBN pumps entering the Alert range with vibration levels below 0.1 in/sec. The required increased frequency testing would accelerate the normal wear process and ultimately lead to increased maintenance activity and reduced availability.

A review of three widely accepted sets of guidelines for absolute vibration limits provides the following results:

OM, Part 6

Vibration Level	Quality Judgement
>0.325 in/sec	Alert Range
>0.700 in/sec	Required Action

ANSI S2.41 (ISO 2372)

Vibration Level	Quality Judgement
0 - 0.10 in/sec	Good
0.10 - 0.25 in/sec	Satisfactory
0.25 - 0.62 in/sec	Unsatisfactory
>0.62 in/sec	Unacceptable

IRD General Machinery Vibration Severity Chart

Vibration Level	Quality Judgement
0 - 0.08 in/sec	Good
0.08 - 0.16 in/sec	Fair
0.16 - 0.31 in/sec	Slightly rough
0.31 - 0.63 in/sec	Rough
>0.63 in/sec	Very Rough

Table 4, Requests for Relief
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Relief Request Number - PV-01 (continued)

IX. **Proposed Alternative** - Establish a minimum reference vibration threshold level of 0.10 in/sec peak velocity for centrifugal and vertical line shaft pumps operating ≥600 RPM . Alert and Required Action levels for baseline vibration levels at or below 0.10 in/sec peak velocity will be 0.25 and 0.6 in/sec respectively. Components with measured vibration levels less than 0.10 in/sec peak velocity during testing will be acceptable, regardless of relative change from the baseline levels. Alert and Required Action levels for baseline vibration levels above 0.10 in/sec peak velocity will be as described in table 3a. The application of this minimum reference value will be reviewed on a case-by-case basis, including any manufacturer's recommendations on acceptable vibration levels, to ensure that the proposed minimum reference value is appropriate. Additionally, when the O&M Committee comes to consensus and publishes a change to the Code with guidance for smoothly running pumps, this guidance will either be adopted or a reasonable alternative will be justified.

Alert and Required Action levels for Reciprocating pumps and for Centrifugal and Vertical Line Shaft pumps operating at <600 RPM are not affected by this relief request and will be as described in table 3a.

X. **Frequency of Proposed Alternative** - As specified in OM-6.

Table 4, Requests for Relief
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I. **Relief Request Number** - PV-02

Relief Request PV-02 has been withdrawn.

Table 4, Requests for Relief
Page 4 of 15

I. **Relief Request Number** - PV-03

II. **Affected System(s)** - Chemical and Volume Control System and Chilled Water System

III. **Affected Component(s)** - Boric Acid Transfer Pumps (1-PMP-62-230-A, 1-PMP-62-232-B) (1-47W809-5)
Main Control Room Chilled Water Pumps (0-PMP-31-80-A, 0-PMP-31-96A-B) (1-47W865-3)[4]
Electric Board Room Chilled Water Pumps (0-PMP-31-128/1-A, 0-PMP-31-129/1-B) (1-47W865-7)[4]
Shutdown Board room Chilled Water Pumps (0-PMP-31-36/1-A, 0-PMP-49/1-B) (1-47W865-8)[4]

IV. **ASME Code Class** - The Boric Acid Transfer Pumps are class 3. The chilled water system pump is TVA Class G.

V. **Category** - Active

VI. **Function of Affected Component(s)** - The Boric Acid Transfer Pumps supplies boric acid for emergency boration. The Chilled Water Pumps provide cooling water to the Main Control Room, Electrical Board Room and Shutdown Board Room ventilation systems as necessary to maintain environmental qualifications of safety related electrical equipment. The Main Control Room Chilled Water Pumps also provide for continued main control room habitability.

VII. **Impractical Requirement** - OM Standard, Part 6, Paragraph 4.6.1.1 - Instrument accuracy shall be within the limits of Table 1. (Table 1 lists an accuracy for flow rate of 2%.)

VIII. **Basis for Granting Relief** - The only permanently installed flow instrumentation in the piping for the Boric Acid Transfer Pumps is in the line which supplies undiluted boric acid to the charging pump suction. Using this line during operation results in making a significant negative reactivity insertion.

The permanently installed flow element for the chilled water pumps is an averaging type annubar, not an orifice or nozzle. During Preoperational Testing, the signal provided by the flow elements for the Main Control Room and Electrical Board Room has proven unrepeatable and unreliable. It is possible to install test instrumentation on the flow element meeting OM-6 requirements. However, since the flow element itself has proven to be unusable, the data collected from instrumentation installed on it would also be unusable. Additionally, the signal output of all the annubars, including the Shutdown Board Room pumps, is low enough that finding reliable instrumentation meeting the instrument range requirement is difficult.

Temporarily installed instrumentation is available which will yield a 3% of range accuracy.

IX. **Proposed Alternative** - Perform the pump test using temporarily installed flow instrumentation with an accuracy of 3%.

The quarterly test for the boric acid transfer pumps will be supplemented with a test performed during refueling outages which tests the pump at full flow, using instrumentation which meets the OM-6 accuracy requirements.

The quarterly test for the chilled water pump is performed at the design required flow rate. The minimum acceptable flow for these pumps will be increased to compensate for the decreased accuracy of the instrumentation used. Thus, even though the instrumentation does not meet the OM-6 accuracy requirements, the test will demonstrate the ability of the pump to deliver the minimum required design flow rate.

X. **Frequency of Proposed Alternative** - Quarterly, with a once per refueling cycle test at full flow with Code instrumentation for the Boric Acid Pumps.

Table 4, Requests for Relief
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I. **Relief Request Number** - PV-04

II. **Affected System(s)** - Essential Raw Cooling Water System

III. **Affected Component(s)** - Screen Wash Pumps (1-PMP-67-431-A, 1-PMP-67-440-B, 2-PMP-67-437-A, 2-PMP-67-447-B) (1-47W845-1)
1-CKV-67-940A-A, 2-CKV-67-945B-B

IV. **ASME Code Class** - 3 (Equivalent)

V. **Category** - Active (Pumps), C-Active (Valves)

VI. **Function of Affected Component(s)** - Provides flush water to flush accumulated debris from the surface of the traveling water screens.

VII. **Impractical Requirement** - OM Standard, Part 6, Paragraph 5.2(d) - Pressure, flow rate, and vibration (displacement or velocity) shall be determined and compared with corresponding reference values.

OM Standard Part 10, paragraph 4.3.2.4 - Observation may be by observing a direct indicator such as changes in system pressure, flow rate, level, temperature, seat leakage testing or other positive means. Generic Letter 89-04 states in the first paragraph of Attachment 1, position 1, "A check valve's full stroke to the open position may be verified by passing the maximum required accident condition flow through the valve. This is considered by the staff as an acceptable full stroke. Any flow rate less than this will be considered a partial stroke exercise. A valid full stroke exercise by flow requires that the flow through the valve be known."

VIII. **Basis for Granting Relief** - These pumps and check valves are not equipped with flow instrumentation. Piping configuration does not provide adequate straight runs of piping to install permanent or temporary clamp on type flow instrumentation.

Flow is not the critical parameter for these pumps. The nature of their operation is to ensure that sufficient pressure is maintained at the spray nozzles during flushing operations of the traveling water screens to ensure that sufficient force is exerted on the debris accumulated on the screen to remove it. This can be verified by verifying the effectiveness of the flushing operation.

IX. **Proposed Alternative** - Verify that the flow delivered through the spray nozzles in the traveling water screens provides coverage of the screen spray area and adequately flushes away debris present on the screen. Pressure and vibration data for the pumps will be collected and analyzed in accordance with OM-6.

X. **Frequency of Proposed Alternative** - Quarterly

Table 4, Requests for Relief
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I. **Relief Request Number** - PV-05

II. **Affected System(s)** - All systems containing containment isolation valves.

III. **Affected Component(s)** - All containment isolation valves (CIVs)

VI. **ASME Code Class** - 2

V. **Category** - A-Active and AC-Active

VI. **Function of Affected Component(s)** - Containment Isolation

VII. **Impractical Requirement** - OM Standard, Part 10, Paragraph 4.2.2.3(e) as invoked by 10CFR50.55a(b)(2)(vii) - "Leakage rate measurements shall be compared with the permissible leakage rates specified by the Owner for a specific valve or valve combination."

VIII. **Basis for Granting Relief** - It is the total leakage from containment which is of significance in determining the effects of an accident and which is required by 10CFR50 Appendix J, not the leakage from an individual valve. Watts Bar has developed the following alternative to meet the total leakage requirements of Appendix J while still providing assurance that a single valve does not become the major source of leakage from containment.

IX. **Proposed Alternative** - CIVs are assigned conservative reference leak rates based upon the valve size and considering the total allowable containment penetration leakage, 0.6 L_a. The total of all of the reference leak rates is set to equal approximately 40% of 0.6 L_a. This provides a comfortable margin, even if all valves are leaking their respective reference leak rates. If a maximum permissible leak rate is not specified by the owner (licensee), OM-10 paragraph 4.2.2.3(e) requires a leak rate acceptance criteria equivalent to 0.3125 SCFH per inch valve size. The reference leak rate assigned to CIVs from the preceding methodology corresponds to an average of 0.06 SCFH per inch valve size. This is less than one fifth the OM-10 guidelines, a much more conservative number.

During refueling outages maintenance is performed, as required, in an attempt to restore all CIVs to below their reference leak rates and as close to zero leakage as is reasonably achievable. This ensures the ability of the containment system to satisfy the integrated leak rate testing criteria and to provide adequate margin for valve degradation over the next fuel cycle. While every attempt is made to maintain CIVs at zero leakage or below their reference leak rates at all times, a valve leaking in excess of its reference value may remain operable and left "as is", provided that an evaluation finds it acceptable with 10CFR50 Appendix J. An example of such a situation would be a valve found to be leaking in excess of its reference leak rate in mid-fuel cycle, and for which all reasonable on-line maintenance efforts have been made. Such evaluation shall be based upon consideration of the effects on overall containment leakage and possible effects on adjacent piping and components, as well as consideration of time, cost, unit operations, and radiological exposure required for corrective measures. While the maximum permissible leak rate at this time would, by plant Technical Specifications, be limited to the current margin between overall containment leakage and 0.6 L_a, maximum single leakage is at all times administratively limited to a value that is as low as reasonably achievable and consistent with the evaluation by the 10CFR50 Appendix J program supervisory personnel or program engineer. Any such valve would be repaired or replaced no later than the next refueling outage or even during the next cold shutdown of sufficient duration if practical.

The above described methodology of setting and maintaining ultraconservative reference leak rates ensures system operability and provides reasonable assurance of valve leak tight integrity intended by the Code. At the same time flexibility is provided to prudently operate until the next refueling outage or lengthy cold shutdown when a valve exceeds its reference leak rate and all reasonable efforts have been made to reduce its leakage.

X. **Frequency of Proposed Alternative** - As required by 10CFR50 Appendix J.

Table 4, Requests for Relief
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I. **Relief Request Number - PV-06**

Relief Request PV-06 has been withdrawn.

Table 4, Requests for Relief
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I. **Relief Request Number** - PV-07

II. **Affected System(s)** - Auxiliary Feedwater and Main Steam

III. **Affected Component(s)** - 1-CKV-3-861-B, 1-CKV-3-862-A, 1-CKV-1-891-S, 1-CKV-1-892-S, 1-CKV-3-921-B, 1-CKV-3-922-A (1-47W803-2)

IV. **ASME Code Class** - 2

V. **Category** - C-Active

VI. **Function of Affected Component(s)** - 1-CKV-3-861-B, 1-CKV-3-862-A, 1-CKV-3-921-B, and 1-CKV-3-922-A open to allow flow from the auxiliary feedwater pumps to enter the main feedwater piping and continue to the steam generator. 1-CKV-1-891-S and 1-CKV-1-892-S open to pass steam flow the Auxiliary Feedwater Pump 1A-S and close to prevent loss of steam generator inventory through a failed steam line or steam generator.

VII. **Impractical Requirement** - OM Standard, Part 10, paragraph 4.3.2.4(c) - As an alternative to the testing in (a) or (b) above, disassembly every refueling outage to verify operability of check valves may be used.

VIII. **Basis for Granting Relief** - Establishing conditions which will allow full flow operation of valves 1-CKV-3-861-B, 1-CKV-3-862-A, 1-CKV-3-921-B, and 1-CKV-3-922-A will require full flow from the steam driven auxiliary feedwater pump and one of the motor driven auxiliary feedwater pumps. This will result in water at ambient temperature being injected into each of two steam generators while the steam generator is at elevated temperatures. The thermal cycling caused by the addition of cold water to a hot steam generator nozzle is not desirable or conducive to long term operation. Therefore, valve disassembly in lieu of full flow exercising is desirable. However, the disassembly of all four valves each refueling is an excessive burden without a corresponding increase in safety. It is not practicable to establish conditions which will allow safely backseating 1-CKV-1-891-S and 1-CKV-1-892-S. Establishing conditions to allow backseat testing of 1-CKV-3-861-B, 1-CKV-3-862-A, 1-CKV-3-921-B, and 1-CKV-3-922-A would require making both a motor driven auxiliary feedwater pump and the turbine driven auxiliary feedwater pump inoperable. Since there is no means to isolate these valves from the steam generator, there is no practical method to pressurize the valves during shutdown conditions to allow testing.

IX. **Proposed Alternative** - Part stroke exercise valves 1-CKV-3-861-B, 1-CKV-3-862-A, 1-CKV-3-921-B, and 1-CKV-3-922-A to the open position in conjunction with cold shutdowns. Full stroke exercise of 1-CKV-1-891-S and 1-CKV-1-892-S to the open position is described in AF-08.

Additionally, group the valves into groups of not more than four. All valves in each group will be identical in: design, material and manufacture; environmental (including physical orientation) and radiological conditions; and function. Disassemble and inspect one valve from each group at each refueling in accordance with the provisions of Generic Letter 89-04, position 2. If any single valve is found unacceptable, all valves in the associated group will then be disassembled and inspected.

X. **Frequency of Proposed Alternative** - Exercising to the open position will be performed in conjunction with cold shutdowns not to exceed once per quarter in the event of frequent cold shutdowns. Disassemble and inspect at least one valve per lot of four at each refueling outage.

Table 4, Requests for Relief
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I. **Relief Request Number** - PV-08

II. **Affected System(s)** - Safety Injection

III. **Affected Component(s)** - 1-CKV-63-560-S, 1-CKV-63-561-S, 1-CKV-63-562-S, 1-CKV-63-563-S, 1-CKV-63-622-S, 1-CKV-63-623-S, 1-CKV-63-624-S, 1-CKV-63-625-S (1-47W811-1)

IV. **ASME Code Class** - 1

V. **Category** - AC-Active

VI. **Function of Affected Component(s)** - Opens to admit combined flow from the RHR pumps and the safety injection accumulators to the RCS during accidents involving loss of RCS pressure boundary integrity.

VII. **Impractical Requirement** - OM Standard, Part 10, paragraph 4.3.2.4(c) - "As an alternative to the testing in (a) or (b) above, disassembly every refueling outage to verify operability of check valves may be used.

VIII. **Basis for Granting Relief** - The accumulators are passive and of themselves do not have sufficient pressure to overcome RCS pressure and inject to the vessel. Furthermore, the only way to open the check valves without inducing an instantaneous RCS pressure drop is by opening the isolation valve associated with each accumulator after the reactor head has been removed. Due to the time (approximately 60 seconds) required to open the isolation valve, the accumulator will depressurize in such a manner that full flow will never be achieved even with a full pressure blowdown. The only means of part stroking the valves is through a 3/8 inch diameter flow restriction using the SIS pumps. The amount of flow achievable through this restriction is not deemed to be large enough to make any observation about the condition of a 10 inch diameter valve. Disassembling all eight valves each refueling presents a significant financial and scheduling burden.

IX. **Proposed Alternative** - Part stroke exercise valves 1-CKV-63-560-S, 1-CKV-63-561-S, 1-CKV-63-562-S and 1-CKV-63-563-S to the open position at the maximum flow available from RHR in conjunction with cold shutdowns. Group the valves into two groups of not more than four with all valves in each group being identical in: design, material and manufacture; environmental (including physical orientation) and radiological conditions; and function. Disassemble and inspect one valve from each group at each refueling in accordance with the provisions of Generic Letter 89-04, position 2. If any single valve is found unacceptable, all valves in the associated group will then be disassembled and inspected.

X. **Frequency of Proposed Alternative** - Part stroke 1-CKV-63-560-S, 1-CKV-63-561-S, 1-CKV-63-562-S and 1-CKV-63-563-S to the open position in conjunction with cold shutdowns not to exceed once per three months in the event of frequent cold shutdowns. Disassemble and inspect one valve per group at each refueling in accordance with Generic Letter 89-04, position 2.

Table 4, Requests for Relief
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I. **Relief Request Number** - PV-09

II. **Affected System(s)** - Essential Raw Cooling Water

III. **Affected Component(s)** - 0-CKV-67-502A-A, 0-CKV-67-502B-A, 0-CKV-67-502C-A, 0-CKV-67-502D-A, 0-CKV-67-502E-B, 0-CKV-67-502F-B, 0-CKV-67-502G-B, 0-CKV-67-502H-B (1-47W845-1)

IV. **ASME Code Class** - 3

V. **Category** - C-Active

VI. **Function of Affected Component(s)** - Valves open to admit air to pump column to allow the water trapped in the pump column to drain down. This avoids motor overcurrent as the pump tries to accelerate the column of water on a pump start. These are deep draft pumps which extend a considerable distance from the river elevation to the pump discharge head. Valves also close after releasing the air from the pump column to provide a flow boundary when the pump starts and water again reaches the pump discharge head.

VII. **Impractical Requirement** - OM Standard, Part 10, paragraph 4.3.2.4 - "Observation may be by observing a direct indicator such as changes in system pressure, flow rate, level, temperature, seat leakage testing or other positive means." Generic Letter 89-04 states in the first paragraph of Attachment 1, position 1, "A check valve's full stroke to the open position may be verified by passing the maximum required accident condition flow through the valve. This is considered by the staff as an acceptable full stroke. Any flow rate less than this will be considered a partial stroke exercise. A valid full stroke exercise by flow requires that the flow through the valve be known."

VIII. **Basis for Granting Relief** - There is no practical way to determine the flow rate through these small diameter valves during the venting of the pump column. The rules of OM Part 10 and the guidance of Generic Letter 89-04 were developed with liquid flow in mind and not compressible gaseous flow. Attempting to measure an air flow rate this small will result in very inaccurate and unrepeatable results. The techniques developed for field measurement of compressible gaseous flow lend themselves to the measurement of much larger quantities through a much larger ducting system.

Additionally, the nature of the flow through these valves is such that it will not be at a steady state long enough to quantify. The flow will rapidly accelerate to a maximum, then steadily decrease as the driving force of the water column level above the river elevation decreases.

IX. **Proposed Alternative** - Full stroke exercise the valve to the closed position each pump test. Verify when the pump is shut off that the valve opens and the pump column vents. Flow through the check valve will not be measured.

X. **Frequency of Proposed Alternative** - Once per quarter.

Table 4, Requests for Relief
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I. **Relief Request Number** - PV-10

II. **Affected System(s)** - Essential Raw Cooling Water

III. **Affected Component(s)** - 1-CKV-67-508A-A, 1-CKV-67-508B-B, 2-CKV-67-508A-A, 2-CKV-67-508B-B (1-47W845-1)

IV. **ASME Code Class** - 3

V. **Category** - C-Active

VI. **Function of Affected Component(s)** - Normally open valve that closes to provide flow boundary isolation when the backup train cooling water is used to cool the diesels.

VII. **Impractical Requirement** - OM Standard, Part 10, paragraph 4.3.2.4(c) - "As an alternative to the testing in (a) or (b) above, disassembly every refueling outage to verify operability of check valves may be used.

VIII. **Basis for Granting Relief** - The installed configuration of these valves does not provide for any sort of testing of the back seat or closing function. Disassembling all four valves each outage imposes an unreasonable burden.

IX. **Proposed Alternative** - Group the valves into groups of not more than four with all valves in each group being identical in: design, material and manufacture; environmental (including physical orientation) and radiological conditions; and function. Disassemble and inspect one valve from each group at each refueling in accordance with the provisions of Generic Letter 89-04, position 2. If any single valve is found unacceptable, all valves in the associated group will then be disassembled and inspected.

X. **Frequency of Proposed Alternative** - Disassemble and inspect one valve per group at each refueling in accordance with Generic Letter 89-04, position 2, to verify the backseating function.

Table 4, Requests for Relief
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I. **Relief Request Number** - PV-11

II. **Affected System(s)** - Component Cooling

III. **Affected Component(s)** - 1-CKV-70-681A, 1-CKV-70-681B, 1-CKV-70-681C, 1-CKV-70-681D, 1-CKV-70-682A, 1-CKV-70-682B, 1-CKV-70-682C, 1-CKV-70-682D (1-47W859-2)

IV. **ASME Code Class** - 3

V. **Category** - C-Active

VI. **Function of Affected Component(s)** - Closes to prevent overpressurization of piping from the last check valve back to the containment penetration.

VII. **Impractical Requirement** - OM Standard, Part 10, paragraph 4.3.2.4(c) - "As an alternative to the testing in (a) or (b) above, disassembly every refueling outage to verify operability of check valves may be used."

VIII. **Basis for Granting Relief** - The installed configuration of these valves does not provide for any sort of testing. The valve function can be verified for one of the two series valves, but there is no way to determine which valve is functioning or whether both valves are operational. Disassembling all eight valves each outage imposes an unreasonable burden.

IX. **Proposed Alternative** - Group the valves into groups of not more than four with all valves in each group being identical in: design, material and manufacture; environmental (including physical orientation) and radiological conditions; and function. Disassemble and inspect one valve from each group at each refueling in accordance with the provisions of Generic Letter 89-04, position 2. If any single valve is found unacceptable, all valves in the associated group will then be disassembled and inspected.

X. **Frequency of Proposed Alternative** - Disassemble and inspect one valve per group at each refueling in accordance with Generic Letter 89-04, position 2.

Table 4, Requests for Relief
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I. **Relief Request Number** - PV-12

II. **Affected System(s)** - Component Cooling and Chemical/Volume Control Systems

III. **Affected Component(s)** - 1-RFV-70-539-S (1-47W859-1), 1-RFV-62-1079 and 2-RFV-62-1079 (1-47W809-3)

IV. **ASME Code Class** - 2 and 3

V. **Category** - C-Active

VI. **Function of Affected Component(s)** - Opens to relieve vacuum in their associated tanks.

VII. **Impractical Requirement** - OM Standard, Part 1, paragraph 1.4.1.2 - "Test equipment and readability accuracy of same, inclusive of gages, transducers, load cells, assist devices, calibration standards, etc., used in conjunction with determination of valve set pressure shall have an overall combined accuracy within +2% to -1% at the pressure level of interest. The measure set pressure must comply with the tolerance limits specified in the appropriate acceptance criteria sections: paras. 1.3.3.1(d), 1.3.4.1(d), 4.1.1.9, 4.1.2.9, 4.1.3.8, 8.1.1.9, 8.1.3.9 and 8.1.3.8. The effect of the overall combined accuracy specified above is that the limits of the actual set pressure may be 1% above to 2% below the indicated (measured) set pressure."

OM Standard, Part 1, paragraph 8.1.2.2 - "There shall be a minimum accumulator volume below the valve inlet, based on the valve capacity (cu ft) and calculated from the following formula: minimum volume = (valve capacity [cubic ft per sec] X time open [seconds])/10."

VIII. **Basis for Granting Relief** - The valves installed as vacuum relief valves are very similar in design to a spring loaded check valve. Their operation is a function of the pressure exerted of the difference in pressure forces acting on the two sides of the disc or the 'pallet' as the valve manufacturer calls it. The force which causes this valve to open corresponds to an approximate pressure differential of 0.15 psi. This is a very small differential pressure and would be very difficult to establish, control and measure to the accuracy required by OM-1. The manufacturer's recommended method of verifying proper operation of this valve is to measure via a force gage the additional force necessary to cause the valve pallet to move from the full closed condition with no differential pressure present across the valve. This force is to be within the specified range. The tools used to measure this force are calibrated to 1% accuracy. Although this is within the absolute tolerance required by the reference paragraph of OM-1, the measurement is of the force required to open the valve and not the pressure at which it opens.

Additionally, since the setpoint is verified without causing fluid to flow through the valve, the requirement for a minimum accumulator volume during testing is not applicable.

IX. **Proposed Alternative** - Establish the valve's setpoint and verify proper operation using the manufacturer's recommended technique of determining within 1% the force required to cause the pallet to move off its seat.

X. **Frequency of Proposed Alternative** - As specified in OM-1.

Table 4, Requests for Relief
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I. **Relief Request Number** - PV-13

II. **Affected System(s)** - Containment Spray

III. **Affected Component(s)** - 1-CKV-72-506-A, 1-CKV-72-507-B, 1-CKV-72-524-A, 1-CKV-72-525-B, 1-CKV-72-548-A, 1-CKV-72-549-B, 1-CKV-72-562-A, 1-CKV-72-563-B (1-47W812-1)

IV. **ASME Code Class** - 2

V. **Category** - C-Active

VI. **Function of Affected Component(s)** - Open to pass water from either the Containment Spray or the Residual Heat Removal pumps to the Containment Spray or RHR ring headers. Valves 1-CKV-72-506-A and 1-CKV-507-B also close to provide a flow boundary during operation with suction coming from the containment sump.

VII. **Impractical Requirement** - OM Standard, Part 10, paragraph 4.3.2.4(c) - "As an alternative to the testing in (a) or (b) above, disassembly every refueling outage to verify operability of check valves may be used."

VIII. **Basis for Granting Relief** - Exercising valves 1-CKV-72-548-A, 1-CKV-72-549-B, 1-CKV-72-562-A, 1-CKV-72-563-B with water will result in deluging the containment area with borated water, introducing an unnecessarily hazardous problem with physical damage to auxiliary equipment and unreasonably prolonged cleanup efforts. Exercising with air during operation introduces the potential of inadvertently causing a unit trip, safety injection system actuation, phase B containment isolation and containment spray actuation by exceeding the high-high containment pressure set point due to the volume of air blown into containment during testing of the check valves.

Valves 1-CKV-72-506-A, 1-CKV-72-507-B, 1-CKV-72-524-A, and 1-CKV-72-525-B cannot be full stroke exercised because the largest flow path available, a 6 inch line back to the Refueling Water Storage Tank, will not pass the minimum required accident flow (maximum recirculation flow available of ≈3950 GPM vs. a minimum required accident flow of 4000 gpm). Therefore there is not a flow path available outside containment that allows full stroke exercising. these valves.

Exercising in conjunction with cold shutdowns is impractical due to the length of time required to drain and refill the piping from the test point to the check valves. Disassembly of all four valves each refueling outage is an excessive burden.

IX. **Proposed Alternative** - Full stroke exercise valves 1-CKV-72-506-A and 1-CKV-72-507-B to the closed position quarterly. Part stroke open exercise valves 1-CKV-72-506-A, 1-CKV-72-507-B, 1-CKV-72-524-A, and 1-CKV-72-525-B once per quarter during the pump test. Additionally, group the valves into groups not larger than four with all valves in each group being identical in: design, material and manufacture; environmental (including physical orientation) and radiological conditions; and function. Disassemble and inspect one valve from each group at each refueling in accordance with the provisions of Generic Letter 89-04, position 2. If any single valve is found unacceptable, all valves in the associated group will then be disassembled and inspected.

X. **Frequency of Proposed Alternative** - Full stroke exercise valves 1-CKV-72-506-A and 1-CKV-72-507-B to the closed position quarterly. Part stroke open exercise valves 1-CKV-72-506-A, 1-CKV-72-507-B, 1-CKV-72-524-A, and 1-CKV-72-525-B once per quarter during the pump test. Disassemble and inspect one valve per group at each refueling in accordance with Generic Letter 89-04, position 2, to verify its continued operability.

Table 4, Requests for Relief
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I. **Relief Request Number** - PV-14

II. **Affected System(s)** - Auxiliary Feedwater

III. **Affected Component(s)** - 1-CKV-3-644, 1-CKV-3-645, 1-CKV-3-655, 1-CKV-3-656, 1-CKV-3-670, 1-CKV-3-679 (1-47W803-1)

1-CKV-3-830-B, 1-CKV-3-831-A, 1-CKV-3-832-A, 1-CKV-3-833-B, 1-CKV-3-871-S, 1-CKV-3-872-S, 1-CKV-3-873-S, and 1-CKV-3-874-S (1-47W803-2)

IV. **ASME Code Class** - 2

V. **Category** - C-Active

VI. **Function of Affected Component(s)** - The valves shown on drawing 1-47W803-1 close to prevent loss of steam generator inventory into the containment during certain feedwater line breaks. The valves shown on drawing 1-47W803-2 open to pass auxiliary feedwater flow to their respective steam generator and close to provide flow boundary isolation.

VII. **Impractical Requirement** - OM Standard, Part 10, paragraph 4.3.2.4(c) - "As an alternative to the testing in (a) or (b) above, disassembly every refueling outage to verify operability of check valves may be used.

VIII. **Basis for Granting Relief** - The installed configuration of these valves does not provide for testing of the back seat or closing function without making multiple trains of equipment inoperable. The valve opening function for those valves having an opening function can be verified, but the closing function cannot be positively determined without adversely affecting both the steam driven auxiliary feedwater pump and one of the two motor driven pumps. Disassembling all fourteen valves each outage imposes an unreasonable burden.

IX. **Proposed Alternative** - Group the valves into groups of not more than four with all valves in each group being identical in: design, material and manufacture; environmental (including physical orientation) and radiological conditions; and function. Disassemble and inspect one valve from each group at each refueling in accordance with the provisions of Generic Letter 89-04, position 2. If any single valve is found unacceptable, all valves in the associated group will then be disassembled and inspected.

X. **Frequency of Proposed Alternative** - Disassemble and inspect one valve per group at each refueling in accordance with Generic Letter 89-04, position 2, to verify the backseating function. Test the valves to open once per quarter.

Table 4, Requests for Relief
Page 15a of 15

I. **Relief Request Number** - PV-15

II. **Affected System(s)** - Essential Raw Cooling Water, Reactor Coolant System

III. **Affected Component(s)** - 0-FSV-67-1221-A (1-47W845-4) 0-FSV-67-1223-B (1-47W845-7) 1-FSV-68-396-B, 1-FSV-68-397-A (1-47W813-1)

IV. **ASME Code Class** - 3 (System 67), 1 (System 68)

V. **Category** - B-Active

VI. **Function of Affected Component(s)** - System 67 valves open to admit cooling water to the jackets of the auxiliary air compressors. System 68 valves are the Reactor Coolant head vent valves and open to vent non-condensible gases and H^2 following an accident.

VII. **Impractical Requirement** - OM Standard, Part 10, paragraph 4.2.1.4(b), "The stroke time of all power operated valves shall be measured to at least the nearest second."

VIII. **Basis for Granting Relief** - The System 67 valves are totally enclosed, solenoid actuated valves that are not provided with position indicators. The only means of cycling the valves is by starting and stopping the auxiliary air compressors. The valves open when the compressor starts and close after the compressor stops. Additionally, the valves are installed in series with a thermostat that will not pass flow until the jacket water temperature reaches a predetermined level some time after starting of the air compressor. Therefore, the valve cannot be timed by observing flow through the valve since flow will not begin when the valve opens, but when the air compressor water jacket reaches a preset temperature. WBN has attempted to detect valve operation via an accelerometer mounted on the valve, a stethoscope, and by using ultrasonic test equipment to determine and observe valve obturator position as discussed in the paper presented by Joseph Ondish at the Second NRC/ASME Symposium on Pump and Valve Testing and contained in section 2A of NUREG/CP-0123. None of these methods have been capable of determining valve stroke time.

The System 68 valves are totally enclosed, solenoid actuated Target Rock valves. The only means of cycling these valves is by a hand-indicating controller located in the Main Control Room. This controller has a variable setpoint that is actuated by a thumbwheel. Additionally, the valves are administratively limited to a stroke time of not less than 5 seconds to prevent the introduction of a water hammer event to the system. Since the stroke time is totally dependant upon the rapidity with which the operator operates the thumbwheel and is administratively limited to not less than 5 seconds, the stroke time measured is not indicative of valve condition. Rather it is indicative of the time the operator takes to run up the thumbwheel. Therefore, stroke time testing is not practicable.

IX. **Proposed Alternative** - Exercise the System 67 valves through a full cycle of travel once per quarter, exercise the System 68 valves through a full cycle of travel during shutdowns and replace the valves once every five years. This alternative is discussed in paragraph 4.2.8 of NUREG 1482.

X. **Frequency of Proposed Alternative** - Exercise the System 67 valves through a full cycle of travel once per quarter, exercise the System 68 valves through a full cycle of travel during shutdowns, and replace the valve once every five years.

SOURCE NOTES

Page 1 of 1

1. WBPER 950066 and NRC IFI 95-05-01.
2. WBPER 940234, NCO 940238001, and VIO 390/94-42-03
3. WBPER 950067
4. WBPER 950417

ENCLOSURE 2
Revisions made to Revision 2

1. The following changes have been made in the narrative description:

   a. Information has been added to paragraph 2.1 to implement the minimum reference value requirement on a case by case basis after considering the pump manufacturer's recommendations on acceptable vibration levels. This change is also reflected in the proposed alternative for relief request PV-01.

   b. Information has been added to paragraph 2.2 to implement the requirement to test the boric acid transfer pumps once per refueling cycle at full flow utilizing a flow path that contains instruments meeting the requirements of the Code. This information is also reflected in the proposed alternative of relief request PV-03.

   c. Information has been added to paragraph 2.2 describing the inclusion of the chilled water circulation pumps in relief request PV-03. These pumps were included in the relief request on revision 2, but the inclusion was not reflected in the narrative discussion.

   d. The discharge check valves associated with the Essential Raw Cooling Water (ERCW) Screen Wash Pumps have been specifically included in paragraph 2.3 and in relief request PV-04. These valves were implied previously, but were not specifically identified as part of the relief request. This change specifically includes them.

   e. Information has been added to paragraph 3.1 describing the basis for testing thermal relief valves that do not have an accident mitigation function, are not required to achieve the cold shutdown condition or are not required to maintain the cold shutdown condition. These valves are included in the Augmented IST program, but are not included in the IST program.

   f. Editorially revised paragraph 3.2 to clarify that the requirements of OM-1 do not apply to the thermal expansion check valves.

   g. Revised paragraph 3.3 to address the requirements of OM-6, paragraph 6.2, rather than OM-10, paragraph 4.2.1.9(b).

   h. Revised paragraph 3.4 to reflect the basis for not including the diesel fuel oil pumps and air start valves in the IST program. These valves and pumps are included in the Augmented IST program.

   i. Editorially revised paragraph 3.6 to clarify that passive valves having leak test requirements are included in the WBN IST program.

   j. Revised 3.9 to reflect that safety and relief valve testing will be performed in accordance with OM-1 and removed reference to Relief Request PV-06 which has been withdrawn.

k. Revised paragraph 3.11 to reflect the revision to the proposed alternative for relief request PV-09. The original alternative has been attempted and determined to be subjective in its application. Therefore, the original alternative is being altered.

l. Paragraph 3.14 has been added to address the fact that solenoid valves that serve as pilot valves for diaphragm operated valves are considered part of the operator of the diaphragm valve and are not tested separately from the diaphragm.

2. The list of abbreviations and system numbers has been updated and standardized with other WBN procedures. This change is reflected throughout the program description.

3. The following changes have been made in Table 2, Summary Listing of Valves:

a. The requirement to part stroke test the main steam isolation valves has been removed and Alternate Frequency Justification AF-01 has been revised accordingly.

TVA submittal dated October 27, 1981 committed to periodically perform a 10% part stroke exercise of the MSIVs during normal power operation. Performance of part stroke exercising of the MSIVs has been a problem with the industry. Even though the valve only goes closed approximately 10 percent, the transient introduced to stable unit operation is severe. Utilities have actually tripped the unit during performance of this test. The currently accepted Standard Technical Specifications contain a note stating the part stroke exercising of the MSIVs during plant operation is not recommended. This note is also referenced in paragraph 4.2.4 of NUREG 1482. Due to the problems experienced at other utilities and to the information contained in NUREG 1482, WBN no longer plans to perform a part stroke exercise of the MSIVs during operation.

b. A requirement to full stroke exercise the main steam power operated relief valve manual isolation valves in conjunction with cold shutdowns has been added.

c. Feedwater check valves 1-CKV-3-644, 1-CKV-3-645, 1-CKV-3-655, 1-CKV-3-656, 1-CKV-3-670, and 1-CKV-3-679 have been added to the program. These valves were originally viewed as being open before an accident and remaining open after an accident at reduced flow. However, it has been determined that under certain assumptions involving a break in the feedwater line, these valves are required to close. Therefore, they have been added to the program.

d. A clarifying note has been added to the "ACTR" column for 1-FCV-1-51-S to clarify that this valve has two actuators, one for the opening and normal closing function and one for the emergency closing function.

e. The requirement to full stroke valves 1-CKV-3-861-B, 1-CKV-3-862-A, 1-CKV-3-921-B, and 1-CKV-3-922-A to the closed position in conjunction with cold shutdowns has been removed. TVA has determined that this test would have to be performed

in mode 3 and performance of the test would cause a loss of two trains of auxiliary feedwater. Therefore, disassembly, which was already planned, is being performed in lieu of full stroke exercising to the closed position during cold shutdowns.

f. The "APOSI" [accident position] of valves 1-PCV-3-122 and 1-PCV-3-132 has been changed to open and a full stroke exercise on a quarterly basis has been added.

g. Valves 1-FCV-26-241-B, 1-FCV-26-242-A, 1-FCV-26-244-B and 1-FCV-26-245-A have been deleted from the IST Program. These valves were previously being tested due to their function to provide secondary containment isolation [isolation of the containment annulus]. Design Change Notice [DCN] M-36871-A removed the containment isolation signal from these valves, removed power from the valves, placed them in the open position, and qualified the piping downstream of the valves to perform the function previously being performed by closure of the valves on a containment isolation signal. Since the valves are no longer required to or capable of changing position and since the DCN also removed power from the valve position indicators, these valves are now considered B-passive and have no accident function requiring testing.

h. References to request for relief PV-06, which has been withdrawn, have been removed from the table.

i. Valve 1-CKV-33-794 has been removed from the program. It was determined that this valve is not utilized to meet the requirements of 10 CFR 50, Appendix J. The subject valve is installed on one end of a containment penetration, but the other end of the penetration is equipped with a blind flange having double O-ring seals. Credit is taken for the blind flange and the O-ring seals, which are tested as part of the 10 CFR 50, Appendix J program, rather than the check valve.

j. The type actuator installed on several of the System 43 valves and one System 59 valve has been undated to reflect the current plant design.

k. Valves 1-FCV-68-307-A and 1-FCV-68-308-B, shown on drawing 1-47W625-8, have been relocated to appear in Table 2. These valves are associated with the sampling system and are shown on a sampling system drawing. However, they bear a system 68 designator and have been moved to appear with the other system 68 valves in order to make locating them with in the table easier.

l. Valves 1-FCV-62-84-A and 1-CKV-62-661-S have been removed from the IST program and added to the Augmented IST program. It has been determined that the function of these valves, opening to admit auxiliary spray to the pressurizer on a high pressure condition, is not an accident mitigation function, is not required to achieve the cold shutdown condition, and is not required to maintain the cold shutdown condition. Therefore, the valves are out of the scope of the IST program. In recognition of the valve's important function to stable unit operation, they have been added to the Augmented IST program.

m. Valves 1-FCV-62-69-A and 1-FCV-62-70-A have been removed from the IST program and added to the Augmented IST program. It has been determined that the function of these valves, closing on a low level in the pressurizer to isolate letdown, is not required to mitigate the consequences of an accident, is not required to achieve the cold shutdown condition, and is not required to maintain a cold shutdown condition. Therefore, the valves are out of the scope of the IST program. In recognition of the valve's important function to stable unit operation, they have been added to the Augmented IST program.

n. The proposed frequency for full stroke exercising 1-FCV-62-1228-A and 1-FCV-62-1229-B has been added to the existing alternative frequency justification in AF-16. The subject valves are electrically interlocked with the valves listed in AF-16 in such a manner that cycling the subject valves without cycling the valves identified in AF-16 results in loss of control power to the valve position indicating lights. Thus the ability to stroke time the valves is also lost. These valves will be full stroke exercised with the associated valves identified in AF-16.

o. Valves 2-RFV-62-955 and 2-RFV-62-1079 have been added to the program. These valves provide overpressure protection to the Unit 2 holdup tank in the Chemical and Volume Control System. It has been determined that this tank will be utilized for Unit 1 operation.

p. Valve 1-FCV-63-177-A has been deleted from the IST Program. This valve is normally aligned in the open position and remains open for accident conditions. Since the valve is not required to close, it is no longer considered active and has been removed from the program.

q. Valve 1-FCV-63-185 has been moved from the Augmented IST program to the IST Program because of the addition of a containment isolation signal to the valve. This valve is normally closed, but may be opened under certain circumstances. Although the line associated with the valve is qualified as closed outside containment and thus does not require seat leakage testing, the valve is now required to close. Therefore it has been moved from the Augmented Program to the IST Program.

r. The valves shown on drawing 1-47W830-6 have been relocated within Table 2 after the valves shown on 1-47W811-1. Although the valves are shown on a Waste Disposal System (System 77) drawing, their unique identifiers (UNIDs) designate the valves as Systems 63 and 68. Previously, the two check valves (1-CKV-68-849 and 1-CKV-63-868) had UNIDs that indicated they were part of the Waste Disposal System. With the change to System 63 and 68 UNIDs, there was no longer any logical reason to leave the valves listed with the other System 77 valves. This change is intended to make location of the valves easier for the program user.

s. A DCN was issued that alters the normal alignment of several ERCW valves to minimize the use of Thermalag insulation. This DCN alters the alignment to the emergency diesel generators so that one of the two valves supplying cooling water to each

diesel generator is now normally open with the valve's power supply opened and locked. This removes the requirement to stroke time test valves 1-FCV-67-66-A, 1-FCV-67-67-B, 2-FCV-67-66-A, and 2-FCV-67-67-B since they are now normally open. Additionally, this alters the testing requirements for the check valves 1-CKV-67-508A-A, 1-CKV-67-508B-B, 1-CKV-67-513A-A, 1-CKV-67-513B-B, 2-CKV-67-508A-A, 2-CKV-67-508B-B, 2-CKV-67-513A-A, and 2-CKV-67-513B-B associated with the diesel heat exchangers for the same reasons. This change also altered the alignment to the CCS/ERCW heat exchangers so that the 1A heat exchanger is now fed from the A train header. This eliminated the need for the heat exchanger to realign from the B train header to the A train header on a loss of Train B electrical power. The affected valves have been placed in their accident required position and power has been removed from the breaker. This eliminated the active function of 0-FCV-67-151-A, 1-FCV-67-146-A, 1-FCV-67-223-A, 1-FCV-67-458-A, 1-FVC-67-478-B, 2-FCV-67-143, 2-FCV-67-223-A. These valves have accordingly been removed from the IST Program.

t. Reference to Relief Request PV-04 has been added to the ERCW Screenwash Pump Check valves as discussed in item 1.d above.

u. The direction of testing valve 1-FCV-67-143 has been changed to indicate that this valve will be stroke timed in both directions. The subject valve travels to an intermediate position upon receipt of a safety injection signal. The direction of travel to this position will depend upon the initial position of the valve prior to the accident. Since the exact position of the valve can not be determined, the subject valve will be stroke timed in both directions.

v. Valves 1-TCV-67-84-A, 1-TCV-67-92-A, 1-TCV-67-100-B, and 1-TCV-67-108-B have been removed from the program. They originally included a position verification test since they were believed to have been included in the containment temperature analysis for the Main Steam Line Break accident. However, the portion of the system included in the analysis is the fans and their associated ductwork, not the cooling water side of the system. In fact, the coils supplied by these temperature control valves are not qualified for pressure boundary integrity after a seismic event. Since the valves are not included in the accident analysis, and since they are normally isolated upon receipt of a containment isolation signal, they are not considered to be required to mitigate an accident, achieve the cold shutdown condition or maintain the cold shutdown condition. Therefore, the valves have been removed from the IST Program.

w. The UNIDs for 0-FSV-32-61-A and 0-FSV-32-87-B have been changed to 0-FSV-67-1223-B and 0-FSV-32-1221-A. Additionally, since no means has been identified that allows stroke timing of these valves, request for relief PV-15 has been added to provide an alternative means of ensuring continued valve operability.

x. Valve 1-FCV-70-153-B has been removed from the IST Program. In order to provide for a flow path for Train B of the Component Cooling System with only Unit 1 in service, this

valve has been placed in the open position and disabled (power removed from the breaker). Since the function of the valve originally was to open to provide cooling water to the Residual Heat Exchanger and since the valve is now normally aligned in the open position with power removed from the valve, the active function for this valve has ceased to exist. Therefore, the valve has been removed.

y. During preparation of implementing instructions, it was discovered that the recirculation test line for the Containment Spray Pumps will not allow the pumps to develop full flow. Although these pumps are capable of reaching 4000 gallons per minute (gpm) through the spray headers during an accident the size of the recirculation test line limits flow to 3850-3950 gpm. Therefore, since this is the only means to test the pumps, the associated check valves cannot be full stroke exercised. These valves 1-CKV-72-506-A, 1-CKV-72-507-B, 1-CKV-72-524-A and 1-CKV-72-525-B have been added to existing relief request PV-13 which documents the inability to full stroke exercise valves in the Containment Spray System.

z. The direction of travel of 1-FCV-72-34-A has been changed to show that this valve is required to open, not travel to both positions. The subject valve's function is identical to that of 1-FCV-72-13-B. Both valves are minimum flow recirculation valves providing minimum flow protection to the Containment Spray Pumps and accordingly are required to open. 1-FCV-72-13-B already indicated this and 1-FCV-72-34-A has been revised to match.

aa. Valves 1-RFV-72-40 and 1-RFV-72-41 have been added to prevent hydraulic lock of their associated FCVs. As a result these valves have been added to the IST program to periodically have their set point verified.

bb. Valves 1-FCV-74-16 and 1-FCV-74-28 have been removed from the IST program. These valves are normally aligned in the open position and are not permitted to be altered from position during operation. Since the function of the valves is to remain open to pass RHR flow to the vessel, these valves are not considered to have an active function and have been removed from the IST Program.

cc. Valves 1-CKV-3-820-A and 1-CKV-3-821-B have been deleted in response to DCN M-38209-A which removed the internals (disk) from the valves and left the bodies in place.

dd. Valves 1-FSV-68-396-B and 1-FSV-68-397-A have been determined to be incapable of stroke timing in a manner that gives results indicative of valve condition. These valves are controlled by a manual controller that responds to the position of a thumbwheel. The valves are also administratively restricted to a stroke time not less than five seconds. Therefore, since the only means to cycle the valve is by manually running the thumbwheel up, and the valve is administratively restricted to stroke in not less than five seconds, the stroketime measured would be indicative of how fast the operator chose to move the thumbwheel and not of the condition of the valve. These valves have been included in Request for Relief PV-15 noting they cannot be stroke timed

and proposing periodic replacement of the valve as an alternative.

ee. Valves 1-FCV-67-22-A, 1-FCV-67-24-B, 1-FCV-67-81-A, 1-FCV-67-82-B, 1-FCV-67-147-T, 2-FCV-67-22-A, 2-FCV-67-24-B, 2-FCV-67-81-A, 2-FCV-67-82-B, 2-FCV-67-147-T, 1-FCV-70-2-A, 1-FCV-70-3-B have been deleted. These valves do not have an accident mitigation function and are not required to achieve or maintain cold shutdown. Therefore, they have been removed from the program. This change also resulted in deletion of Alternate Frequency Justification (AF)-30 for 1-FCV-70-2-A and 1-FCV-70-3B.

4. The following changes have been made to Table 3, Alternative Frequency Justifications:

   a. Throughout the table, the direction of testing of valves [e.g., to the closed position or to the open position] has been added for clarification.

   b. The requirement to part stroke the MSIVs has been removed from AF-01 as discussed in item 3.a above.

   c. The description of the normal function of the main steam line warming valves has been removed from AF-03. The description of the accident mitigation function remains.

   d. The manual isolation valves for the Steam Generator PORVs have been added to AF-04.

   e. AF-12 has been withdrawn since the valves associated with it have been moved from the IST Program to the Augmented IST Program as discussed in item 3.l above.

   f. Valves 1-FCV-62-69-A and 1-FCV-62-70-A have been removed from AF-15 since the valves associated with it have been moved from the IST Program to the Augmented IST Program as discussed in item 3.m above.

   g. AF-16 has been revised to reflect the inclusion of valves 1-FCV-63-1228-A, and 1-FCV-63-1229-B as discussed in item 3.n above.

   h. AF-18 has been revised to clarify the specific testing frequency for valves 1-CKV-74-544-A and 1-CKV-74-545-B. These valves can be tested during normal operation, but cannot be tested during shutdown conditions.

   i. AF-27 has been withdrawn since the valves associated with it have been removed from the IST program as discussed in item 3.v above.

   j. The UNIDs for the valves contained in AF-33 has been updated to reflect the currently correct UNID.

5. Table 5, Requests For Relief, has been changed as follows:

   a. PV-01 has been revised to reflect a requirement to consider the pump manufacturer's requirements when utilizing a minimum

vibration reference value of 0.1 ips.

b. PV-03 has been revised to reflect a requirement to perform a full flow test of the boric acid transfer pumps once per refueling cycle utilizing instrumentation that meets the range and accuracy requirements of the Code.

c. PV-04 has been revised to reflect the inclusion of the ERCW Screen Wash Pump discharge check valves in the relief request.

d. PV-06 has been withdrawn.

e. PV-07 has been revised to reflect the inability to full stroke exercise valves 1-CKV-3-861-B, 1-CKV-3-862-A, 1-CKV-3-921-B, and 1-CKV-3-922-A to the closed position.

f. PV-09 has been revised to reflect the inability to repeatably identify the point at which flow through the ERCW pump air release check valve ceases.

g. PV-10 has been revised to reflect that valves 1-CKV-67-513A-A, 1-CKV-67-513B-B, 2-CKV-67-513A-A, and 2-CKV-67-513B-B are no longer required to close and therefore do not require disassembly. This change is part of the changes due to realignment of the flow control valves in the ERCW system discussed in item 3.s above.

h. PV-12 has been revised to reflect the inclusion of vacuum relief valve 2-RFV-62-1079 in the Unit 1 IST program.

i. PV-13 has been revised to address the recently identified inability to full stroke exercise the check valves in the Containment Spray system that are not in the flow path back to the RWST.

j. PV-14 has been revised to reflect the inclusion of valves 1-CKV-3-644, 1-CKV-3-645, 1-CKV-3-655, 1-CKV-3-656, 1-CKV-3-670 and 1-CKV-3-679 in the IST Program.

k. PV-15 has been added to reflect the inability to stroke time test valves 0-FSV-67-1221-A, 0-FSV-67-1223-B, 1-FSV-68-396-B, and 1-FSV-68-397-A.

ENCLOSURE 3

The following includes TVA's response to the NRC reviewer's request, by letter dated August 25, 1994, for additional information relative to Revision 2 of the WBN IST Program.

NRC Question No.1

"The IST program does not include a description of how the components were selected and how testing requirements were identified for each component. The program does not include verification that all pumps and valves within the scope of 10 CFR 50.55a and Section XI, and does not ensure that all applicable testing requirements have been identified. Therefore, the applicant is requested to include this information in the IST program. The program should describe the development process, such as a listing of the documents used, the method of determing the selection of components, the basis for the testing required, the basis for categorizing valves, and the method or process used for maintaining the program current with design modifications or other activities performed under 10 CFR 50.59."

TVA Response

A formal component specific basis document is being prepared and will be issued prior to return to power following the first refueling outage. The following information is being provided to address the reviewer's question on a generic basis. The WBN IST program was developed on a system and component specific functional basis. WBN Design Criteria WB-DC-40-64, *Design Basis Events Design Criteria*, provides a listing of accidents considered for WBN, identifies the systems required to mitigate the consequences of those accidents, and identifies the specific function each such system is required to perform. From the listing contained in this Design Criteria, systems which met the requirements of NRC Regulatory Guide 1.26 for consideration as Code Class 1, 2, or 3 and which contained pumps and valves were selected for further consideration.

The System Descriptions for these systems were then reviewed to determine how each system operates to perform the function identified in WB-DC-40-64. This review identified those portions of the systems that needed to be considered for inclusion in the IST Program. The portions of the systems reviewed range from 100 percent of the system (for example, the Containment Spray System which has no function other than accident mitigation) to a smaller portion (for example, the Chemical and Volume Control System, which has accident mitigation functions and safe shutdown functions that require inclusion in addition to routine operational functions that do not require inclusion).

The portion of the system that performed a required function (accident mitigation or achieving/maintaining the cold shutdown condition) was further reviewed utilizing the System Descriptions, General Operating Instructions, Abnormal Operating Instructions, and Emergency Operating Instructions. In addition, the system flow diagrams were reviewed to identify the pumps and valves that performed an active function including also those passive valves that performed a function that required testing, such as maintenance of seat leakage integrity or position indication.

Those valves that were required to change position to fulfill their function were designated active. Valves required to maintain position, but were not required to change position [i.e., to remain closed to provide flow path integrity or to remain open to allow

flow to pass through them] were designated as passive. This population of valves was reviewed to determine whether a requirement for seat leakage integrity existed. Those valves for which seat leakage integrity requirements existed were then categorized as category A. Other valves were categorized as category B, C, or D based on the type of valve. With the categorizations completed in this manner, the testing requirements were then identified from Table 1 of OM-10.

Pumps required to function to fulfill a specific function to mitigate the consequences of an accident, to achieve the cold shutdown condition, or to maintain the cold shutdown condition were designated active and testing provisions identified in OM-6 were addressed for each pump.

NRC Question No. 2

"Sections 3.1 and 3.2 of the IST program indicate that thermal relief valves and thermal relief check valves are not included in the program. The Operations and Maintenance (O&M) Committee has indicated that the requirements of Part 1 of the O&M Code (and previous editions of OM-1) apply to pressure relief devices required for overpressure protection. For those thermal relief valves and thermal relief check valves, the applicant should review the function. If any of these valves are required for overpressure protection, as defined by OM-1, they should be in the IST program and tested in accordance with OM-1."

TVA Response

Paragraph 1.1 of OM-10 states in part, "The pressure-relief devices covered are those for protecting systems or portions of systems which perform a required function in shutting down a reactor to the cold shutdown condition, in maintaining the cold shutdown condition, or in mitigating the consequences of an accident." The WBN Inservice Testing Program includes within its scope those pressure-relief devices that are required to function during accident conditions, those required to function to shut down the reactor, and those required to function to maintain the cold shutdown condition. The additional pressure-relief devices that are installed at WBN on Code systems that are not required to function to mitigate the consequences of an accident, to achieve the cold shutdown condition or to maintain the cold shutdown condition are deemed to be outside the scope of the ASME XI Inservice Testing Program mandated by 10 CFR 50.55a. These valves function to protect equipment that is isolated, shutdown or in stand by. In recognition of their safety function and of the requirement of 10 CFR 50, Appendix B to test plant equipment to a level commensurate with its safety function, these valves are included in the WBN Augmented Inservice Testing Program. This program utilizes the requirements of OM-1 for periodic testing of these valves.

The term "thermal relief check valves" is misleading. These valves are not pressure relief devices and are not subject to the testing described in OM-1. They are check valves, not safety or relief valves. To avoid confusion with pressure relief devices subject to testing in accordance with OM-1, the Inservice Testing Program has been revised to refer to these as Thermal Expansion Check Valves.

NRC Question

"Also, there is no type "C-passive" identified in Table 1, "Inservice Test Requirements," of OM-10."

TVA Response

OM-10, paragraph 1.3, defines passive valves as being "valves which maintain obturator position and are not required to change obturator position to accomplish the required function(s), as specified in paragraph 1.1." OM-10, paragraph 1.4(c) defines Category C as including "valves which are self-actuating in response to some system characteristic, such as pressure (relief valves) or flow direction (check valves) for fulfillment of the required function(s) as specified in paragraph 1.1." The subject valves' function is to continue to maintain their pressure boundary integrity, i.e., not to rupture. Since this function does not require a change in obturator position and since the subject valves are either check valves or relief valves, they are considered Category C-Passive. This Category is not listed in table 1 of OM-10 because there are no testing requirements associated with this category.

NRC Question No. 3

"Section 3.3, "Corrective Action," of the IST program indicates that the operability requirements of the plant technical specifications are "more restrictive" than the requirement of Paragraph 4.2.1.9(b) of OM-10. Paragraph 4.2.1.9, "Corrective Action," specifies the actions for two conditions that could occur when measuring the stroke time of a valve: (1) paragraph (a) applies if a valve fails to exhibit the required change of obturator position which exceeds the limiting value of full-stroke time established per paragraph 4.2.1.4; and (2) paragraph (b) applies if a valve has a measured stroke time which exceeds a multiple of the reference value according to paragraph 4.2.1.8, and requires the valve to be retested or declared inoperable if the stroke time does not meet the acceptance criteria. Because the multiple of reference value may not be the same value as the limiting full-stroke time, a period of 96 hours is allowed to analyze the "new stroke time" to determine if it is acceptable. For valves that have the more restrictive limiting values, the 96 hours is essentially unavailable and the valve would be declared inoperable immediately. However, for valves which have some margin between the multiple value (based on reference value) and the limiting value, the valve may not be "inoperable."

TVA Response

All reference to OM-10 has been removed from Section 3.3 of the IST Program. A discussion of OM-6, paragraph 6.2 has been included. As discussed in Position 8 of Generic Letter 89-04 and section 3.2 of NUREG 1482, the provisions of OM-10, paragraph 6.2, are less restrictive than the Technical Specifications. Therefore, the Technical Specifications will be followed, not the provisions of OM-10, paragraph 6.2.

NRC Question No. 4

"Section 3.4, "Emergency Diesel Systems," of the IST program states that the pumps and valves associated with the emergency diesels are excluded from the IST program, indicating that the testing performed for the emergency diesel-system would identify failure of the components. While it may be acceptable to consider diesel skid-mounted components as adequately tested by the diesel test, the IST program should include diesel support systems, such as fuel oil transfer, that may not be skid-mounted, if the components are Code class. The approach may be acceptable, but additional information needs to be included in Section 3.4 to identify which component are covered and which ones may not be covered."

TVA Response

Section 3.4 has been revised to address that the skid mounted components on the diesel generator skids are not ASME Code Class components and that the valves in the air start system and the fuel oil transfer pumps and their associated check valves are included in an Augmented IST Program (AIST). The AIST Program provides testing requirements for pumps and valves that are important to safety, but do not fall within the scope of the ASME XI IST Program. It utilizes the requirements of OM-6 and OM-10 for testing of these components.

NRC Question No. 5

"Section 3.6, "Passive Valves," of the IST program states that "passive valves have no testing requirements other than verification of the accuracy of remote position indicators for valves so equipped." In fact, Category A passive valves also have leak test requirements. For example, certain manual valves which have leak-tight criteria would be subject to IST even though the valves may be "passive."

TVA Response

Section 3.6 has been revised to require seat leakage testing of Category A passive valves.

NRC Question No. 6

"Section 3.7, "Backseat Testing of Category C-Active and AC-Active check valves," of the IST program discusses the verification of check valves to close. The section does not indicate that certain check valves are disassembled and inspected to verify the valves are capable of closing, although OM-10 states that disassembly and inspection is an acceptable alternative to the other means listed in paragraph 4.3.2.4, "Valve Obturator Movement," and that Position 2 of GL 89-04 indicates that a sampling program of disassembly and inspection is an acceptable alternative to verify the opening or closing capability of a check valve when it is not practical to test the valves."

TVA Response

Section 3.7 of the IST program has been revised to address the fact that WBN utilizes the provisions for check valve disassembly contained in OM-10 and Generic Letter 89-04.

NRC Question No.7

"Section 3.8, "Category A Valves," of the IST program indicates that "valves for which seat leakage is important may be either pressure isolation valves (PIV) or containment isolation valves (CIV)." In fact, valves other than PIVs and CIVs may have specific leakage limits and may be Category A valves subject to IST leak testing criteria. For example, certain valves that prevent unmonitored offsite releases may have leakage limits."

TVA Response

At the present time, no valves at WBN have been identified as requiring seat leakage testing other than the referenced PIVs and CIVs. Although it is true that other reasons as such limiting unmonitored offsite releases may exist at other plants, no valves fitting these other applications have been identified at WBN. The wording of Section 3.8 of the IST program has been revised to clarify that the description provided is intended to reflect the IST program as it currently exists for WBN.

NRC Question No. 8

"A number of valves are being disassembled and inspected on a sampling basis in accordance with Position 2 of GL 89-04. The applicant should investigate nonintrusive test methods which may prove less burdensome to employ than performing disassembly and inspection of the valves. While nonintrusive techniques may not be feasible in all of the installations, it may be advantageous to determine where these techniques could be applied. For example, several utilities have indicated that significant cost savings can result from testing the accumulator discharge check valves with flow, using nonintrusive techniques, over disassembly and inspection. A summary of the methods employed by pressurized water reactor licensees for these valves was developed by Oak Ridge National Laboratory, ORNL/NRC/LTR-94-04, "Utility Survey PWR Safety Injection Accumulator Tank Discharge Check Valve Testing."

TVA Response

Nonintrusive testing is being pursed as an alternative to disassembly. The valves identified for disassembly in the IST program are so identified because of the inability to ensure that nonintrusive check valve testing techniques will work until an actual attempt to test the valve by the nonintrusive methodology is made. WBN anticipates replacing the planned disassemblies with nonintrusive testing techniques as nonintrusive testing techniques are attempted and determined to be adequate for individual valves.

NRC Question No. 9

"In Relief Request PV-01, the "Frequency of Proposed Alternative" states that it will be as specified in "OM-1." The correct reference should be "OM-6."

TVA Response

The "Frequency of Proposed Alternative" for Relief Request PV-01 has been revised to correctly reference "OM-6."

NRC Question

"Also, as noted above, Relief Request PV-04 incorrectly references paragraph 5.3(d) of OM-6, while the correct reference is paragraph 5.2(d)."

TVA Response

The "Impractical Requirement" for Relief Request PV-04 has been revised to correctly reference paragraph 5.2(d) of OM-6.

NRC Question No. 10

"Relief Request PV-01 (see Section 3.9.6.1 of SSER 14, to be published) will be authorized with the provision that, prior to assigning the 0.10 in/sec as a minimum reference value, the applicant review each case, including any manufacturers' recommendations on acceptable vibration levels, to ensure that the proposed minimum reference value is appropriate."

TVA Response

The Proposed Alternative section of Relief Request PV-01 has been revised to include a requirement to implement the Relief Request on a case-by-case basis and to consult the vendor's recommendations to ensure the proposed minimum reference value is appropriate.

NRC Question

"Once the O&M Committee comes to a consensus and changes the Code with guidance for smoothly-running pumps, the applicant must adopt the guidance or develop and justify a reasonable alternative to the Code."

TVA Response
The Proposed Alternative section of Relief Request PV-01 has been revised to include a requirement to consider future O&M Committee guidance and either adopt the guidance or provide a justifiable alternative.

NRC Question
"If the O&M Committee changes the Code in a manner that is consistent with the requested alternative, no further action will be required for the alternative to be acceptable on a continuing basis."

TVA Response
No response required.

NRC Question No. 11
"For Relief Request PV-03 (see Section 3.9.6.1 of SSER 14, to be published) the alternative to use temporary flow instrumentation for inservice testing the boric acid transfer pumps will be authorized for a period not to exceed beyond the first refueling outage. During the interim period, the applicant must further assess the possibility of performing a supplemental test during cold shutdowns or refueling outages."

TVA Response
Relief Request PV-03 has been revised to require that the boric acid transfer pumps be tested in conjunction with refueling outages utilizing a flow path that contains instrumentation meeting OM-6 requirements for range and accuracy. This flow path discharge directly into the charging pump suction header and results in the introduction of concentrated boric acid to the Reactor Coolant System. This test will not be performed during mid-cycle shutdowns due to the increased boron concentration in the Reactor Coolant System.

NRC Question No. 12
"For Relief Request PV-06, the proposed alternative will not be approved as requested. The applicant's justification does not necessarily agree with discussions in the O&M Committee working group. The issue is more appropriately one that should be addressed to the O&M Committee, considering that the applicant's basis is stated as its interpretation of the requirements of OM-1, and is an issue that is already under discussion within the working group."

TVA Response
Relief Request PV-06 has been withdrawn.

NRC Question No. 13
"Relief Request PV-13 (see Section 3.9.6.3 of SSER 14, to be published) states that the function is to open, but the alternative is described as verifying the backseat function. This discrepancy should be corrected."

TVA Response
The function of the valves in question, 1-CKV-72-548-A, 1-CKV-72-549-B, 1-CKV-72-562-A, and 1-CKV-72-563-B was correctly stated in the description of the function. The frequency of proposed alternative has been revised to correct the discrepancy.

ENCLOSURE 4
COMMITMENT

A formal component specific basis document is being prepared and will be issued prior to return to full power following the first refueling outage.