WATTS BAR NUCLEAR PLANT

Inservice Testing Program for Pumps and Valves

Unit 1

First Inservice Interval

Revision 1

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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 valve 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. Pumps whose vibration levels are above this minimum value will be treated as required by OM-6, Table 3.

2.2 Steam Driven Auxiliary Feedwater Pump Testing (PV-02)

OM Part 6, paragraph 5.4 requires Pumps which cannot be tested during plant operation to be tested within one week of plant startup. The Auxiliary Feedwater Pump 1A-S, which is steam turbine driven, does not have any means of receiving steam to turn the turbine except from the steam generator. In order to avoid excessive cooldown of the primary side, testing of Auxiliary Feedwater Pump 1A-S is administratively restricted until steam generator pressure reaches the point where full flow is possible without excessive steam generator cooldown. It is possible that this pressure will not be reached within one week after entering the lowest operational mode in which Auxiliary Feedwater Pump 1A-S is required operable (i.e., secondary side water chemistry problems causing extended operation in the long cycle mode in order to improve water chemistry). The need to delay testing of this pump until sufficient steam generator pressure is reached is recognized and provided for in the WBN Technical Specifications. Relief is therefore requested to allow the first test of Auxiliary Feedwater Pump 1A-S after entering mode 3 to be performed as provided for in the WBN Technical Specifications. Subsequent tests will be performed at the required frequency of once per 3 months.

2.3 Boric Acid Transfer 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.

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.

2.4 ERCW Screen Wash Pump Testing (PV-04)

The ERCW Screen Wash Pumps 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 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 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

Many safety related systems, particularly those serving 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. Thus failure of the TRVs will not result in failure of either the component or its system to fulfill its safety related function. Therefore, the thermal relief valves have been categorized C-Passive and have no test requirements.

.2 Thermal Relief Check Valves

Several containment penetrations have been fitted with small spring loaded check valves designed to relieve pressure due to thermal expansion of fluid in the penetration. Similar to the thermal relief valves, the quantity of thermal expansion is so small that any amount of opening by the check valve will allow it to pass its maximum required accident flow. Thus, the thermal relief 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-10, paragraph 4.2.1.9(b) requires that if a Category A or B valve fails to test satisfactorily (valve exercising) it may be retested immediately. If the retest is also unacceptable and if the conditions are not corrected within 96 hours, the valve shall be declared inoperable. Watts Bar Technical Specifications regarding corrective actions are more restrictive than those identified in ANSI/ASME OM-10, paragraph 4.2.1.9(b). 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-10.

3.4 Emergency Diesel Systems

The inservice operability testing of pumps and valves associated with the emergency diesels are excluded from the enclosed test programs. 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, failure of these components to perform their intended function will be identified by the failure of the associated emergency diesel to meet its operability testing requirements.

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 which is 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

Passive valves have no testing requirements other than verification of the accuracy of remote position indicators for valves so equipped. 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. 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.

.6 **Passive Valves** (continued)

WBN also has valves which were originally equipped with a remote position indicator, 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 the power breaker for these valves open 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, by an electrical signal initiated by a position indicating device, by observation of appropriate pressure indication in the system, by leak testing or by other positive means. This action meets the requirements of position 3 of attachment 1 of Generic Letter 89-04.

3.8 Category A Valves

Valves for which seat leakage is important may be either pressure isolation valves (PIV) or containment isolation valves (CIV).

A. Containment Isolation Valves (PV-06)

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. 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 (PV-06)

OM Standard, Part 1, paragraphs 8.1.1.8, 8.1.2.8, and 8.1.2.7, require a minimum of 10 minutes hold time between successive openings (pops) of safety and relief valves. This hold period is included to allow thermal stabilization following an opening of a safety or relief valve which operates at an elevated temperature. Valves which are tested at ambient temperatures do not need this thermal stabilization period. Relief is therefore requested to forgo the 10 minute thermal soak for valves which are tested at ambient temperature conditions.

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

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. Relief is requested to permit testing of the time required to drain the pump column. A reference value for this time will be established and future tests compared to the reference value. An increase of 50% above the reference time will be considered indication that the valve is not opening sufficiently. 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 on the Component Cooling surge tanks 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.

ABBREVIATIONS AND SYSTEM NUMBERS

4.1 Abbreviations

ACT 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.
AUG A valve included in the test program on an augmented basis because the applicable design criteria imposes stroke time limits for other than a safety related function.
B When contained in the APOSI column in Table 2, indicates a valve which has a safety function in both the open and the closed position. Category A and B-Active valves may be exercised to either position. Category C-Active valves will be exercised to both positions.
BAL Ball valve
BT Bench test of safety or relief valve to determine its setpoint
BUT 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.
C When contained in the TESTS column in Table 2, indicates a check valve test. Also contains a number from Chart 1 to indicate the type of test and the frequency of performance.
CKV Check valve
CLASS ASME Code Class
CYL Air, hydraulic or other high pressure fluid cylinder actuator
DIA Diaphragm
DP Differential pressure when used in reference to a centrifugal pump, discharge pressure when used in reference to a positive displacement pump
FCV Flow Control Valve
GA Gate valve
GL Globe valve
ISV Isolation Valve
LT Seat leakage measurement test in accordance with OM-10
MOT 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 Closed
PLUG Plug valve
PNU Pneumatically operated valve
PV Verification of accurate indication of valve position
Q When contained in Table 1, indicates a Quarterly frequency.
Q 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 Chart 1 to indicate the test and frequency.
SFV Safety of relief valve
SIZE Nominal valve diameter in inches
SLF Self actuating valve
SOL Solenoid actuator
SYS TVA system identification number. See 4.2 following for system numbers and corresponding names.
TYPE Valve body type
V Vibration measurement
XCK Excess flow check valve

System Identification Numbers

01	Main Steam	62	Chemical and Volume Control
02	Condensate	63	Safety Injection
03	Feedwater	67	Essential Raw Cooling Water
18	Diesel Fuel Oil	68	Reactor Coolant
26	High Pressure Fire Protection	70	Component Cooling
30	Ventilation	72	Containment Spray
31	Chilled Water	74	Residual Heat Removal
32	Control Air	77	Waste Disposal
33	Service Air	78	Spent Fuel Cooling
43	Sampling	81	Primary Water
52	System Test Facility	82	Diesel Starting Air
59	Demineralized Water	84	Flood Mode Boration
61	Ice Condenser Containment	90	Radiation Monitoring

Chart 1, Test Code Identifications

	Once per quarter	Once per cold shutdown[1]	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		

Notes for Chart 1:

1. Cold shutdown testing is performed in other than mode 1 operation. Testing may actually be performed during mode 3 or 4 during the startup or shutdown sequences of operation.

Table 1, Summary Listing of Pumps
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Sys	Pump	Code Class	Drawing	Coord	Speed	Flow Rate	Diff/ Disch Press	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 (PV-02)	3	1-47W803-2	H-6	Q	Q	Q	PV-01
31	0-PMP-31-80-A	N	1-47W865-3	E-9	(1)	Q	Q	PV-01
	0-PMP-31-96A-B	N	1-47W865-3	E-4	(1)	Q	Q	PV-01
	0-PMP-31-128/1-A	N	1-47W865-7	F-9	(1)	Q	Q	PV-01
	0-PMP-31-129/1-B	N	1-47W865-7	F-4	(1)	Q	Q	PV-01
	0-PMP-31-36/1-A	N	1-47W865-8	E-9	(1)	Q	Q	PV-01
	0-PMP-31-49/1-B	N	1-47W865-8	E-3	(1)	Q	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-B	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-B	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	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb
Drawing Number 1-47W801-1												
1-FCV-1-4-T	1	2	C-3	B-Act	32	GL	CYL	O	C	Q2 Q4 FS PV	AF-01	None
1-FCV-1-11-T	1	2	E-3	B-Act	32	GL	CYL	O	C	Q2 Q4 FS PV	AF-01	None
1-FCV-1-22-T	1	2	F-3	B-Act	32	GL	CYL	O	C	Q2 Q4 FS PV	AF-01	None
1-FCV-1-29-T	1	2	C-3	B-Act	32	GL	CYL	O	C	Q2 Q4 FS PV	AF-01	None
1-FCV-1-147-A	1	2	C-3	B-Act	2	GL	DIA	O	C	Q2 FS PV	AF-03	None
1-FCV-1-148-B	1	2	E-3	B-Act	2	GL	DIA	O	C	Q2 FS PV	AF-03	None
1-FCV-1-149-A	1	2	F-3	B-Act	2	GL	DIA	O	C	Q2 FS PV	AF-03	None
1-FCV-1-150-B	1	2	A-3	B-Act	2	GL	DIA	O	C	Q2 FS PV	AF-03	None
1-PCV-1-5-T	1	2	C-2	B-Act	6	GL	DIA	C	O	Q2 FS PV	AF-04	None
1-PCV-1-12-T	1	2	D-2	B-Act	6	GL	DIA	C	O	Q2 FS PV	AF-04	None
1-PCV-1-23-T	1	2	F-2	B-Act	6	GL	DIA	C	O	Q2 FS PV	AF-04	None
1-PCV-1-30-T	1	2	A-2	B-Act	6	GL	DIA	C	O	Q2 FS PV	AF-04	None
1-SFV-1-512	1	2	F-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-513	1	2	F-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-514	1	2	F-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-515	1	2	F-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-516	1	2	F-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-517	1	2	D-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-518	1	2	D-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-519	1	2	D-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-520	1	2	D-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-521	1	2	D-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-522	1	2	B-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-523	1	2	B-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-524	1	2	B-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-525	1	2	B-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-526	1	2	B-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-527	1	2	A-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-528	1	2	A-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-529	1	2	A-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-530	1	2	A-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
1-SFV-1-531	1	2	A-2	C-Act	6x10	SFV	SLF	C	O	BT	None	None
Drawing Number 1-47W801-2												
1-FCV-1-7-B	1	2	D-4	B-Act	4	GA	SOL	O	C	Q1 FS PV	None	None
1-FCV-1-14-A	1	2	E-4	B-Act	4	GA	SOL	O	C	Q1 FS PV	None	None
1-FCV-1-25-B	1	2	G-4	B-Act	4	GA	SOL	O	C	Q1 FS PV	None	None
1-FCV-1-32-A	1	2	B-4	B-Act	4	GA	SOL	O	C	Q1 FS PV	None	None
1-FCV-1-181-A	1	2	D-2	B-Act	4	GA	SOL	O	C	Q1 FS PV	None	None
1-FCV-1-182-B	1	2	F-2	B-Act	4	GA	SOL	O	C	Q1 FS PV	None	None
1-FCV-1-183-A	1	2	H-2	B-Act	4	GA	SOL	O	C	Q1 FS PV	None	None
1-FCV-1-184-B	1	2	B-2	B-Act	4	GA	SOL	O	C	Q1 FS PV	None	None

Table 2, Summary Listing of Valves

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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb
Drawing Number 1-47W804-1												
1-CKV-2-667	2	N	G-2	C-Act	2.5	CKV	SLF	C	O	C0 C4	AF-05	None
Drawing Number 1-47W803-1												
1-CKV-3-508	3	2	F-2	C-Act	16	CKV	SLF	O	C	C8	AF-06	None
1-CKV-3-509	3	2	E-2	C-Act	16	CKV	SLF	O	C	C8	AF-06	None
1-CKV-3-510	3	2	C-2	C-Act	16	CKV	SLF	O	C	C8	AF-06	None
1-CKV-3-511	3	2	B-2	C-Act	16	CKV	SLF	O	C	C8	AF-06	None
1-CKV-3-638	3	2	A-3	C-Act	6	CKV	SLF	O	C	C8	AF-07	None
1-CKV-3-652	3	2	C-2	C-Act	6	CKV	SLF	O	C	C8	AF-07	None
1-CKV-3-669	3	2	D-2	C-Act	6	CKV	SLF	O	C	C8	AF-07	None
1-CKV-3-678	3	2	E-2	C-Act	6	CKV	SLF	O	C	C8	AF-07	None
1-FCV-3-33-A	3	2	C-3	B-Act	16	GA	MOT	O	C	Q2 PV	AF-06	None
1-FCV-3-35	3	N	C-4	B-Act	16	ANG	DIA	O	C	Q2 FS PV	AF-06	None
1-FCV-3-35A	3	N	C-4	B-Act	6	GA	DIA	O	C	Q2 FS PV	AF-06	None
1-FCV-3-47-B	3	2	E-3	B-Act	16	GA	MOT	O	C	Q2 PV	AF-06	None
1-FCV-3-48	3	N	E-4	B-Act	16	ANG	DIA	O	C	Q2 FS PV	AF-06	None
1-FCV-3-48A	3	N	D-4	B-Act	6	GA	DIA	O	C	Q2 FS PV	AF-06	None
1-FCV-3-87-A	3	2	F-3	B-Act	16	GA	MOT	O	C	Q2 PV	AF-06	None
1-FCV-3-90	3	N	F-4	B-Act	16	ANG	DIA	O	C	Q2 FS PV	AF-06	None
1-FCV-3-90A	3	N	F-4	B-Act	6	GA	DIA	O	C	Q2 FS PV	AF-06	None
1-FCV-3-100-B	3	2	B-3	B-Act	16	GA	MOT	O	C	Q2 PV	AF-06	None
1-FCV-3-103	3	N	B-4	B-Act	16	ANG	DIA	O	C	Q2 FS PV	AF-06	None
1-FCV-3-103A	3	N	A-4	B-Act	6	GA	DIA	O	C	Q2 FS PV	AF-06	None
1-FCV-3-185	3	2	C-2	B-Act	2	GL	DIA	O	C	Q2 FS PV	AF-06	None
1-FCV-3-186	3	2	E-2	B-Act	2	GL	DIA	O	C	Q2 FS PV	AF-06	None
1-FCV-3-187	3	2	F-2	B-Act	2	GL	DIA	O	C	Q2 FS PV	AF-06	None
1-FCV-3-188	3	2	A-2	B-Act	2	GL	DIA	O	C	Q2 FS PV	AF-06	None
1-FCV-3-236	3	2	C-3	B-Act	6	GA	DIA	O	C	Q2 FS PV	AF-06	None
1-FCV-3-239	3	2	D-3	B-Act	6	GA	DIA	O	C	Q2 FS PV	AF-06	None
1-FCV-3-242	3	2	E-3	B-Act	6	GA	DIA	O	C	Q2 FS PV	AF-06	None
1-FCV-3-245	3	2	A-3	B-Act	6	GA	DIA	O	C	Q2 FS PV	AF-06	None
Drawing Number 1-47W803-2												
1-CKV-1-891-S	1	2	C-8	C-Act	4	CKV	SLF	C	O	C0 C2 C4	AF-08	PV-08
1-CKV-1-892-S	1	2	A-8	C-Act	4	CKV	SLF	C	O	C0 C2 C4	AF-08	PV-08
1-FCV-1-15-A	1	2	C-8	B-Act	4	GA	MOT	O	C	Q1 PV	None	None
1-FCV-1-16-A	1	2	A-8	B-Act	4	GA	MOT	C	O	Q1 PV	None	None
1-FCV-1-17-A	1	2	C-7	B-Act	4	GA	MOT	O	C	Q2 PV	AF-02	None
1-FCV-1-18-B	1	2	C-7	B-Act	4	GA	MOT	O	C	Q2 PV	AF-02	None
1-FCV-1-51-S	1	2	H-6	B-Act	4	GA	CYL	B	B	Q1 PV	None	None
1-CKV-3-805-A	3	3	F-5	C-Act	8	CKV	SLF	B	B	C2 C4 C7	AF-07	None
1-CKV-3-806-B	3	3	F-6	C-Act	8	CKV	SLF	B	B	C2 C4 C7	AF-07	None
1-CKV-3-810-S	3	3	G-3	C-Act	10	CKV	SLF	B	B	C2 C4 C7	AF-07	None

Table 2, Summary Listing of Valves
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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb.
Drawing Number 1-47W803-2 (continued)												
1-CKV-3-814-A	3	3	G-5	C-Act	1.5	CKV	SLF	B	B	C1 C7	None	None
1-CKV-3-815-B	3	3	G-6	C-Act	1.5	CKV	SLF	B	B	C1 C7	None	None
1-CKV-3-818-S	3	3	G-6	C-Act	1.5	CKV	SLF	B	B	C1 C7	None	None
1-CKV-3-820-A	3	3	F-5	C-Act	6	CKV	SLF	C	O	C2	AF-07	None
1-CKV-3-821-B	3	3	F-6	C-Act	6	CKV	SLF	C	O	C2	AF-07	None
1-CKV-3-830-B	3	2	G-8	C-Act	4	CKV	SLF	B	B	C2 C7	AF-07	None
1-CKV-3-831-A	3	2	E-8	C-Act	4	CKV	SLF	B	B	C2 C7	AF-07	None
1-CKV-3-832-A	3	2	D-8	C-Act	4	CKV	SLF	B	B	C2 C7	AF-07	None
1-CKV-3-833-B	3	2	B-8	C-Act	4	CKV	SLF	B	B	C2 C7	AF-07	None
1-CKV-3-861-B	3	2	G-10	C-Act	4	CKV	SLF	B	B	C0 C5 C8	None	PV-07
1-CKV-3-862-A	3	2	E-10	C-Act	4	CKV	SLF	B	B	C0 C5 C8	None	PV-07
1-CKV-3-864-S	3	3	H-6	C-Act	6	CKV	SLF	C	O	C2	AF-07	None
1-CKV-3-871-S	3	2	F-8	C-Act	4	CKV	SLF	B	B	C2 C7	AF-07	None
1-CKV-3-872-S	3	2	E-8	C-Act	4	CKV	SLF	B	B	C2 C7	AF-07	None
1-CKV-3-873-S	3	2	C-8	C-Act	4	CKV	SLF	B	B	C2 C7	AF-07	None
1-CKV-3-874-S	3	2	A-8	C-Act	4	CKV	SLF	B	B	C2 C7	AF-07	None
1-CKV-3-921-B	3	2	G-10	C-Act	4	CKV	SLF	B	B	C0 C5 C8	None	PV-07
1-CKV-3-922-A	3	2	F-10	C-Act	4	CKV	SLF	B	B	C0 C5 C8	None	PV-07
1-FCV-3-116A-A	3	3	F-5	B-Act	4	GA	MOT	C	O	Q1 PV	None	None
1-FCV-3-116B-A	3	3	F-5	B-Act	4	GA	MOT	C	O	Q1 PV	None	None
1-FCV-3-126A-B	3	3	F-7	B-Act	4	GA	MOT	C	O	Q1 PV	None	None
1-FCV-3-126B-B	3	3	F-7	B-Act	4	GA	MOT	C	O	Q1 PV	None	None
1-FCV-3-136A-A	3	3	H-4	B-Act	6	GA	MOT	C	O	Q1 PV	None	None
1-FCV-3-136B-A	3	3	H-4	B-Act	6	GA	MOT	C	O	Q1 PV	None	None
1-FCV-3-179A-B	3	3	H-4	B-Act	6	GA	MOT	C	O	Q1 PV	None	None
1-FCV-3-179B-B	3	3	H-4	B-Act	6	GA	MOT	C	O	Q1 PV	None	None
1-LCV-3-148-B	3	3	G-8	B-Act	4	GA	DIA	C	O	Q1 FS PV	None	None
1-LCV-3-148A-B	3	3	G-8	B-Act	2	ANG	DIA	C	O	Q1 FS PV	None	None
1-LCV-3-156-A	3	3	E-8	B-Act	4	GA	DIA	C	O	Q1 FS PV	None	None
1-LCV-3-156A-A	3	3	E-8	B-Act	2	ANG	DIA	C	O	Q1 FS PV	None	None
1-LCV-3-164-A	3	3	D-8	B-Act	4	GA	DIA	C	O	Q1 FS PV	None	None
1-LCV-3-164A-A	3	3	C-8	B-Act	2	ANG	DIA	C	O	Q1 FS PV	None	None
1-LCV-3-171-B	3	3	B-8	B-Act	4	GA	DIA	C	O	Q1 FS PV	None	None
1-LCV-3-171A-B	3	3	B-8	B-Act	2	ANG	DIA	C	O	Q1 FS PV	None	None
1-LCV-3-172-A	3	3	F-8	B-Act	3	GL	DIA	C	O	Q1 FS PV	None	None
1-LCV-3-173-B	3	3	E-8	B-Act	3	GL	DIA	C	O	Q1 FS PV	None	None
1-LCV-3-174-B	3	3	C-8	B-Act	3	GL	DIA	C	O	Q1 FS PV	None	None
1-LCV-3-175-A	3	3	B-8	B-Act	3	GL	DIA	C	O	Q1 FS PV	None	None
1-PCV-3-122	3	3	F-5	B-Act	4	GL	DIA	C	C	FS	None	None
1-PCV-3-132	3	3	F-6	B-Act	4	GL	DIA	C	C	FS	None	None

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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb
Drawing Number 1-47W850-9												
1-CKV-26-1260	26	2	B-9	AC-Pas	4	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-26-1296	26	2	B-3	AC-Pas	4	CKV	SLF	C	C	AJ	None	PV-05
1-FCV-26-240-A	26	2	B-9	A-Act	4	GA	MOT	O	C	Q1 AJ PV	None	PV-05
1-FCV-26-241-B	26	3	D-7	B-Act	4	GA	MOT	O	C	Q1 PV	None	None
1-FCV-26-242-A	26	3	D-7	B-Act	4	GA	MOT	O	C	Q1 PV	None	None
1-FCV-26-243-A	26	2	B-3	A-Act	4	GA	MOT	O	C	Q1 AJ PV	None	PV-05
1-FCV-26-244-B	26	3	G-2	B-Act	4	GA	MOT	O	C	Q1 PV	None	None
1-FCV-26-245-A	26	3	G-1	B-Act	4	GA	MOT	O	C	Q1 PV	None	None
Drawing Number 1-47W866-1												
1-FCV-30-7-A	30	2	C-1	A-Act	24	BUT	CYL	0	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-8-B	30	2	C-2	A-Act	24	BUT	CYL	0	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-9-B	30	2	C-1	A-Act	24	BUT	CYL	0	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-10-A	30	2	C-9	A-Act	24	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-14-A	30	2	C-9	A-Act	24	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-15-B	30	2	C-10	A-Act	24	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-16-B	30	2	E-10	A-Act	24	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-17-A	30	2	E-2	A-Act	24	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-19-B	30	2	G-1	A-Act	24	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-20-A	30	2	G-2	A-Act	24	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-37-B	30	2	D-10	A-Act	8	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-40-A	30	2	D-9	A-Act	8	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-50	30	2	C-9	A-Act	24	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-51	30	2	C-10	A-Act	24	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-52	30	2	C-9	A-Act	24	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-53	30	2	C-10	A-Act	24	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-56	30	2	E-9	A-Act	24	BUT	CYL	0	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-57	30	2	E-10	A-Act	24	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-58	30	2	G-9	A-Act	12	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-30-59	30	2	G-10	A-Act	12	BUT	CYL	O	C	Q1 FS AJ PV	None	PV-05
1-FSV-30-134-B	30	2	F-9	A-Act	0.5	GA	SOL	O	C	Q1 FS AJ PV	None	PV-05
1-FSV-30-135-A	30	2	F-10	A-Act	0.5	GA	SOL	O	C	Q1 FS AJ PV	None	PV-05
Drawing Number 1-47W865-3												
0-CKV-31-2193	31	N	E-8	B-Act	1X1	SFV	SLF	C	O	C1	None	None
0-CKV-31-2235	31	N	E-3	B-Act	1X1	SFV	SLF	C	O	C1	None	None
0-RFV-31-2210	31	N	C-8	C-Act	1X1	SFV	SLF	C	O	BT	None	PV-06
0-RFV-31-2252	31	N	C-3	C-Act	1X1	SFV	SLF	C	O	BT	None	PV-06
Drawing Number 1-47W865-5												
1-CKV-31-3378	31	2	F-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-31-3392	31	2	E-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-31-3407	31	2	C-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-31-3421	31	2	B-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-FCV-31-305-B	31	2	B-7	A-Act	2	GL	DIA	O	C	Q1 FS AJ PV	None	PV-05

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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb.
Drawing Number 1-47W865-5 (continued)												
1-FCV-31-306-A	31	2	B-7	A-Act	2	GL	DIA	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-31-308-A	31	2	C-7	A-Act	2	GL	DIA	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-31-309-B	31	2	C-7	A-Act	2	GL	DIA	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-31-326-A	31	2	E-7	A-Act	2	GL	DIA	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-31-327-B	31	2	E-7	A-Act	2	GL	DIA	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-31-329-B	31	2	F-7	A-Act	2	GL	DIA	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-31-330-A	31	2	F-7	A-Act	2	GL	DIA	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	SLF	C	O	C1	None	None
0-CKV-31-2364	31	N	F-3	C-Act	6	CKV	SLF	C	O	C1	None	None
0-RFV-31-2326	31	N	D-8	C-Act	1X1	SFV	SLF	C	O	BT	None	PV-06
0-RFV-31-2383	31	N	D-3	C-Act	1X1	SFV	SLF	C	O	BT	None	PV-06
Drawing Number 1-47W865-8												
0-CKV-31-2607	31	N	E-8	C-Act	6	CKV	SLF	C	O	C1	None	None
0-CKV-31-2649	31	N	D-10	C-Act	6	CKV	SLF	C	O	C1	None	None
0-RFV-31-2623	31	N	E-2	C-Act	1X1	SFV	SLF	C	O	BT	None	PV-06
0-RFV-31-2665	31	N	D-4	C-Act	1X1	SFV	SLF	C	O	BT	None	PV-06
Drawing Number 1-47W848-1												
1-CKV-32-293	32	2	A-9	AC-Act	2	CKV	SLF	O	C	C8 AJ	AF-09	PV-05
1-CKV-32-303-A	32	2	C-9	AC-Act	2	CKV	SLF	O	C	C8 AJ	AF-09	PV-05
1-CKV-32-313-B	32	2	D-9	AC-Act	2	CKV	SLF	O	C	C8 AJ	AF-09	PV-05
1-FCV-32-80-A	32	2	C-9	A-Act	2	GL	DIA	O	C	Q2 AJ FS PV	AF-09	PV-05
1-FCV-32-102-B	32	2	D-9	A-Act	2	GL	DIA	O	C	Q2 AJ FS PV	AF-09	PV-05
1-FCV-32-110-A	32	2	A-9	A-Act	2	GL	DIA	O	C	Q2 AJ FS PV	AF-09	PV-05
1-BYV-32-288	32	2	A-9	A-Pas	2	GL	MAN	C	C	AJ	None	PV-05
1-BYV-32-298-A	32	2	C-9	A-Pas	2	GL	MAN	C	C	AJ	None	PV-05
1-BYV-32-308-B	32	2	D-9	A-Pas	2	GL	MAN	C	C	AJ	None	PV-05
Drawing Number 1-47W846-2												
1-CKV-33-794	33	2	F-6	AC-Pas	3	CKV	SLF	C	C	AJ	None	PV-05
1-ISV-33-713	33	2	F-5	A-Pas	2	DIA	MAN	C	C	AJ	None	PV-05
1-ISV-33-714	33	2	F-6	A-Pas	2	DIA	MAN	C	C	AJ	None	PV-05
Drawing Number 1-47W625-1												
1-FCV-43-2-B	43	2	D-3	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-3-A	43	2	D-5	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-11-B	43	2	B-2	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-12-A	43	2	B-4	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-22-B	43	2	F-5	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-23-A	43	2	D-5	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05

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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb.
Drawing Number 1-47W625-2												
1-FCV-43-34-B	43	2	B-2	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-35-A	43	2	C-4	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-54D-B	43	2	C-7	B-Act	0.375	GA	DIA	O	C	Q1 FS PV	None	None
1-FCV-43-55-A	43	2	C-6	B-Act	0.375	GA	DIA	O	C	Q1 FS PV	None	None
1-FCV-43-56D-B	43	2	C-7	B-Act	0.375	GA	DIA	O	C	Q1 FS PV	None	None
1-FCV-43-58-A	43	2	C-6	B-Act	0.375	GA	DIA	O	C	Q1 FS PV	None	None
1-FCV-43-59D-B	43	2	D-8	B-Act	0.375	GA	DIA	O	C	Q1 FS PV	None	None
1-FCV-43-61-A	43	2	D-7	B-Act	0.375	GA	DIA	O	C	Q1 FS PV	None	None
1-FCV-43-63D-B	43	2	E-9	B-Act	0.375	GA	DIA	O	C	Q1 FS PV	None	None
1-FCV-43-64-A	43	2	E-8	B-Act	0.375	GA	DIA	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	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-77-A	43	2	E-8	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
Drawing Number 1-47W625-8												
1-FCV-68-307-A	68	2	G-2	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-68-308-B	68	2	F-1	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
Drawing Number 1-47W625-11												
1-FCV-43-201-A	43	2	F-5	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-202-A	43	2	F-5	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-207-B	43	2	D-6	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-208-B	43	2	C-6	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-433-B	43	2	F-4	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-434-B	43	2	F-4	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-435-A	43	2	D-5	A-Act	0.375	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-43-436-A	43	2	C-5	A-Act	0.375	GA	DIA	O	C	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	SLF	C	C	AJ	None	PV-05
1-CKV-43-841	43	2	A-10	AC-Pas	0.375	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-43-883	43	2	G-5	AC-Pas	0.375	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-43-884	43	2	A-9	AC-Pas	0.375	CKV	SLF	C	C	AJ	None	PV-05
1-FSV-43-250-A	43	2	D-A	A-Pas	0.375	GA	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-251-A	43	2	C-1	A-Pas	0.375	GA	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-287-A	43	2	B-8	A-Pas	0.375	GA	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-288-A	43	2	B-8	A-Pas	0.375	GA	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-307-A	43	2	B-9	A-Pas	0.375	GA	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-309-B	43	2	D-2	A-Pas	0.375	GA	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-310-B	43	2	C-2	A-Pas	0.375	GA	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-318-B	43	2	B-9	A-Pas	0.375	GA	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-319-B	43	2	B-9	A-Pas	0.375	GA	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-325-B	43	2	B-10	A-Pas	0.375	GA	SOL	C	C	AJ PV	None	PV-05
1-FSV-43-341-B	43	2	H-6	A-Pas	0.375	GA	SOL	C	C	AJ PV	None	PV-05

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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb.
Drawing Number 1-47W625-15 (continued)												
1-FSV-43-342-A	43	2	G-6	A-Pas	0.375	GA	SOL	C	C	AJ PV	None	PV-05
Drawing Number 47W331-3												
1-ISV-52-500	52	2	H-2	A-Pas	0.75	GA	MAN	C	C	AJ	None	PV-05
1-ISV-52-501	52	2	H-2	A-Pas	0.75	GA	MAN	C	C	AJ	None	PV-05
1-ISV-52-502	52	2	H-2	A-Pas	0.75	GA	MAN	C	C	AJ	None	PV-05
1-ISV-52-503	52	2	H-2	A-Pas	0.75	GA	MAN	C	C	AJ	None	PV-05
1-ISV-52-504	52	2	H-2	A-Pas	0.75	GA	MAN	C	C	AJ	None	PV-05
1-ISV-52-505	52	2	H-2	A-Pas	0.75	GA	MAN	C	C	AJ	None	PV-05
1-ISV-52-506	52	2	H-2	A-Pas	0.75	GA	MAN	C	C	AJ	None	PV-05
1-ISV-52-507	52	2	H-2	A-Pas	0.75	GA	MAN	C	C	AJ	None	PV-05
Drawing Number 1-47W856-1												
1-ISV-59-522	59	2	F-2	A-Pas	2	DIA	MAN	C	C	AJ	None	PV-05
1-ISV-59-698	59	2	F-2	A-Pas	2	DIA	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	SLF	C	C	AJ	None	PV-05
1-CKV-61-658	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-659	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-660	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-661	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-662	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-663	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-664	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-665	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-666	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-667	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-668	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-669	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-670	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-671	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-672	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-673	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-674	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-675	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-676	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-677	61	N	D-12	C-Act	12	CKV	SLF	C	O	C3	AF-10	None
1-CKV-61-680	61	2	B-7	AC-Pas	0.375	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-61-692	61	2	F-11	AC-Pas	0.375	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-61-745	61	2	G-9	AC-Pas	0.375	CKV	SLF	C	C	AJ	None	PV-05
1-FCV-61-96-A	61	2	E-11	A-Act	2	DIA	DIA	O	C	Q1 FS AJ PV	None	PV-05

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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb.
Drawing Number 1-47W814-2 (continued)												
1-FCV-61-97-B	61	2	E-11	A-Act	2	DIA	DIA	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-61-110-A	61	2	G-9	A-Act	2	DIA	DIA	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-61-122-B	61	2	G-9	A-Act	2	DIA	DIA	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-61-191-A	61	2	A-6	A-Act	2	DIA	DIA	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-61-192-B	61	2	A-7	A-Act	2	DIA	DIA	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-61-193-A	61	2	B-6	A-Act	2	DIA	DIA	O	C	Q1 FS AJ PV	None	PV-05
1-FCV-61-194-B	61	2	B-7	A-Act	2	DIA	DIA	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	SLF	C	B	C3 C7	AF-11	None
1-CKV-62-523-A	62	2	G-9	C-Act	2	CKV	SLF	C	B	C1 C7	None	None
1-CKV-62-525-A	62	2	G-9	C-Act	4	CKV	SLF	O	B	C3 C4 C7	AF-11	None
1-CKV-62-530-B	62	2	F-9	C-Act	2	CKV	SLF	C	B	C1 C7	None	None
1-CKV-62-532-B	62	2	F-9	C-Act	4	CKV	SLF	O	B	C3 C4 C7	AF-11	None
1-CKV-62-639-S	62	2	C-7	AC-Act	0.75	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-62-661-S	62	1	B-3	C-Act	2	CKV	SLF	O	C	C2	AF-12	None
1-FCV-62-61-B	62	2	B-7	A-Act	4	GA	MOT	O	C	Q2 AJ PV	AF-14	PV-05
1-FCV-62-63-A	62	2	B-8	A-Act	4	GA	MOT	O	C	Q2 AJ PV	AF-14	PV-05
1-FCV-62-69-A	62	1	A-2	B-Act	4	GL	DIA	O	C	Q2 FS PV	AF-15	None
1-FCV-62-70-A	62	1	A-2	B-Act	3	GL	DIA	O	C	Q2 FS PV	AF-15	None
1-FCV-62-72-A	62	2	A-5	A-Act	2	GL	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-62-73-A	62	2	A-4	A-Act	2	GL	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-62-74-A	62	2	A-4	A-Act	2	GL	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-62-76-A	62	2	A-5	A-Act	2	GL	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-62-77-B	62	2	A-7	A-Act	2	GL	DIA	O	C	Q2 AJ FS PV	AF-15	PV-05
1-FCV-62-83	62	2	A-8	B-Pas	2	GL	DIA	O	C	PV	None	None
1-FCV-62-84-A	62	1	B-2	B-Act	2	GL	DIA	B	B	Q2 FS PV	AF-12	None
1-FCV-62-89	62	2	D-8	B-Pas	3	GL	DIA	O	C	PV	None	None
1-FCV-62-90-A	62	2	D-8	B-Act	3	GA	MOT	O	C	Q2 PV	AF-15	None
1-FCV-62-91-B	62	2	D-8	B-Act	3	GA	MOT	O	C	Q2 PV	AF-15	None
1-FCV-62-93	62	2	F-9	B-Pas	3	GL	DIA	O	C	PV	None	None
1-FCV-62-125	62	2	B-10	B-Pas	0.75	GL	DIA	C	C	PV	None	None
1-FCV-62-1228-A	62	2	C-10	B-Act	1	GL	DIA	O	C	Q1 FS PV	None	None
1-FCV-62-1229-B	62	2	C-10	B-Act	1	GL	DIA	O	C	Q1 FS PV	None	None
1-LCV-62-118-A	62	2	A-12	B-Pas	3	3W	DIA	N	N	PV	None	None
1-LCV-62-132-A	62	2	D-10	B-Act	4	GA	MOT	O	C	Q2 PV	AF-16	None
1-LCV-62-133-B	62	2	D-10	B-Act	4	GA	MOT	O	C	Q2 PV	AF-16	None
1-LCV-62-135-A	62	2	H-10	B-Act	8	GA	MOT	C	O	Q2 PV	AF-16	None
1-LCV-62-136-B	62	2	H-10	B-Act	8	GA	MOT	C	O	Q2 PV	AF-16	None
1-PCV-62-81	62	2	A-10	B-Pas	2	GL	DIA	O	C	PV	None	None
1-RFV-62-505-S	62	2	F-10	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
1-RFV-62-518-S	62	2	E-9	C-Act	.75X1	SFV	SLF	C	O	BT	None	PV-06
1-RFV-62-636-S	62	2	B-6	C-Act	2x3	SFV	SLF	C	O	BT	None	PV-06

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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb.
Drawing Number 1-47W809-1 (continued)												
1-RFV-62-649-S	62	2	C-9	C-Act	2x3	SFV	SLF	C	O	BT AJ	None	PV-06
1-RFV-62-662-S	62	2	A-3	AC-Act	2x3	SFV	SLF	C	O	BT	None	PV-06
1-RFV-62-675-S	62	2	B-10	C-Act	2x3	SFV	SLF	C	O	BT	None	PV-06
1-RFV-62-688-S	62	2	D-9	C-Act	3X4	SFV	SLF	C	O	BT	None	PV-06
1-RFV-62-1220	62	2	F-10	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
1-RFV-62-1221	62	2	G-10	C-Act	.75X1	SFV	SLF	C	O	BT	None	PV-06
1-RFV-62-1222	62	2	E-9	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
Drawing Number 1-47W809-2												
1-CKV-62-930	62	3	B-4	C-Act	3	CKV	SLF	C	O	C3	AF-13	None
1-FCV-62-138-B	62	3	A-4	B-Act	3	GL	MOT	C	O	Q1 PV	None	None
Drawing Number 1-47W809-3												
1-RFV-62-955	62	2	C-11	C-Act	0.75	SFV	SLF	C	O	BT	None	PV-06
1-RFV-62-1079	62	2	C-12	C-Act	0.75	SFV	SLF	C	O	BT	None	PV-12
Drawing Number 1-47W809-5												
[illegible]KV-62-1252-A	62	3	F-8	C-Act	2	CKV	SLF	C	O	C1 C7	None	None
[illegible]KV-62-1052-B	62	3	F-7	C-Act	2	CKV	SLF	C	O	C1 C7	None	None
Drawing Number 1-47W811-1												
1-CKV-63-502-S	63	2	F-10	C-Act	12	CKV	SLF	C	O	C3 C8	AF-18	None
1-CKV-63-510-S	63	2	G-10	C-Act	8	CKV	SLF	C	B	C3 C4 C8	AF-11	None
1-CKV-63-524-A	63	2	F-8	C-Act	4	CKV	SLF	C	B	C3 C4 C7	AF-11	None
1-CKV-63-526-B	63	2	G-8	C-Act	4	CKV	SLF	C	B	C3 C4 C7	AF-11	None
1-CKV-63-528-A	63	2	F-8	C-Act	0.75	CKV	SLF	C	B	C1 C7	None	None
1-CKV-63-530-B	63	2	D-8	C-Act	0.75	CKV	SLF	C	B	C1 C7	None	None
1-CKV-63-543-A	63	1	F-3	AC-Act	2	CKV	SLF	C	B	C3 LT	AF-11	None
1-CKV-63-545-A	63	1	F-3	AC-Act	2	CKV	SLF	C	B	C3 LT	AF-11	None
1-CKV-63-547-B	63	1	E-3	AC-Act	2	CKV	SLF	C	B	C3 LT	AF-11	None
1-CKV-63-549-B	63	1	E-3	AC-Act	2	CKV	SLF	C	B	C3 LT	AF-11	None
1-CKV-63-551-S	63	1	H-1	AC-Act	2	CKV	SLF	C	B	C3 LT	AF-11	None
1-CKV-63-553-S	63	1	H-3	AC-Act	2	CKV	SLF	C	B	C3 LT	AF-11	None
1-CKV-63-555-S	63	1	G-3	AC-Act	2	CKV	SLF	C	B	C3 LT	AF-11	None
1-CKV-63-557-S	63	1	G-2	AC-Act	2	CKV	SLF	C	B	C3 LT	AF-11	None
1-CKV-63-558-B	63	1	E-2	AC-Act	6	CKV	SLF	C	B	C3 LT	AF-11	None
1-CKV-63-559-B	63	1	E-1	AC-Act	6	CKV	SLF	C	B	C3 LT	AF-11	None
1-CKV-63-560-S	63	1	F-1	AC-Act	10	CKV	SLF	C	B	C0 C5 LT	None	PV-08
1-CKV-63-561-S	63	1	D-1	AC-Act	10	CKV	SLF	C	B	C0 C5 LT	None	PV-08
1-CKV-63-562-S	63	1	E-2	AC-Act	10	CKV	SLF	C	B	C0 C5 LT	None	PV-08
1-CKV-63-563-S	63	1	F-2	AC-Act	10	CKV	SLF	C	B	C0 C5 LT	None	PV-08

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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb.
Drawing Number 1-47W811-1 (continued)												
1-CKV-63-581-S	63	1	C-6	AC-Act	3	CKV	SLF	C	O	C3 LT	AF-11	None
1-CKV-63-586-S	63	1	E-1	AC-Act	1.5	CKV	SLF	C	O	C3 LT	AF-11	None
1-CKV-63-587-S	63	1	D-2	AC-Act	1.5	CKV	SLF	C	O	C3 LT	AF-11	None
1-CKV-63-588-S	63	1	E-2	AC-Act	1.5	CKV	SLF	C	O	C3 LT	AF-11	None
1-CKV-63-589-S	63	1	F-2	AC-Act	1.5	CKV	SLF	C	O	C3 LT	AF-11	None
1-CKV-63-622-S	63	1	D-1	AC-Act	10	CKV	SLF	C	B	C0 LT	None	PV-08
1-CKV-63-623-S	63	1	D-1	AC-Act	10	CKV	SLF	C	B	C0 LT	None	PV-08
1-CKV-63-624-S	63	1	D-3	AC-Act	10	CKV	SLF	C	B	C0 LT	None	PV-08
1-CKV-63-625-S	63	1	D-3	AC-Act	10	CKV	SLF	C	B	C0 LT	None	PV-08
1-CKV-63-632-A	63	1	H-2	AC-Act	6	CKV	SLF	C	B	C3 C5 LT	AF-18	None
1-CKV-63-633-B	63	1	G-1	AC-Act	6	CKV	SLF	C	B	C3 C5 LT	AF-18	None
1-CKV-63-634-A	63	1	G-3	AC-Act	6	CKV	SLF	C	B	C3 C5 LT	AF-18	None
1-CKV-63-635-B	63	1	G-1	AC-Act	6	CKV	SLF	C	B	C3 C5 LT	AF-18	None
1-CKV-63-640-S	63	1	G-3	AC-Act	8	CKV	SLF	C	B	C3 C5 LT	AF-18	None
1-CKV-63-641-S	63	1	F-1	AC-Act	6	CKV	SLF	C	B	C3 C5 LT	AF-18	None
CKV-63-643-S	63	1	F-3	AC-Act	8	CKV	SLF	C	B	C3 C5 LT	AF-18	None
CKV-63-644-S	63	1	D-2	AC-Act	6	CKV	SLF	C	B	C3 C5 LT	AF-18	None
1-CKV-63-725	63	2	E-8	C-Act	2	CKV	SLF	C	B	C0	AF-17	None
1-FCV-63-1-A	63	2	E-10	B-Act	14	GA	MOT	O	C	Q2 PV	AF-19	None
1-FCV-63-3-A	63	2	E-8	B-Act	2	GL	MOT	O	C	Q2 PV	AF-20	None
1-FCV-63-4-B	63	2	E-8	B-Act	2	GL	MOT	O	C	Q1 PV	None	None
1-FCV-63-5-B	63	2	D-10	B-Act	6	GA	MOT	O	C	Q2 PV	AF-19	None
1-FCV-63-6-B	63	2	F-10	B-Act	4	GA	MOT	C	O	Q1 PV	None	None
1-FCV-63-7-A	63	2	F-10	B-Act	4	GA	MOT	C	O	Q1 PV	None	None
1-FCV-63-8-A	63	2	H-9	B-Act	8	GA	MOT	C	O	Q2 PV	AF-21	None
1-FCV-63-11-B	63	2	H-9	B-Act	8	GA	MOT	C	O	Q2 PV	AF-21	None
1-FCV-63-22-B	63	2	E-6	B-Act	4	GA	MOT	O	C	Q2 PV	AF-22	None
1-FCV-63-23-B	63	2	E-7	A-Act	1	GL	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-63-25-B	63	2	B-7	B-Act	4	GA	MOT	C	O	Q2 PV	AF-23	None
1-FCV-63-26-A	63	2	B-7	B-Act	4	GA	MOT	C	O	Q2 PV	AF-23	None
1-FCV-63-47-A	63	2	E-10	B-Act	6	GA	MOT	O	C	Q1 PV	None	None
1-FCV-63-48-B	63	2	E-10	B-Act	6	GA	MOT	O	C	Q1 PV	None	None
1-FCV-63-67-B	63	1	B-5	B-Act	10	GA	MOT	O	C	Q2 PV	AF-24	None
1-FCV-63-71-A	63	2	D-6	A-Act	0.75	GL	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-63-72-A	63	2	H-7	B-Act	18	GA	MOT	C	O	Q2 PV	AF-25	None
1-FCV-63-73-B	63	2	H-7	B-Act	18	GA	MOT	C	O	Q2 PV	AF-25	None
1-FCV-63-80-A	63	1	B-4	B-Act	10	GA	MOT	O	C	Q2 PV	AF-24	None
1-FCV-63-84-B	63	2	C-6	A-Act	0.75	GL	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-63-93-A	63	2	G-7	B-Act	8	GA	MOT	O	C	Q2 PV	AF-26	None
1-FCV-63-94-B	63	2	G-7	B-Act	8	GA	MOT	O	C	Q2 PV	AF-26	None

Table 2, Summary Listing of Valves
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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb.
Drawing Number 1-47W811-1 (continued)												
1-FCV-63-98-B	63	1	B-3	B-Act	10	GA	MOT	O	C	Q2 PV	AF-24	None
1-FCV-63-118-A	63	1	B-1	B-Act	10	GA	MOT	O	C	Q2 PV	AF-24	None
1-FCV-63-152-A	63	2	F-7	B-Act	4	GA	MOT	O	C	Q1 PV	None	None
1-FCV-63-153-B	63	2	E-7	B-Act	4	GA	MOT	O	C	Q1 PV	None	None
1-FCV-63-156-A	63	2	F-6	B-Act	4	GA	MOT	C	O	Q1 PV	None	None
1-FCV-63-157-B	63	2	D-6	B-Act	4	GA	MOT	C	O	Q1 PV	None	None
1-FCV-63-172-B	63	2	F-6	B-Act	12	GA	MOT	C	O	Q2 PV	AF-26	None
1-FCV-63-175-B	63	2	E-8	B-Act	2	GL	MOT	O	C	Q1 PV	None	None
1-FCV-63-177-A	63	2	F-10	B-Act	4	GA	MOT	O	C	Q1 PV	None	None
1-RFV-63-511-S	63	2	E-10	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
1-RFV-63-534-A	63	2	E-7	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
1-RFV-63-535-S	63	2	E-7	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
1-RFV-63-536-B	63	2	D-7	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
1-RFV-63-577-S	63	2	A-7	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
1-RFV-63-602-S	63	2	A-2	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
[1-]RFV-63-603-S	63	2	A-3	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
[1-]RFV-63-604-S	63	2	A-4	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
1-RFV-63-605-S	63	2	A-6	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
1-RFV-63-626-A	63	2	G-7	C-Act	2x3	SFV	SLF	C	O	BT	None	PV-06
1-RFV-63-627-B	63	2	F-7	C-Act	2x3	SFV	SLF	C	O	BT	None	PV-06
1-RFV-63-637-S	63	2	F-7	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
1-RFV-63-835	63	2	E-10	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
Drawing Number 1-47W845-1												
0-CKV-67-502A-A	67	3	E-8	C-Act	2	CKV	SLF	B	B	C1 C7	None	PV-09
0-CKV-67-502B-A	67	3	E-6	C-Act	2	CKV	SLF	B	B	C1 C7	None	PV-09
0-CKV-67-502C-A	67	3	F-6	C-Act	2	CKV	SLF	B	B	C1 C7	None	PV-09
0-CKV-67-502D-A	67	3	F-8	C-Act	2	CKV	SLF	B	B	C1 C7	None	PV-09
0-CKV-67-502E-B	67	3	F-4	C-Act	2	CKV	SLF	B	B	C1 C7	None	PV-09
0-CKV-67-502F-B	67	3	F-6	C-Act	2	CKV	SLF	B	B	C1 C7	None	PV-09
0-CKV-67-502G-B	67	3	E-6	C-Act	2	CKV	SLF	B	B	C1 C7	None	PV-09
0-CKV-67-502H-B	67	3	E-4	C-Act	2	CKV	SLF	B	B	C1 C7	None	PV-09
0-CKV-67-503A-A	67	3	E-8	C-Act	20	CKV	SLF	B	B	C1 C7	None	None
0-CKV-67-503B-A	67	3	D-7	C-Act	20	CKV	SLF	B	B	C1 C7	None	None
0-CKV-67-503C-A	67	3	F-7	C-Act	20	CKV	SLF	B	B	C1 C7	None	None
0-CKV-67-503D-A	67	3	F-8	C-Act	20	CKV	SLF	B	B	C1 C7	None	None
0-CKV-67-503E-B	67	3	F-4	C-Act	20	CKV	SLF	B	B	C1 C7	None	None
0-CKV-67-503F-B	67	3	F-5	C-Act	20	CKV	SLF	B	B	C1 C7	None	None
0-CKV-67-503G-B	67	3	E-5	C-Act	20	CKV	SLF	B	B	C1 C7	None	None

Table 2, Summary Listing of Valves
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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb.
Drawing Number 1-47W845-1 (continued)												
0-CKV-67-503H-B	67	3	E-4	C-Act	20	CKV	SLF	B	B	C1 C7	None	None
1-CKV-67-508A-A	67	3	C-10	C-Act	8	CKV	SLF	B	B	C1 C0	None	PV-10
1-CKV-67-508B-B	67	3	C-5	C-Act	8	CKV	SLF	B	B	C1 C0	None	PV-10
1-CKV-67-513A-A	67	3	C-10	C-Act	8	CKV	SLF	B	B	C1 C0	None	PV-10
1-CKV-67-513B-B	67	3	C-5	C-Act	8	CKV	SLF	B	B	C1 C0	None	PV-10
1-CKV-67-940A-A	67	N	H-6	C-Act	3	CKV	SLF	C	O	C1	None	None
1-FCV-67-9A-A	67	3	G-9	B-Act	4	BAL	MOT	C	O	Q1 PV	None	None
1-FCV-67-9B-A	67	3	H-9	B-Act	4	BAL	MOT	C	O	Q1 PV	None	None
1-FCV-67-10A-B	67	3	F-3	B-Act	4	BAL	MOT	C	O	Q1 PV	None	None
1-FCV-67-10B-B	67	3	F-5	B-Act	4	BAL	MOT	C	O	Q1 PV	None	None
1-FCV-67-22-A	67	3	G-8	B-Act	24	BUT	MOT	O	C	Q1 PV	None	None
1-FCV-67-24-B	67	3	F-3	B-Act	24	BUT	MOT	O	C	Q1 PV	None	None
1-FCV-67-65-B	67	3	C-5	B-Act	8	BUT	MOT	C	O	Q1 PV	None	None
1-FCV-67-66-A	67	3	C-10	B-Act	8	BUT	MOT	C	O	Q1 PV	None	None
1-FCV-67-67-B	67	3	C-5	B-Act	8	BUT	MOT	C	O	Q1 PV	None	None
[illegible]CV-67-68-A	67	3	C-10	B-Act	8	BUT	MOT	C	O	Q1 PV	None	None
[illegible]CKV-67-508A-A	67	3	C-8	C-Act	8	CKV	SLF	B	B	C1 C0	None	PV-10
2-CKV-67-508B-B	67	3	C-4	C-Act	8	CKV	SLF	B	B	C1 C0	None	PV-10
2-CKV-67-513A-A	67	3	C-8	C-Act	8	CKV	SLF	B	B	C1 C0	None	PV-10
2-CKV-67-513B-B	67	3	C-4	C-Act	8	CKV	SLF	B	B	C1 C0	None	PV-10
2-CKV-67-935-B	67	N	H-6	C-Act	3	CKV	SLF	C	O	C1	None	None
2-FCV-67-9A-A	67	3	G-9	B-Act	4	BAL	MOT	C	O	Q1 PV	None	None
2-FCV-67-9B-A	67	3	F-9	B-Act	4	BAL	MOT	C	O	Q1 PV	None	None
2-FCV-67-10A-B	67	3	G-3	B-Act	4	BAL	MOT	C	O	Q1 PV	None	None
2-FCV-67-10B-B	67	3	H-3	B-Act	4	BAL	MOT	C	O	Q1 PV	None	None
2-FCV-67-22-A	67	3	F-8	B-Act	24	BUT	MOT	O	C	Q1 PV	None	None
2-FCV-67-24-B	67	3	G-3	B-Act	24	BUT	MOT	O	C	Q1 PV	None	None
2-FCV-67-65-B	67	3	C-3	B-Act	8	BUT	MOT	C	O	Q1 PV	None	None
2-FCV-67-66-A	67	3	C-8	B-Act	8	BUT	MOT	C	O	Q1 PV	None	None
2-FCV-67-67-B	67	3	C-4	B-Act	8	BUT	MOT	C	O	Q1 PV	None	None
2-FCV-67-68-A	67	3	C-8	B-Act	8	BUT	MOT	C	O	Q1 PV	None	None
Drawing Number 1-47W845-2												
0-FCV-67-144	67	3	C-6	B-Act	16	GL	MOT	O	C	Q1 PV	None	None
0-FCV-67-151-A	67	3	C-6	B-Act	24	BUT	MOT	B	B	Q1 PV	None	None
0-FCV-67-152-B	67	3	C-6	B-Act	24	BUT	MOT	B	B	Q1 PV	None	None
1-FCV-67-81-A	67	3	G-10	B-Act	24	BUT	MOT	O	C	Q1 PV	None	None
1-FCV-67-82-B	67	3	G-9	B-Act	24	BUT	MOT	O	C	Q1 PV	None	None
1-FCV-67-123-B	67	3	D-9	B-Act	18	BUT	MOT	C	O	Q1 PV	None	None
1-FCV-67-124-B	67	3	E-8	B-Act	18	BUT	MOT	C	O	Q1 PV	None	None
[illegible]FCV-67-125-A	67	3	C-9	B-Act	18	BUT	MOT	C	O	Q1 PV	None	None
[illegible]CV-67-126-A	67	3	D-7	B-Act	18	BUT	MOT	C	O	Q1 PV	None	None
[illegible]FCV-67-143	67	3	C-8	B-Act	12	GL	MOT	O	C	Q1 PV	None	None

Table 2, Summary Listing of Valves

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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb.
Drawing Number 1-47W845-2 (continued)												
1-FCV-67-146-A	67	3	C-7	B-Act	24	BUT	MOT	O	C	Q1 PV	None	None
1-FCV-67-147-T	67	3	A-5	B-Act	24	BUT	MOT	C	O	Q1 PV	None	None
1-FCV-67-223-A	67	3	A-6	B-Act	24	BUT	MOT	O	C	Q1 PV	None	None
1-FCV-67-458-A	67	3	A-9	B-Act	24	BUT	MOT	O	C	Q1 PV	None	None
1-FCV-67-478-B	67	3	B-6	B-Act	24	BUT	MOT	O	C	Q1 PV	None	None
2-FCV-67-81-A	67	3	H-2	B-Act	24	BUT	MOT	O	C	Q1 PV	None	None
2-FCV-67-82-B	67	3	H-2	B-Act	24	BUT	MOT	O	C	Q1 PV	None	None
2-FCV-67-143	67	3	C-4	B-Act	12	GL	MOT	O	C	Q1 PV	None	None
2-FCV-67-147-T	67	3	A-5	B-Act	24	BUT	MOT	O	C	Q1 PV	None	None
2-FCV-67-223-A	67	3	A-6	B-Act	24	BUT	MOT	O	C	Q1 PV	None	None
Drawing Number 1-47W845-3												
1-CKV-67-575A-A	67	2	H-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-67-575B-B	67	2	E-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-67-575C-A	67	2	G-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-67-575D-B	67	2	D-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-67-580A-A	67	2	C-7	AC-Act	2	CKV	SLF	O	C	C7 AJ	None	PV-05
1-CKV-67-580B-B	67	2	B-7	AC-Act	2	CKV	SLF	O	C	C7 AJ	None	PV-05
1-CKV-67-580C-A	67	2	B-7	AC-Act	2	CKV	SLF	O	C	C7 AJ	None	PV-05
1-CKV-67-580D-B	67	2	A-7	AC-Act	2	CKV	SLF	O	C	C7 AJ	None	PV-05
1-CKV-67-585A-A	67	2	D-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-67-585B-B	67	2	B-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-67-585C-A	67	2	C-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-67-585D-B	67	2	A-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-67-1054A-A	67	2	H-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-67-1054B-B	67	2	E-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-67-1054C-A	67	2	G-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-67-1054D-B	67	2	D-7	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-FCV-67-83-A	67	2	H-8	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-87-A	67	2	H-7	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-88-B	67	2	H-8	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-89-B	67	2	H-7	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-91-A	67	2	G-8	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-95-A	67	2	F-7	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-96-B	67	2	F-8	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-97-B	67	2	G-7	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-99-B	67	2	F-8	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-103-B	67	2	E-7	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-104-A	67	2	E-8	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-105-A	67	2	F-7	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-107-B	67	2	E-8	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-111-B	67	2	D-7	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05

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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	N Posi	A Posi	Tests	Alt. Freq. Just.	Rel. Req. Numb.
Drawing Number 1-47W845-3 (continued)												
1-FCV-67-112-A	67	2	D-8	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-113-A	67	2	E-7	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-67-130-A	67	2	C-8	A-Act	2	PLG	MOT	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-131-B	67	2	C-8	A-Act	2	PLG	MOT	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-133-A	67	2	B-8	A-Act	2	PLG	MOT	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-134-B	67	2	C-8	A-Act	2	PLG	MOT	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-138-B	67	2	B-8	A-Act	2	PLG	MOT	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-139-A	67	2	B-8	A-Act	2	PLG	MOT	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-141-B	67	2	A-8	A-Act	2	PLG	MOT	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-142-A	67	2	A-8	A-Act	2	PLG	MOT	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-295-A	67	2	C-7	A-Act	2	PLG	MOT	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-296-A	67	2	C-7	A-Act	2	PLG	MOT	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-297-B	67	2	B-7	A-Act	2	PLG	MOT	O	C	Q1 AJ PV	None	PV-05
1-FCV-67-298-B	67	2	A-7	A-Act	2	PLG	MOT	O	C	Q1 AJ PV	None	PV-05
1-TCV-67-84-A	67	3	H-5	B-Pas	4	GL	DIA	N	O	FS	AF-27	None
[illegible]TCV-67-92-A	67	3	G-5	B-Pas	4	GL	DIA	N	O	FS	AF-27	None
[illegible]TCV-67-100-B	67	3	E-5	B-Pas	4	GL	DIA	N	O	FS	AF-27	None
1-TCV-67-108-B	67	3	D-5	B-Pas	4	GL	DIA	N	O	FS	AF-27	None
Drawing Number 1-47W845-4												
1-FCV-67-162	67	3	B-4	B-Act	2	GL	DIA	C	O	Q1 FS PV	None	None
1-FCV-67-164	67	3	B-6	B-Act	2	GL	DIA	C	O	Q1 FS PV	None	None
1-FCV-67-176	67	3	D-4	B-Act	1.5	GL	DIA	C	O	Q1 FS PV	None	None
1-FCV-67-182	67	3	D-6	B-Act	1.5	GL	DIA	C	O	Q1 FS PV	None	None
1-FCV-67-184	67	3	D-4	B-Act	1.5	GL	DIA	C	O	Q1 FS PV	None	None
1-FCV-67-186	67	3	D-6	B-Act	1.5	GL	DIA	C	O	Q1 FS PV	None	None
1-FCV-67-213	67	3	A-4	B-Act	1.5	GL	DIA	C	O	Q1 FS PV	None	None
1-FCV-67-215	67	3	B-6	B-Act	1.5	GL	DIA	C	O	Q1 FS PV	None	None
1-FCV-67-342	67	3	G-4	B-Act	2	GL	DIA	C	O	Q1 FS PV	None	None
1-FCV-67-344	67	3	G-6	B-Act	2	GL	DIA	C	O	Q1 FS PV	None	None
1-FCV-67-346	67	3	F-4	B-Act	1.5	GL	DIA	C	O	Q1 FS PV	None	None
1-FCV-67-348	67	3	F-6	B-Act	1.5	GL	DIA	C	O	Q1 FS PV	None	None
1-FCV-67-350	67	3	F-4	B-Act	1.5	GL	DIA	C	O	Q1 FS PV	None	None
1-FCV-67-352	67	3	F-6	B-Act	1.5	GL	DIA	C	O	Q1 FS PV	None	None
1-FCV-67-354	67	3	G-4	B-Act	1.5	GL	DIA	C	O	Q1 FS PV	None	None
1-FCV-67-356	67	3	G-6	B-Act	1.5	GL	DIA	C	O	Q1 FS PV	None	None
0-FSV-32-61-A	32	N	B-12	B-Act	1	GA	SOL	C	O	Q1 FS	None	None
Drawing Number 1-47W845-5												
0-FCV-67-205-A	67	3	H-2	B-Act	4	BUT	MOT	O	C	Q1 PV	None	None
0-FCV-67-208-B	67	3	H-3	B-Act	4	BUT	MOT	O	C	Q1 PV	None	None

Table 2, Summary Listing of Valves

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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb.
Drawing Number 1-47W845-7												
0-FSV-32-87-B	32	N	A-10	B-Act	1	GA	SOL	C	O	Q1 FS	None	None
2-FCV-67-217	67	3	C-4	B-Act	2	GL	DIA	C	O	Q1 FS PV	None	None
2-FCV-67-219	67	3	C-6	B-Act	2	GL	DIA	C	O	Q1 FS PV	None	None
2-FCV-67-336	67	3	A-4	B-Act	1	GL	DIA	C	O	Q1 FS PV	None	None
2-FCV-67-338	67	3	A-6	B-Act	1	GL	DIA	C	O	Q1 FS PV	None	None
2-FCV-67-354	67	3	F-4	B-Act	1.5	GL	DIA	C	O	Q1 FS PV	None	None
2-FCV-67-356	67	3	F-6	B-Act	1.5	GL	DIA	C	O	Q1 FS PV	None	None
Drawing Number 1-47W813-1												
1-CKV-68-559-S	68	2	H-4	C-Act	4	CKV	SLF	C	B	C0	AF-17	None
1-FCV-68-22	68	2	B-8	B-Pas	4	GL	DIA	O	O	PV	None	None
1-FCV-68-332-B	68	1	C-2	B-Act	3	GA	MOT	O	C	Q1 PV	None	None
1-FCV-68-333-A	68	1	B-2	B-Act	3	GA	MOT	O	C	Q1 PV	None	None
1-FSV-68-394-A	68	2	F-7	B-Act	1	GL	SOL	C	O	Q2 FS PV	AF-28	None
1-FSV-68-395-B	68	2	G-7	B-Act	1	GL	SOL	C	O	Q2 FS PV	AF-28	None
1-FSV-68-396-B	68	2	F-5	B-Act	1	GL	SOL	C	O	Q2 FS PV	AF-28	None
1-FSV-68-397-A	68	2	G-6	B-Act	1	GL	SOL	C	O	Q2 FS PV	AF-28	None
1-PCV-68-334-B	68	1	C-1	B-Act	3	GL	SOL	C	O	Q2 FS PV	AF-28	None
1-PCV-68-340A-A	68	1	B-1	B-Act	3	GL	SOL	C	O	Q2 FS PV	AF-28	None
1-RFV-68-563-S	68	1	A-3	C-Act	6x6	SFV	SLF	C	O	BT	None	PV-06
1-RFV-68-564-S	68	1	A-2	C-Act	6x6	SFV	SLF	C	O	BT	None	PV-06
1-RFV-68-565-S	68	1	A-2	C-Act	6x6	SFV	SLF	C	O	BT	None	PV-06
Drawing Number 1-47W859-1												
0-CKV-70-504-B	70	3	D-7	C-Act	16	CKV	SLF	B	B	C1 C7	None	None
0-FCV-70-197-A	70	3	B-5	B-Act	20	BUT	MOT	O	C	Q1 PV	None	None
1-CKV-70-504A-A	70	3	B-7	C-Act	16	CKV	SLF	B	B	C1 C7	None	None
1-CKV-70-504B-S	70	3	C-7	C-Act	16	CKV	SLF	B	B	C1 C7	None	None
1-FCV-70-2-A	70	3	B-5	B-Act	18	BUT	MOT	O	C	Q2 PV	AF-30	None
1-FCV-70-3-B	70	3	D-7	C-Act	18	BUT	MOT	O	C	Q2 PV	AF-30	None
1-FCV-70-66	70	3	B-5	B-Act	2	ANG	DIA	O	C	Q1 FS PV	None	None
1-RFV-70-538-S	70	3	B-7	C-Act	3x4	SFV	SLF	C	O	BT	None	PV-06
1-RFV-70-539-S	70	3	C-7	C-Act	3	SFV	SLF	C	O	BT	None	PV-12
2-FCV-70-66	70	3	D-3	B-Act	2	ANG	DIA	O	C	Q1 FS PV	None	None
Drawing Number 1-47W859-2												
1-CKV-70-679	70	2	H-3	AC-Act	3	CKV	SLF	O	C	C8 AJ	AF-29	PV-05
1-CKV-70-681A	70	2	G-8	C-Act	2	CKV	SLF	O	C	C0	None	PV-11
1-CKV-70-681B	70	2	F-8	C-Act	2	CKV	SLF	O	C	C0	None	PV-11
1-CKV-70-681C	70	2	E-8	C-Act	2	CKV	SLF	O	C	C0	None	PV-11
1-CKV-70-681D	70	2	H-8	C-Act	2	CKV	SLF	O	C	C0	None	PV-11

Table 2, Summary Listing of Valves
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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb.
Drawing Number 1-47W859-2 (continued)												
1-CKV-70-682A	70	2	G-8	C-Act	2	CKV	SLF	O	C	CO	None	PV-11
1-CKV-70-682B	70	2	F-8	C-Act	2	CKV	SLF	O	C	C0	None	PV-11
1-CKV-70-682C	70	2	E-8	C-Act	2	CKV	SLF	O	C	C0	None	PV-11
1-CKV-70-682D	70	2	H-8	C-Act	2	CKV	SLF	O	C	C0	None	PV-11
1-CKV-70-687	70	2	H-9	AC-Pas	0.5	CKV	SLF	C	C	AJ	None	PV-05
1-CKV-70-698	70	2	E-9	AC-Pas	0.5	CKV	SLF	C	O	AJ	None	PV-05
1-CKV-70-790	70	2	G-3	AC-Pas	0.75	CKV	SLF	C	O	AJ	AF-29	PV-05
1-FCV-70-85-B	70	2	D-10	A-Act	6	BUT	MOT	O	C	Q1 AJ PV	None	PV-05
1-FCV-70-87-B	70	2	F-10	A-Act	3	GA	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-70-89-B	70	2	E-9	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-70-90-A	70	2	F-10	A-Act	3	GA	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-70-92-A	70	2	E-9	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-70-100-A	70	2	G-3	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
1-FCV-70-133-A	70	3	H-3	B-Act	3	GA	MOT	O	C	Q2 PV	AF-29	None
1-FCV-70-134-B	70	2	H-3	A-Act	3	GA	MOT	O	C	Q2 AJ PV	AF-29	PV-05
FCV-70-140-B	70	2	G-3	A-Act	6	BUT	MOT	O	C	Q2 AJ PV	AF-29	PV-05
FCV-70-143-A	70	2	E-3	A-Act	6	BUT	MOT	O	C	Q1 AJ PV	None	PV-05
1-FCV-70-183-A	70	2	C-9	B-Act	3	GA	MOT	O	C	Q1 PV	None	None
1-FCV-70-215-A	70	3	B-7	B-Act	3	GA	MOT	O	C	Q1 PV	None	None
1-RFV-70-703	70	2	E-5	AC-Act	3x4	SFV	SLF	C	O	BT AJ	None	PV-05
1-RFV-70-835	70	3	H-6	C-Act	0.75	SFV	SLF	C	O	BT	None	PV-05
Drawing Number 1-47W859-4												
1-FCV-70-153-B	70	3	F-3	B-Act	18	BUT	MOT	C	O	Q1 PV	None	None
1-FCV-70-156-A	70	3	F-4	B-Act	18	BUT	MOT	C	O	Q1 PV	None	None
Drawing Number 1-47W812-1												
1-CKV-72-506-A	72	2	C-10	C-Act	12	CKV	SLF	C	O	C1 C7	None	None
1-CKV-72-507-B	72	2	B-10	C-Act	12	CKV	SLF	C	O	C1 C7	None	None
1-CKV-72-524-A	72	2	D-6	C-Act	10	CKV	SLF	C	O	C1	None	None
1-CKV-72-525-B	72	2	A-6	C-Act	10	CKV	SLF	C	O	C1	None	None
1-CKV-72-548-A	72	2	D-2	C-Act	10	CKV	SLF	C	O	C0	None	PV-13
1-CKV-72-549-B	72	2	A-2	C-Act	10	CKV	SLF	C	O	C0	None	PV-13
1-CKV-72-562-A	72	2	F-2	C-Act	8	CKV	SLF	C	O	C0	None	PV-13
1-CKV-72-563-B	72	2	E-2	C-Act	8	CKV	SLF	C	O	C0	None	PV-13
1-FCV-72-2-B	72	2	A-3	A-Act	10	GA	MOT	C	O	Q1 AJ PV	None	PV-05
1-FCV-72-13-B	72	2	B-6	B-Act	2	GL	MOT	C	O	Q1 PV	None	None
1-FCV-72-21-B	72	2	B-10	B-Act	12	GA	MOT	O	C	Q1 PV	None	None
1-FCV-72-22-A	72	2	C-10	B-Act	12	GA	MOT	O	C	Q1 PV	None	None
1-FCV-72-34-A	72	2	C-6	B-Act	2	GL	MOT	C	B	Q1 PV	None	None
1-FCV-72-39-A	72	2	C-3	A-Act	10	GA	MOT	C	O	Q1 AJ PV	None	PV-05
FCV-72-40-A	72	2	F-3	A-Act	8	GA	MOT	C	O	Q2 AJ PV	AF-31	PV-05

Table 2, Summary Listing of Valves

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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb.
Drawing Number 1-47W812-1 (continued)												
1-FCV-72-41-B	72	2	E-3	A-Act	8	GA	MOT	C	O	Q2 AJ PV	AF-31	PV-05
1-FCV-72-44-A	72	2	G-3	B-Act	12	GA	MOT	C	O	Q1 PV	AF-25	None
1-FCV-72-45-B	72	2	H-3	B-Act	12	GA	MOT	C	O	Q1 PV	AF-25	None
1-RFV-72-508-A	72	2	C-9	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
1-RFV-72-509-B	72	2	A-9	C-Act	.75x1	SFV	SLF	C	O	BT	None	PV-06
Drawing Number 1-47W810-1												
1-CKV-74-514-A	74	2	F-8	C-Act	8	CKV	SLF	C	B	C3 C4 C8	AF-18	None
1-CKV-74-515-B	74	2	C-8	C-Act	8	CKV	SLF	C	B	C3 C4 C8	AF-18	None
1-CKV-74-544-A	74	2	F-5	C-Act	8	CKV	SLF	C	B	C3 C5 C7	AF-18	None
1-CKV-74-545-B	74	2	C-5	C-Act	8	CKV	SLF	C	B	C3 C5 C7	AF-18	None
1-FCV-74-1-A	74	1	G-2	A-Act	14	GA	MOT	C	O	Q2 LT PV	AF-32	None
1-FCV-74-2-B	74	1	G-3	A-Act	14	GA	MOT	C	O	Q2 LT PV	AF-32	None
1-FCV-74-3-A	74	2	F-9	B-Act	14	GA	MOT	O	C	Q1 PV	None	None
1-FCV-74-8-A	74	1	G-3	A-Act	10	GA	MOT	C	O	Q2 LT PV	AF-32	None
1-FCV-74-9-B	74	1	G-2	A-Act	10	GA	MOT	C	O	Q2 LT PV	AF-32	None
1-FCV-74-12-A	74	2	G-7	B-Act	3	GL	MOT	O	C	Q1 PV	None	None
1-FCV-74-16	74	2	E-4	B-Act	8	BUT	DIA	O	O	Q1 FS	None	None
1-FCV-74-21-B	74	2	C-9	B-Act	14	GA	MOT	O	C	Q1 PV	None	None
1-FCV-74-24-B	74	2	B-6	B-Act	3	GL	MOT	O	C	Q1 PV	None	None
1-FCV-74-28	74	2	C-4	B-Act	8	BUT	DIA	O	O	Q1 FS	None	None
1-FCV-74-33-A	74	2	E-4	B-Act	8	GA	MOT	O	C	Q2 PV	AF-26	None
1-FCV-74-35-B	74	2	C-4	B-Act	8	GA	MOT	O	C	Q2 PV	AF-26	None
1-RFV-74-505-S	74	2	H-3	C-Act	3x4	SFV	SLF	C	O	BT	None	PV-06
Drawing Number 1-47W830-1												
1-FCV-77-9-B	77	2	D-1	A-Act	3	DIA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-77-10-A	77	2	E-1	A-Act	3	DIA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-77-16-B	77	2	B-5	A-Act	0.75	DIA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-77-17-A	77	2	B-6	A-Act	0.75	DIA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-77-18-B	77	2	B-5	A-Act	1	DIA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-77-19-A	77	2	B-5	A-Act	1	DIA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-77-20-A	77	2	C-5	A-Act	1	DIA	DIA	O	C	Q1 AJ FS PV	None	PV-05
Drawing Number 1-47W830-6												
1-FCV-63-64-A	63	2	B-6	A-Act	1	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-68-305-A	68	2	G-7	A-Act	0.75	GL	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-CKV-77-849	77	2	G-7	AC-Act	1	CKV	SLF	O	C	C8 AJ	AF-33	PV-05
1-CKV-77-868	77	2	B-7	AC-Act	1	CKV	SLF	O	C	C8 AJ	AF-33	PV-05
Drawing Number 1-47W851-1												
1-FCV-77-127-B	77	2	F-7	A-Act	2	PLG	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-77-128-A	77	2	F-7	A-Act	2	PLG	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-RFV-77-2875	77	2	F-7	AC-Act	2	SFV	SLF	C	B	BT AJ	None	PV-05

Table 2, Summary Listing of Valves

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Valve Number	Sys	Class	Coor	Cat	Size	Type	Act	NPosi	APosi	Tests	Alt. Freq. Just.	Rel. Req. Numb.
Drawing Number 1-47W855-1												
1-ISV-78-557	78	2	G-7	A-Pas	4	DIA	MAN	C	C	AJ	None	PV-05
1-ISV-78-558	78	2	G-8	A-Pas	4	DIA	MAN	C	C	AJ	None	PV-05
1-ISV-78-560	78	2	H-8	A-Pas	6	DIA	MAN	C	C	AJ	None	PV-05
1-ISV-78-561	78	2	H-7	A-Pas	6	DIA	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	DIA	DIA	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	GL	MAN	C	C	AJ	None	PV-06
Drawing Number 1-47W610-90-3												
1-FCV-90-107-A	90	2	A-9	A-Act	1.5	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-108-B	90	2	C-8	A-Act	1.5	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-109-B	90	2	C-8	A-Act	1.5	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-110-B	90	2	C-8	A-Act	1.5	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
FCV-90-111-A	90	2	D-9	A-Act	1.5	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
CV-90-113-A	90	2	A-5	A-Act	1.5	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-114-B	90	2	C-4	A-Act	1.5	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-115-B	90	2	C-4	A-Act	1.5	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-116-B	90	2	C-4	A-Act	1.5	GA	DIA	O	C	Q1 AJ FS PV	None	PV-05
1-FCV-90-117-A	90	2	D-5	A-Act	1.5	GA	DIA	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

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.

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

ALTERNATIVE FREQUENCY JUSTIFICATION AF-02

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

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.

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 once per 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

II. **Function of Affected Component(s)** - Opens to allow steam line warming before opening the MSIVs during a normal plant startup. Closes to interrupt loss of SG inventory through a ruptured main steam line occurring during the startup phase of plant operation. Provides flow boundary isolation between the seismically qualified and non-seismically qualified portions of the main steam system during the startup phase of plant operation.

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 during once per cold shutdown, not to exceed once per quarter in the event of frequent cold shutdowns.

Table 3, Alternative Frequency Justifications
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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

II. **Function of Affected Component(s)** - Opens to mitigate steam generator pressure transients, controls steam generator temperature by controlling the pressure.

III. **Basis for Alternative Frequency** - Opening these valves 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.

IV. **Proposed Alternative Frequency** - Full stroke once per cold shutdown, 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

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. **Alternative Frequency** - Test the valve at reduced flow 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).

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

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.

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

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-CKV-3-805-A, 1-CKV-3-806-B, 1-CKV-3-810-S, 1-CKV-3-820-A, 1-CKV-3-821-B, 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

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** - Backseat valves 1-CKV-3-805-A, 1-CKV-3-806-B, and 1-CKV-3-810-S quarterly. Full stroke exercise all of the valves once per cold shutdown, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-08

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

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 once per cold shutdown, not to exceed once per quarter in the event of frequent cold shutdown.

Table 3, Alternative Frequency Justifications
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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

II. **Function of Affected Component(s)** - Containment isolation

III. **Basis for Alternative Frequency** - Exercising these valves 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 once per cold shutdown, 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

Function of Affected Component(s) - Remains closed during operation to prevent drafts from entering the ice storage compartment and causing sublimation. Opens during ice melt portion of accident to drain water into lower compartment and 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. **Alternative Frequency** - Test 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-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

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)

Table 3, Alternative Frequency Justifications
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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.

Back seating 1-CKV-62-504-S or 1-CKV-63-510-S renders both trains of their respective systems inoperable.

IV. **Proposed Alternative Frequency** - Full stroke at refueling. Part stroke valves in the normal seal injection flow path or pump minimum flow test flow path once per quarter. Back seat valves 1-CKV-62-504-S and 1-CKV-63-510-S once per cold shutdown but not more often than once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-12

Affected Component(s) - 1-CKV-62-661-S, 1-FCV-62-84-A

II. **Function of Affected Component(s)** - Valves 1-CKV-62-661 and 1-FCV-62-84-B open to admit auxiliary spray to the pressurizer during low RCS flow or high pressure conditions.

III. **Basis for Alternative Frequency** - Alternating between 1-FCV-62-85-B and 1-FCV-62-86-A during power operation is in violation of the precautions of System Description N3-62-4001. The basis for the precaution in the System Description is to limit the number of thermal stress cycles experienced by the charging nozzles associated with these valves. Opening 1-FCV-62-84-A during power operation to establish maximum auxiliary spray flow also introduces an additional thermal stress cycle on the pressurizer nozzle associated with it.

IV. **Alternative Frequency** - Full stroke once per cold shutdown, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-13

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

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.

Table 3, Alternative Frequency Justifications
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IV. **Alternative Frequency** - Test valve at full flow once per refueling cycle.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-14

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

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. **Alternative Frequency** - Full stroke once per cold shutdown, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-15

I. **Affected Component(s)** - 1-FCV-62-69-A, 1-FCV-62-70-A, 1-FCV-62-77-B, 1-FCV-62-90-A, 1-FCV-62-91-B

II. **Function of Affected Components** - 1-FCV-62-69-A and 1-FCV-62-70-A close on pressurizer low level to preclude loss of pressurizer inventory. 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 also provides a containment isolation function.

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. **Alternative Frequency** - Full stroke once per cold shutdown, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-16

I. **Affected Component(s)** - 1-LCV-62-132-A, 1-LCV-62-133-B, 1-LCV-62-135-A, 1-LCV-62-136-B

II. **Function of Affected Component(s)** - Changes position to realign charging pump suction from the Volume Control Tank to the RWST 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.

Alternative Frequency - Full stroke once per cold shutdown, not to exceed once per quarter in the event of frequent cold shutdowns.

Table 3, Alternative Frequency Justifications
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ALTERNATIVE FREQUENCY JUSTIFICATION AF-17

I. **Affected Component(s)** - 1-CKV-63-725, 1-CKV-68-559-B

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. **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-CKV-74-514-A, 1-CKV-74-515-B, 1-CKV-74-544-A, 1-CKV-74-545-B

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.

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 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 in the pump minimum flow recirculation flow path.

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

Table 3, Alternative Frequency Justifications
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ALTERNATIVE FREQUENCY JUSTIFICATION AF-19

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

II. **Function of Affected Component(s)** - Closed 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. **Alternative Frequency** - Full stroke once per cold shutdown, 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

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. **Alternative Frequency** - Full stroke once per cold shutdown, 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

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. **Alternative Frequency** - Full stroke once per cold shutdown, 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

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

Table 3, Alternative Frequency Justifications
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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. **Alternative Frequency** - Full stroke once per cold shutdown, 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

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 once per cold shutdown 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

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.

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. **Alternative Frequency** - Full stroke once per cold shutdown but not more often than once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-25

Affected Component(s) - 1-FCV-63-72-A, 1-FCV-63-73-B, 1-FCV-72-44-A, 1-FCV-72-45-B

Table 3, Alternative Frequency Justifications
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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 once per cold shutdown, 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-FCV-74-33-A, 1-FCV-74-35-B

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 also 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.

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. **Alternative Frequency** - Full stroke once per cold shutdown, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-27

I. **Affected Component(s)** - 1-TCV-67-84-A, 1-TCV-67-92-A, 1-TCV-67-100-B, 1-TCV-67-108-B

II. **Function of Affected Component(s)** - Fails open to prevent loss of cooling water flow to the lower compartment coolers.

III. **Basis for Alternative Frequency** - Valves are physically located in an area of the reactor building to which it is extremely difficult to obtain safe access during operation.

IV. **Alternative Frequency** - Test the valves once per cold shutdown, but not more often than once per three months in the event of frequent cold shutdowns.

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

Table 3, Alternative Frequency Justifications
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II. **Function of Affected Component(s)** - The PCVs are power operated relief valves on the pressurizer which function to control overpressure conditions during startup and shutdown. The FSVs are the reactor head vent valves.

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 marked tendency to not reseat sufficiently to preclude excessive seat leakage after cycling. Therefore, cycling the valves during operation introduces the likelihood of creating an unacceptable leak from the RCS.

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

ALTERNATIVE FREQUENCY JUSTIFICATION AF-29

I. **Affected Component(s)** - 1-CKV-70-679, 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-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

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. **Alternative Frequency** - Full stroke once per cold shutdown, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-30

I. **Affected Component(s)** - 1-FCV-70-2-A, 1-FCV-70-3-B

II. **Function of Affected Component(s)** - Closed by operator in the event of a pipe break in the Component Cooling System.

III. **Basis for Alternative Frequency** - These two valves are normally maintained in the deenergized condition to avoid uncontrolled operation in the event of a fire affecting the control cabling (Appendix R). Additionally, although the valves only feed one train of equipment, they feed multiple systems of the same train. Failure of the valve to reopen would result in the loss of one train of the centrifugal charging pumps, the safety injection pumps, the residual heat removal pumps and the containment spray pumps.

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

Table 3, Alternative Frequency Justifications
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ALTERNATIVE FREQUENCY JUSTIFICATION AF-31

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

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)

IV. **Proposed Alternative Frequency** - Full stroke once per cold shutdown, 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

II. **Function of Affected Component(s)** - Closes to isolate low pressure RHR piping from high pressure of the reactor coolant system. Reopens to provide normal RHR decay heat removal flow path from the RCS.

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 once per cold shutdown, not to exceed once per quarter in the event of frequent cold shutdowns.

ALTERNATIVE FREQUENCY JUSTIFICATION AF-33

I. **Affected Component(s)** - 1-CKV-77-849, 1-CKV-77-868

II. **Function of Affected Component(s)** - 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 also prohibit quarterly exercising of these valves.

IV. **Alternative Frequency** - Full stroke once per cold shutdown, 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

II. **Function of Affected Component(s)** - 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.

Table 3, Alternative Frequency Justifications
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IV. **Alternative Frequency** - Full stroke once per cold shutdown, not to exceed once per quarter in the event of frequent cold shutdowns.

Table 4, Request for Relief
Page 1 of 15

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 $\geq$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

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

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

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.

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-1.

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

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

III. **Affected Component(s)** - Auxiliary Feedwater Pump 1A-S

IV. **ASME Code Class** - 3

V. **Category** - Active

VI. **Function of Affected Component(s)** - Supply feedwater flow to the steam generators when the main feedwater system is not available for any reason.

VII. **Impractical Requirement** - OM Standard, Part 6, paragraphs 5.4 - Pumps which can only be tested during plant operation shall be tested within one week following plant startup.

VIII. **Basis for Granting Relief** - In order to run the turbine which supplies power to auxiliary feedwater pump 1A-S, steam generator pressure would normally be at the hot no load condition. Although unlikely, it is conceivable that the unit could be required to operate in mode 3, a mode in which the auxiliary feedwater pump is normally required operable, for longer than one week without raising steam generator pressure to a level high enough to allow pump 1A-S operation. This situation may be the result of extended time being required to clean up the secondary side water chemistry following an extended outage. Without sufficient steam generator pressure, meaningful pump tests cannot be performed. This is recognized by the WBN Technical Specifications and provisions are made in the Technical Specifications for delaying the testing of this pump until sufficient steam generator pressure has been developed.

IX. **Proposed Alternative** - When the auxiliary feedwater pump 1A-S test schedule cannot be maintained during a shutdown, perform testing in accordance with the provisions of the WBN Technical Specifications regarding testing after reaching the appropriate Steam Generator pressure. Following this initial test, testing will be conducted on the normal once per quarter frequency.

X. **Frequency of Proposed Alternative** - Each shutdown for which auxiliary feedwater pump 1A-S test schedule cannot be maintained.

Table 4, Request for Relief
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I. **Relief Request Number** - PV-03

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

III. **Affected Component(s)** - Boric Acid Transfer Pumps

IV. **ASME Code Class** - 3

V. **Category** - Active

VI. **Function of Affected Component**(s) - Supplies boric acid for emergency boration.

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 this pump 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. Temporarily installed instrumentation is available which will yield a 3% accuracy.

IX. **Proposed Alternative** - Perform the pump test using temporarily installed flow instrumentation with an accuracy of 3% and a reduced range of allowable test quantities.

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

Table 4, Request 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

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

V. **Category** - Active

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 5.3(d) - Pressure, flow rate, and vibration (displacement or velocity) shall be determined and compared with corresponding reference values.

VIII. **Basis for Granting Relief** - These pumps 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 will be collected and analyzed in accordance with OM-6.

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

Table 4, Request 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.

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 10CFR50.55 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.

Table 4, Request for Relief
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Relief Request Number - PV-05 (continued)

IX. **Proposed Alternative** (continued) -

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, Request for Relief
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I. **Relief Request Number** - PV-06

II. **Affected System(s)** - All systems equipped with safety or relief valves.

III. **Affected Component(s)** - All safety or relief valves.

IV. **ASME Code Class** - 1, 2, and 3

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

VI. **Function of Affected Component(s)** - Relieve overpressure conditions.

VII. **Impractical Requirement** - OM Standard, Part 1, paragraphs 8.1.1.8, 8.1.2.8, and 8.1.3.7 - "A minimum of 10 minutes shall elapse between successive openings."

VIII. **Basis for Granting Relief** - These steps require a ten minute delay between successive openings of valves. They were included in OM-1 in order to allow for thermal stabilization following an opening at an elevated temperature. When testing at ambient temperature this introduces an unnecessary delay in testing.

IX. **Proposed Alternative** - The ten minute delay will be observed for tests performed at elevated temperature, but for tests performed at ambient conditions, the hold time for thermal stabilization will not be observed.

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

Table 4, Request 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-3-891-S, 1-CKV-1-892-S, 1-CKV-1-921-B, 1-CKV-3-922-A

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 if safety.

It is not practicable to establish conditions which will allow safely backseating 1-CKV-1-891-S and 1-CKV-1-892-S.

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 at least once per cold shutdown. Backseat testing of these valves will be performed once per cold shutdown following the part stroke to open test. 1-CKV-1-891-S and 1-CKV-1-892-S will be tested as 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** - Part stroke once per cold shutdown not to exceed once per quarter in the event of frequent cold shutdowns and disassemble and inspect at least one valve per lot of four at each refueling outage.

Table 4, Request 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-62-562-S, 1-CKV-63-563-S, 1-CKV-63-622-S, 1-CKV-63-623-S, 1-CKV-63-624-S, 1-CKV-62-625-S

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 tremendous financial and scheduling burden.

IX. **Proposed Alternative** - Part stroke exercise valves 1-CKV-63-560-S, 1-CKV-63-561-S, 1-CKV-62-562-S and 1-CKV-63-563-S at the maximum flow available from RHR during 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-62-562-S and 1-CKV-63-563-S every cold shutdown 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, Request 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

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 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.

The critical parameter for determining the performance of these column vent check valves is not the flow rate they will pass but rather the time which it takes to allow the column to vent. This ensures that the column will be vented before it can reasonably be expected that another start signal will be generated for the pumps. As long as the column has been vented, the motor does not have to attempt to accelerate a standing column of water.

IX. **Proposed Alternative** - Initially establish a reference value for the length of time required for the column to vent. Subsequent tests will then determine the time it takes for the column to vent and compare the time to the reference value. An increase of 50% or more will be considered indication that the valve is not opening sufficiently. The closing function of the valve will be demonstrated each pump test.

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

Table 4, Request 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, 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, 2-CKV-67-513B-B

IV. **ASME Code Class** - 3

V. **Category** - C-Active

VI. **Function of Affected Component(s)** - Opens to pass cooling water flow to its respective diesel generator, closes to provide flow boundary isolation when the backup train cooling water is used.

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. The valve opening function can be verified, but there is no way to positively determine that the valve is backseating properly. Disassembling all fourteen valves each outage imposes an unreasonable burden.

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, Request 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

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, Request 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-RFV-62-1079

IV. **ASME Code Class** - 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, Request for Relief
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I. **Relief Request Number** - PV-13

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

III. **Affected Component(s)** - 1-CKV-72-548-A, 1-CKV-72-549-B, 1-CKV-72-562-A, 1-CKV-72-563-B

IV. **ASME Code Class** - 2

V. **Category** - C-Active

VI. **Function of Affected Component(s)** - Opens to pass water from either the Containment Spray or the Residual Heat Removal pumps to the Containment Spray or RHR ring headers.

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