ENCLOSURE 4

SECTION 4.0
INSERVICE TESTING
PROGRAM PLAN FOR VALVES

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SECTION 4.1

PROGRAM DESCRIPTION

PROGRAM DESCRIPTION

The Inservice Testing (IST) Program for Class 1, 2, & 3 valves meets the requirements of Subsection IWV of the ASME Section XI Code, 1983 Edition, through the Summer of 1983 Addenda. Where code requirements are determined to be impractical, specific requests for relief are written, referenced, and included with the tables. Additional valve relief requests may be necessary and these will be identified and submitted during subsequent program revisions. Byron Station received a Safety Evaluation Report (SER) on September 15, 1988 and is listed in Table 2 of NRC Generic Letter 89-04 as a plant with a reviewed IST Program and SER issued. Per NRC Generic Letter 89-04, the status of relief requests as stated in the SER is unchanged. Any modifications to Byron Station relief requests approved in the SER (VR-1 through VR-17) which are covered by one of the eleven positions discussed in NRC Generic Letter 89-04, Attachment 1, must be performed in accordance with the guidelines given in the Generic Letter. Pre-approval is granted for all relief requests submitted which are consistent with the eleven positions given. New relief requests dealing with a position not covered by NRC Generic Letter 89-04, Attachment 1, must receive NRC approval prior to implementation. The table lists all code Class 1, 2, & 3 valves which have been assigned a specific code category as directed by Subsection IWV of Section XI. The table is organized according to operating system and listed in valve number order using P&ID references to further categorize.

The valves subject to ISI testing are those valves which are identified in accordance with the scope of ASME Section XI, Subsection IWV-1100:

> "This Subsection provides the rules and requirements for inservice testing to assess operational readiness of certain Class 1, 2, and 3 valves (and their actuating and position indicating systems) in light-water cooled nuclear power plants, which are required to perform a specific function in shutting down a reacto to the cold shutdown condition or in mitigating the co.. quences of of an accident."

Exceptions to this scope are those valves which are exempt, but added to the program based on NRC mandates. These valves are identified in the program notes and relief requests.

After installation and prior to service, all valves identified in this program were tested as required by Subsection IWV-3100 of Section XI of the ASME Cod These tests were conducted under conditions similar to those to be experienced during subsequent inservice tests. When a valve or its control system has been replaced or undergone maintenance that could affect its performance, it will be retested prior to its return to service, to demonstrate that all performance parameters are within acceptable limits.

As required by NRC Generic Letter 89-04, Attachment 1, Position 5, the limiting value of full-stroke time will be based on the valve reference or average stroke time of the valve when it is known to be in good condition and operating properly. This limiting value is based on a reasonable deviation from this reference stroke time based on valve size, valve type, actuator type, system design, dual unit/dual train design, etc. The deviation should not be so restrictive that it results in a valve being declared inoperable due to reasonable stroke time variations. However, the deviation used to establish the limit should be such that corrective action would be taken for a valve that may not perform its intended function. New or additional reference values may be required if:

1) A valve has been replaced,
2) When a reference value or set of values may have been affected by repair or routine servicing of a valve, or
3) If it is necessary or desirable for some reason other than 1) or 2) above.

NRC Generic Letter 89-04, Attachment 1, Positions 1-3 discuss full stroke, alternatives to full stroke, and backflow testing of check valves, respectively. A valid full stroke test is one in which verification of maximum required accident condition flow through the valve is obtained. The minimum acceptable flow value for a specific valve is determined from Technical Specifications, UFSAR, manufacturers data, engineering calculations, etc. An alternative to full stroke testing includes, but is not limited to, a sample disassembly and inspection program of valves grouped by similarity of design (manufacturer, size, model number, materials of construction, etc.) and service conditions (including valve orientation). This sample disassembly and inspection program will be performed during refueling outages. A backflow test verifies that the disc travels to the seat promptly on cessation or reversal of flow, for check valves which perform a safety function in the closed direction. For category A/C check valves (valves that have a specified leak rate limit and are self-actuated in response to a system characteristic), the backflow test is satisfied by performing the leak-rate test.

Per NRC Generic Letter 89-04, Attachment 1, Position #8, whenever valve data is determined to be within the Required Action Range, the valve is inoperable, and the Technical Specification LCO Action Statement time starts. In the event a valve must be declared inoperable as a result of inservice testing, limitations on plant operations will be as stated in the Technical Specifications.

Section XI of the ASME Boiler and Pressure Vessel Code shall not be construed to supersede the requirements of the Technical Specifications.

SECTION 4.2

PROGRAM REFERENCES

PROGRAM REFERENCES

1. Title 10, Code of Federal Regulations, Part 50, Domestic Licensing of Production and Utilization Facilities, particularly Section 50.55a, Codes and Standards.

2. ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1983 Edition, Summer 1983 Addenda.

3. ASME/ANSI OM-1987, Operation and Maintenance of Nuclear Power Plants, including 1988 Addenda, Part 10, Inservice Testing of Valves in Light Water Reactor Power Plants.

4. U. S. Nuclear Regulatory Commission, Generic Letter 89-04, Guidance on Developing Acceptable Inservice Testing Programs.

5. Byron Station UFSAR, Section 3.9.6.2, Inservice Testing of Valves.

6. Byron Station Technical Specification 3/4.0.5, Generic ASME Program Requirement.

7. Byron Station Technical Staff Procedure, BVP 200-2, ISI Requirements for Valves.

8. NRC Safety Evaluation Reports (SER's):

   a. 09/15/88 (Initial Program Plan Review)
   b. 09/14/90 (Supplemental Program Plan Review)
   c. 09/14/90 (Relief Requests VR-21 and VR-22 Review)

9. Byron Station IST Valve Program Plan Responses (file: 3.11.0240)

   a. Byron Letter 88-1321 (Initial Program Plan Review Response)

SECTION 4.3

PROGRAM TABLES

TABLE DESCRIPTION

The following information is included in the summary tables:

A. REVISION

The revision corresponds to the current revision of the program.

B. PAGE

The pages are numbered sequentially and show the total number of tables.

C. VALVE NUMBER

The valve number references the unique Byron Station equipment piece number (EPN). This specific valve number identifies the unit and system.

D. P&ID

The P&ID column references the specific P&ID number which the valves are located on. The Unit 2 P&ID number is given directly underneath the Unit 1 P&ID number.

E. CLASS

The class refers to the ASME class assigned to the specific valve.

F. VALVE CATEGORY

The valve category identifies the valve category defined in subarticle IWV-2200 of ASME Section XI.

G. VALVE SIZE

The valve size lists the nominal pipe size of each valve in inches.

H. VALVE TYPE

The valve type categorizes the valve as to its valve design. The following abbreviations will be used to identify specific valve types:

Gate	GA
Globe	GL
Butterfly	BTF
Check	CK
Safety Valve	SV
Relief Valve	RV
Power Operated Relief Valve	PORV
Diaphragm Seated	D
Plug	P
Angle	AN

I. ACT. TYPE

The actuator type identifies the valve actuator. The followi.g abbreviations will be used to designate specific types of valve actuators:

Motor Operated	M.O.
Air Operated	A.O.
Hydraulic Operated	H.O.
Self Actuated	S.A.
Manual	M
Solenoid Operated	S.O.

J. NORMAL POSITION

Normal position identifies the normal operating position of a specific valve. O for open and C for closed.

K. STROKE DIRECT.

The stroke direction identifies the direction the valve actuator moves a specific valve stem to place the valve disc in a position to perform its designed safety function. O for open, and C for closed. This identifies the direction the valve stem will move when tested.

Note: Exercising of a power operated valve will involve stroking the valve to both its open and closed position. The valve will only be timed, however, in the direction designated to perform its safety function. Therefore, the program plan specifies only the direction in which valves must be stroked to be timed.

L. TEST METHOD

The test method column identifies specific tests which will be performed on specific valves to fulfill the requirements of Subsection IWV of ASME Section XI. The tests and abbreviations used are as follows:

1. (Bt) Check Valve Back Flow Test

   The check valve disc will be exercised to the closed position required to fulfill its safety function by verifying that the disc travels to the seat promptly on cessation or reversal of flow. For category A/C check valves (valves which have a specified leak rate limit and are self-actuated in response to a system characteristic), the back flow test is satisfied by performing the leak rate test.

2. (Ct) Check Valve Full Stroke Test

   The check valve disc will be exercised to the open position required to fulfill its safety function by verifying the maximum required accident flow through the valve or alternatives to full flow testing, per NRC Generic Letter 89-04, Attachment 1, Positions 1 and 2.

3. (Ft) Fail Safe Test

   Valves with fail safe actuators will be tested to verify the valve operator moves the valve stem to the required fail safe position upon loss of actuating power, in accordance with IWV-3415.

   This will be accomplished during the normal stroking of the valve. Upon stroking a valve to its fail safe position, the solenoid operator is de-energized causing air to be vented which in turn allows the spring to move the valve to its fail safe position. This condition simulates loss of actuating power (Electric and/or Air) and hence satisfies the fail safe test requirements of IWV-3415.

4. (It) Position Indication Check

   Valves which are identified to require a Position Indication Test will be inspected in accordance with IWV-3300 of ASME Section XI.

5. (Lt) Seat Leakage Test

   The seat leakage tests will meet the requirements of IWV-3420 for Category A valves. On these valves, seat leakage is limited to a specific maximum amount in the closed position for fulfillment of their safety function.

6. (Rt) Safety Valve Setpoint Check

Safety valve setpoints will be verified in accordance with IWV-3510 of ASME Section XI.

7. (St) Full Stroke Test

Valve exercising tests of Category A and B valves will be performed in accordance with IWV-3410. The test will include full stroke testing to verify operability in the direction required to fulfill the required safety function.

8. (Xt) Part-Stroke Test

If only limited operation is practical during plant operation, the valves shall be part-stroke (Xt) exercised during plant operation and full-stroke exercised during cold shutdowns, in accordance with IWV-3412 or IWV-3522.

F. TEST MODE

Denotes the frequency and plant condition necessary to perform a given test. The following abbreviations are used:

Normal Operation (OP)

Tests designated "OP" will be performed once every 3 months, except in those modes in which the valve is not required to be operable.

Semiannual (S)

Tests with this designation will be conducted once every 6 months, except in those modes in which the valve is not required to be operable.

Cold Shutdown (CS)

Valves that cannot be operated during plant operation shall be full stroke exercised during cold shutdowns. Valve testing will commence within 48 hours after shutdown, with completion of cold shutdown valve testing not being a prerequisite to plant startup. Valve tests which are not completed during a cold shutdown, shall be completed during subsequent cold shutdowns to meet the Code Specified Testing Frequency.

For planned shutdowns, where ample time is available, and testing all the valves identified for cold shutdown test frequency in the IST Program will be accomplished, exceptions to the 48 hours may be taken. In case of frequent cold shutdowns, valve testing need not be performed more often than once during any three-month period.

Reactor Refueling (RR)

Tests with this designation will be conducted during reactor refueling outages only.

N. RELIEF REQUEST

Relief requests reference a specific request for relief from code requirements. All relief requests are included in Section 4.6.

O. NOTES

Notes provide a short explanation concerning a particular IST valve. All notes are included in Section 4.4.

P. TECHNICAL APPROACHES AND POSITIONS

Technical approaches and positions provide detailed discussions on a particular IST topic. All technical approaches and positions are included in Section 4.5.

Q. REMARKS

Remarks reference other information useful in determining valve testing requirements or methods.

SECTION 4.3

PROGRAM TABLES

UNITS 1 AND 2

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2AF001A	M-37	3	C	6.0	CK	S.A.	C	0	Xt/Ct	OP/CS		12	3	
	M-122							C	Bt	RR	VR-18, 19		3	
1/2AF001B	M-37	3	C	6.0	CK	S.A.	C	0	Xt/Ct	OP/CS		12	3	
	M-122							C	Bt	RR	VR-18, 19		3	
1/2AF003A	M-37	3	C	6.0	CK	S.A.	C	0	Xt/Ct	OP/CS		12	3	
	M-122													
1/2AF003B	M-37	3	C	6.0	CK	S.A.	C	0	Xt/Ct	OP/CS		12	3	
	M-122													
1/2AF006A	M-37	3	B	6.0	GA	M.O.	C	0	St	OP			1	
	M-122								It	RR				
1/2AF006B	M-37	3	B	6.0	GA	M.O.	C	0	St	OP			1	
	M-122								It	RR				
1/2AF013A	M-37	2	B	4.0	GL	M.O.	0	C	St	OP			1	
	M-122								It	RR				
1/2AF013B	M-37	2	B	4.0	GL	M.O.	0	C	St	OP			1	
	M-122								It	RR				
1/2AF013C	M-37	2	B	4.0	GL	M.O.	0	C	St	OP			1	
	M-122								It	RR				
1/2AF013D	M-37	2	B	4.0	GL	M.O.	0	C	St	OP			1	
	M-122								It	RR				
1/2AF013E	M-37	2	B	4.0	GL	M.O.	0	C	St	OP			1	
	M-122								It	RR				
1/2AF013F	M-37	2	B	4.0	GL	M.O.	0	C	St	OP			1	
	M-122								It	RR				
1/2AF013G	M-37	2	B	4.0	GL	M.O.	0	C	St	OP			1	
	M-122								It	RR				
1/2AF013H	M-37	2	B	4.0	GL	M.O.	[illegible]	C	St	OP			1	
	M-122								It	RR				
1/2AF014A	M-37	2	C	4.0	CK	S.A.	C		Ct	CS		12	3	
	M-122								Bt	OP/RR		12, 30	3	
1/2AF014B	M-37	2	C	4.0	CK	S.A.	C	0	Ct	CS		12	3	
	M-122							C	Bt	OP/RR		12, 30	3	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2AF014C	M-37	2	C	4.0	CK	S.A.	C	O	Ct	CS		12	3	
	M-122							C	Bt	OP/RR		12, 30	3	
1/2AF014D	M-37	2	C	4.0	CK	S.A.	C	O	Ct	CS		12	3	
	M-122							C	Bt	OP/RR		12, 30	3	
1/2AF014E	M-37	2	C	4.0	CK	S.A.	C	O	Ct	CS		12	3	
	M-122							C	Bt	OP/RR		12, 30	3	
1/2AF014F	M-37	2	C	4.0	CK	S.A.	C	O	Ct	CS		12	3	
	M-122							C	Bt	OP/RR		12, 30	3	
1/2AF014G	M-37	2	C	4.0	CK	S.A.	C	O	Ct	CS		12	3	
	M-122							C	Bt	OP/RR		12, 30	3	
1/2AF014H	M-37	2	C	4.0	CK	S.A.	C	O	Ct	CS		12	3	
	M-122							C	Bt	OP/RR		12, 30	3	
1/2AF017A	M-37	3	B	6.0	GA	M.O.	C	O	St	OP			1	
	M-122								It	RR				
1/2AF017B	M-37	3	B	6.0	GA	M.O.	C	O	St	OP			1	
	M-122								It	RR				
1/2AF029A	M-37	3	C	6.0	CK	S.A.	C	O	Ct	CS		12	3	
	M-122													
1/2AF029B	M-37	3	C	6.0	CK	S.A.	C	O	Ct	CS		12	3	
	M-122													

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2CC685	M-66-1A	2	A	4.0	GA	M.O.	O	C	St	CS	VR-8		1	
	M-139-1								It	RR				
									Lt	RR	VR-1			
1/2CC9412A	M-66-2	3	B	12.0	GA	M.O.	C	O	St	OP			1	
	M-139-2								It	RR				
1/2CC9412B	M-66-2	3	B	12.0	GA	M.O.	C	O	St	OP			1	
	M-139-2								It	RR				
1/2CC9413A	M-66-1A	2	A	6.0	GA	M.O.	O	C	St	CS	VR-8		1	
	M-139-1								It	RR				
									Lt	RR	VR-1			
1/2CC9414	M-66-1A	2	A	6.0	GA	M.O.	O	C	St	CS	VR-8		1	
	M-139-1								It	RR				
									Lt	RR	VR-1			
1/2CC9416	M-66-1A	2	A	6.0	GA	M.O.	O	C	St	CS	VR-8		1	
	M-139-1								It	RR				
									Lt	RR	VR-1			
1/2CC9437A	M-66-1A	2	B	3.0	GL	A.O.	C	C	St	OP			1	Passive
	M-139-1								It	RR				
1/2CC9437B									St	OP			1	
	M-66-1A	2	B	3.0	GL	A.O.	O	C	It	RR				
	M-139-1								Lt	OP				
1/2CC9438	M-66-1A	2	A	4.0	GA	M.O.	O	C	Lt	RR	VR-1			
	M-139-1								It	RR				
									St	CS	VR-8		1	
1/2CC9463A	M-66-3B	3	C	12.0	CK	S.A.	C	O	Ct	CS		32	3	
								C	Bt	OP			3	
1/2CC9463B	M-66-3B	3	C	12.0	CK	S.A.	C	O	Ct	CS		32	3	
								C	Bt	OP			3	
0CC9464	M-66-3B	3	C	12.0	CK	S.A.	C	O	Ct	CS		32	3	
								C	Bt	OP			3	
1/2CC9473A	M-66-3B	3	B	16.0	GA	M.O.	C	O	St	OP			1	
									It	RR				

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2CC9473B	M-66-3B	3	B	16.0	GA	M.O.	C	O	St	OP			1	
									It	RR				
1/2CC9486	M-66-1A	2	AC	6.0	CK	S.A.	O	C	Lt/Bt	RR	VR-1, 8, 18		3	
	M-139-1							O	Ct	OP			3	
1/2CC9518	M-66-1A	2	AC	0.75	CK	S.A.	C	C	Lt	RR	VR-1, 18		3	Passive
	M-139-1							O	Ct	RR	VR-18	24	3	
1/2CC9534	M-66-1A	2	AC	0.75	CK	S.A.	C	C	Lt	RR	VR-1, 18		3	Passive
	M-139-1							O	Ct	RR	VR-18	24	3	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2CS001A	M-61-4	2	B	14.0	GA	M.O.	0	C	St	OP			1	
	M-136-4								It	RR				
1/2CS001B	M-61-4	2	B	14.0	GA	M.O.	0	C	St	OP			1	
	M-136-4								It	RR				
1/2CS003A	M-46-1A	2	C	10.0	CK	S.A.	C	0	Xt/Ct	OP/RR	VR-4, 19		3	
	M-129-1A													
1/2CS003B	M-46-1A	2	C	10.0	CK	S.A.	C	0	Xt/Ct	OP/RR	VR-4, 19		3	
	M-129-1A													
1/2CS007A	M-46-1C	2	A	10.0	GA	M.O.	C	0	Lt	RR	VR-1			
	M-129-1C								St	OP			1	
									It	RR				
1/2CS007B	M-46-1C	2	A	10.0	GA	M.O.	C	0	Lt	RR	VR-1			
	M-129-1C								St	OP			1	
									It	RR				
1/2CS008A	M-46-1C	2	AC	10.0	CK	S.A.	C	0	Ct	RR	VR-4, 19		3	
	M-129-1C							C	Lt	RR	VR-1, 18, 19		3	
1/2CS008B	M-46-1C	2	AC	10.0	CK	S.A.	C	0	Ct	RR	VR-4, 19		3	
	M-129-1C							C	Lt	RR	VR-1, 18, 19		3	
1/2CS009A	M-61-4	2	B	16.0	GA	M.O.	C	0	St	OP			1	
	M-136-4								It	RR				
1/2CS009B	M-61-4	2	B	16.0	GA	M.O.	C	0	St	OP			1	
	M-136-4								It	RR				
1/2CS011A	M-46-1A	2	C	6.0	CK	S.A.	C	0	Ct	OP			3	
	M-129-1A													
1/2CS011B	M-46-1A	2	C	6.0	CK	S.A.	C	0	Ct	OP			3	
	M-129-1A													
1/2CS019A	M-46-1B	2	B	3.0	GA	M.O.	C	0	St	OP			1	
	M-129-1B								It	RR				
1/2CS019B	M-46-1B	2	B	3.0	GA	M.O.	C	0	St	OP			1	
	M-129-1B								It	RR				
1/2CS020A	M-46-1B	2	C	3.0	CK	S.A.	C	0	Ct	RR	VR-2, 19		3	
	M-129-1A													
1/2CS020B	M-46-1B	2	C	3.0	CK	S.A.	C	0	Ct	RR	VR-2, 19		3	
	M-129-1A													

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2CV112B	M-64-4A	2	B	4.0	GA	M.O.	O	C	St	CS		4, 28	1	
	M-138-4								It	RR				
1/2CV112C	M-64-4A	2	B	4.0	GA	M.O.	O	C	St	CS		4, 28	1	
	M-138-4								It	RR				
1/2CV112D	M-64-4B	2	B	8.0	GA	M.O.	C	O	St	CS		2	1	
	M-138-4								It	RR				
1/2CV112E	M-64-4B	2	B	8.0	GA	M.O.	C	O	St	CS		2	1	
	M-138-4								It	RR				
1/2CV8100	M-64-2	2	A	2.0	GL	M.O.	O	C	St	CS	VR-9			
	M-138-2								It	RR			1	
									Lt	RR	VR-1			
1/2CV8104	M-64-4B	2	B	3.0	GL	M.O.	C	O	St	CS		2	1	
	M-138-4								It	RR				
1/2CV8105	M-64-3B	2	B	3.0	GA	M.O.	O	C	St	CS		4	1	
	M-138-3B								It	RR				
1/2CV8106	M-64-3B	2	B	3.0	GA	M.O.	O	C	St	CS		4	1	
	M-138-3B							O	It	RR				
1/2CV8110	M-64-3A	2	B	2.0	GL	M.O.	O	C	St	OP			1	
	M-138-3								It	RR				
1/2CV8111	M-64-3A	2	B	2.0	GL	M.O.	O	C	St	OP			1	
	M-138-3								It	RR				
1/2CV8112	M-64-2	2	A	2.0	GL	M.O.	O	C	St	CS	VR-9		1	
	M-138-2								It	RR				
									Lt	RR	VR-1			
1/2CV8113	M-64-2	2	AC	.75	CK	S.A.	C	C	Lt	RR	VR-1, 18		3	Passive
	M-138-2						O		Ct	RR	VR-18	24	3	
1/2CV8114	M-64-3A	2	B	2.0	GL	S.O.	O	C	St	OP			1	
	M-138-3								It	RR		20		
1/2CV8116	M-64-3A	2	B	2.0	GL	S.O.	O	C	St	OP			1	
	M-138-3								It	RR		20		

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2CV8152	M-64-5	2	A	3.0	GL	A.O.	0	C	St	CS		4	1	
	M-138-5A								It	RR				
									Ft	CS		4	2	
									Lt	RR	VR-1			
1/2CV8160	M-64-5	2	A	3.0	GL	A.O.	0	C	St	CS		4	1	
	M-138-5A								It	RR				
									Ft	CS		4	2	
									Lt	RR	VR-1			
1/2CV8442	M-64-4B	2	C	2.0	CK	S.A.	C	0	Ct	CS		2, 29	3	
	M-138-4													
1/2CV8480A	M-64-3A	2	C	2.0	CK	S.A.	C	0	Ct	OP		31	3	
	M-138-3							C	Bt	OP				
1/2CV8480B	M-64-3A	2	C	2.0	CK	S.A.	C	0	Ct	OP		31	3	
	M-138-3							C	Bt	OP			3	
1/2CV8481A	M-64-3A	2	C	4.0	CK	S.A.	C	0	Ct/Xt	CS/OP	VR-15		3	
	M-138-3A							C	Bt	OP			3	
1/2CV8481B	M-64-3A	2	C	4.0	CK	S.A.	C	0	Ct/Xt	CS/OP	VR-15		3	
	M-138-3A							C	Bt	OP			3	
1/2CV8546	M-64-4B	2	C	8.0	CK	S.A.	C	0	Ct	CS	VR-15	2, 26	3	
	M-138-4													
1/2CV8804A	M-64-4B	2	B	8.0	GA	M.O.	C	0	St	CS		2	1	
	M-138-4								It	RR				

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2DG5182A	M-152-20 (Typical)	NONE	B	3.0	GA	S.O.	C	O	St	OP	VR-13			
1/2DG5182B	M-152-20 (Typical)	NONE	B	3.0	GA	S.O.	C	O	St	OP	VR-13			
1/2DG5183A	M-152-20 (Typical)	NONE	B	3.0	GA	S.O.	C	O	St	OP	VR-13			
1/2DG5183B	M-152-20 (Typical)	NONE	B	3.0	GA	S.O.	C	O	St	OP	VR-13			
1/2DG5184A	M-152-20 (Typical)	NONE	C	3.0	CK	S.A.	C	O	Ct	OP	VR-13		3	
1/2DG5184B	M-152-20 (Typical)	NONE	C	3.0	CK	S.A.	C	O	Ct	OP	VR-13		3	
1/2DG5185A	M-152-20 (Typical)	NONE	C	3.0	CK	S.A.	C	O	Ct	OP	VR-13		3	
1/2DG5185B	M-152-20 (Typical)	NONE	C	3.0	CK	S.A.	C	O	Ct	OP	VR-13		3	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2DO003A	M-50-1B	3	C	1.5	CK	S.A.	C	O	Ct	OP			3	
	M-130-1A							C	Bt	OP			3	
1/2DO003B	M-50-1A	3	C	1.5	CK	S.A.	C	O	Ct	OP			3	
	M-130-1B							C	Bt	OP			3	
1/2DO003C	M-50-1B	3	C	1.5	CK	S.A.	C	O	Ct	OP			3	
	M-130-1A							C	Bt	OP			3	
1/2DO003D	M-50-1A	3	C	1.5	CK	S.A.	C	O	Ct	OP			3	
	M-130-1B							C	Bt	OP			3	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2FC009	M-63-1A	2	A	4.0	P	M	C	C	Lt	RR	VR-1			Passive
1/2FC010	M-63-1A	2	A	4 0	P	M	C	C	Lt	RR	VR-1			Passive
1/2FC011	M-63-1B M-63-1C	2	A	3.0	P	M	C	C	Lt	RR	VR-1			Passive
1/2FC012	M-63-1B M-63-1C	2	A	3.0	P	M	C	C	Lt	RR	VR-1			Passive

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1FP010	M-52-1	2	B	4.0	GA	A.O.	O	C	St	OP			1	
									It	RR				
									FT	OP			2	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2FW009A	M-36-1C	2	B	16.0	GA	H.O.	O	C	St/Xt	CS/OP		3	1	
	M-121-1B								It	RR				
1/2FW009B	M-36-1A	2	B	16.0	GA	H.O.	O	C	St/Xt	CS/OP		3	1	
	M-121-1D								It	RR				
1/2FW009C	M-36-1D	2	B	16.0	GA	H.O.	O	C	St/Xt	CS/OP		3	1	
	M-121-1A								It	RR				
1/2FW009D	M-36-1B	2	B	16.0	GA	H.O.	O	C	St/Xt	CS/OP		3	1	
	M-121-1C								It	RR				
1/2FW034A	M-36-1C	NONE	B	2.0	GL	A.O.	O	C	Ft	RR		21	2	
	M-121-1B													
1/2FW034B	M-36-1A	NONE	B	2.0	GL	A.O.	O	C	Ft	RR		21	2	
	M-121-1D													
1/2FW034C	M-36-1D	NONE	B	2.0	GL	A.O.	O	C	Ft	RR		21	2	
	M-121-1A													
1/2FW034D	M-36-1B	NONE	B	2.0	GL	A.O.	O	C	Ft	RR		21	2	
	M-121-1C													
1/2FW035A	M-36-1C	2	B	3.0	GL	A.O.	O	C	St	OP			1	
	M-121-1B								It	RR				
									Ft	OP			2	
1/2FW035B	M-36-1A	2	B	3.0	GL	A.O.	O	C	St	OP			1	
	M-121-1D								It	RR				
									Ft	OP			2	
1/2FW035C	M-36-1D	2	B	3.0	GL	A.O.	O	C	St	OP			1	
	M-121-1A								It	RR				
									Ft	OP			2	
1/2FW035D	M-36-1B	2	B	3.0	GL	A.O.	O	C	St	OP			1	
	M-121-1C								It	RR				
									Ft	OP			2	
1/2FW039A	M-36-1C	2	B	6.0	GA	A.O.	O	C	St	OP		10	1	
	M-121-1B								It	RR				
									Ft	CS		10	2	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2FW039B	M-36-1A	2	B	6.0	GA	A.O.	O	C	St	CS		10	1	
	M-121-1B								It	RR				
									Ft	CS		10	2	
1/2FW039C	M-36-1D	2	B	6.0	GA	A.O.	O	C	St	CS		10	1	
	M-121-1A								It	RR				
									Ft	CS		10	2	
1/2FW039D	M-36-1B	2	B	6.0	GA	A.O.	O	C	St	CS		10	1	
	M-121-1C								It	RR				
									Ft	CS		10	2	
1/2FW043A	M-36-1C	2	B	3.0	GL	A.O.	C	C	St	OP			1	
	M-121-1B								It	RR				
									Ft	OP			2	
1/2FW043B	M-36-1A	2	B	3.0	GL	A.O.	C	C	St	OP			1	
	M-121-1D								It	RR				
									Ft	OP			2	
1/2FW043C	M-36-1D	2	B	3.0	GL	A.O.	C	C	St	OP			[illegible]	
	M-121-1A								It	RR				
									Ft	OP			2	
1/2FW043D	M-36-1B	2	B	3.0	GL	A.O.	C	C	St	OP			1	
	M-121-1C								It	RR				
									Ft	OP			2	
1/2FW510	M-36-1C	NONE	B	16.0	AN	A.O.	O	C	Ft	RR		16	2	
	M-121-1													
1/2FW510A	M-36-1C	NONE	B	4.0	GA	A.O	C	C	Ft	RR		17	2	
	M-121-1													
1/2FW520	M-36-1A	NONE	B	16.0	AN	A.O.	O	C	Ft	RR		16	2	
	M-121-1													
1/2FW520A	M-36-1A	NONE	B	4.0	GA	A.O.	C	C	Ft	RR		17	2	
	M-121-1													
1/2FW530	M-36-1D	NONE	B	16.0	AN	A.O.	O	C	Ft	RR		16	2	
	M-121-1													

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2FW530A	M-36-1D M-121-1	NONE	B	4.0	GA	A.O	C	C	Ft	RR		17	2	
1/2FW540	M-36-1B M-121-1	NONE	B	16.0	AN	A.O.	9	C	Ft	RR		16	2	
1/2FW540A	M-36-1B M-121-1	NONE	B	4.0	GA	A.O.	C	C	Ft	RR		17	2	

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1/2IA065	M-55-4	2	A	3.0	GL	A.O	O	C	Lt	RR	VR-1			
	M-55-5								St	RR	VR-10		1	
									Ft	RR	VR-10		2	
									It	RR				
1/2IA066	M-55-4	2	A	3.0	GL	A.O.	O	C	Lt	RR	VR-1			
	M-55-5								St	RR	VR-10		1	
									Ft	RR	VR-10		2	
									It	RR				
1/2IA091	M-55-4	2	AC	0.75	CK	S.A.	C	C	Lt	RR	VR-1, 18		3	Passive
	M-55-5													

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2MS001A	M-35-2 M-120-2A	2	B	30.25	GA	H.O.	O	C	St/Xt It	CS/OP RR		1	1	
1/2MS001B	M-35-1 M-120-1	2	B	32.75	GA	H.O.	O	C	St/Xt It	CS/OP RR		1	1	
1/2MS001C	M-35-2 M-120-2B	2	B	32.75	GA	H.O.	O	C	St/Xt It	CS/OP RR		1	1	
1/2MS001D	M-35-1 M-120-1	2	B	30.25	GA	H.O.	O	C	St/Xt It	CS/OP RR		1	1	
1/2MS013A	M-35-2 M-120-2A	2	C	6.0 x 10.0	SV	S.A	C	O	Rt	RR				
1/2MS013B	M-35-1 M-120-1	2	C	6.0 x 10.0	SV	S.A.	C	O	Rt	RR				
1/2MS013C	M-35-2 M-120-2B	2	C	6.0 x 10.0	SV	S.A.	C	O	Rt	RR				
1/2MS013D	M-35-1 M-120-1	2	C	6.0 x 10.0	SV	S.A.	C	O	Rt	RR				
1/2MS014A	M-35-2 M-120-2A	2	C	6.0 x 10.0	SV	S.A	C	O	Rt	RR				
1/2MS014B	M-35-1 M-120-1	2	C	6.0 x 10.0	SV	S.A.	C	O	Rt	RR				
1/2MS014C	M-35-2 M-120-2B	2	C	6.0 x 10.0	SV	S.A.	C	O	Rt	RR				
1/2MS014D	M-35-1 M-120-1	2	C	6.0 x 10.0	SV	S.A.	C	O	Rt	RR				
1/2MS015A	M-35-2 M-120-2A	2	C	6.0 x 10.0	SV	S.A.	C	O	Rt	RR				
1/2MS015B	M-35-1 M-120-1	2	C	6.0 x 10.0	SV	S.A.	C	O	Rt	RR				
1/2MS015C	M-35-2 M-120-2B	2	C	6.0 x 10.0	SV	S.A.	C	O	Rt	RR				
1/2MS015D	M-35-1 M-120-1	2	C	6.0 x 10.0	SV	S.A.	O	O	Rt	RR				

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2MS016A	M-35-2 M-120-2A	2	C	6.0 x 10.0	SV	S.A.	O	O	Rt	RR				
1/2MS016B	M-35-1 M-120-1	2	C	6.0 x 10.0	SV	S.A.	O	O	Rt	RR				
1/2MS016C	M-35-2 M-120-2B	2	C	6.0 x 10.0	SV	S.A.	O	O	Rt	RR				
1/2MS016D	M-35-1 M-120-1	2	C	6.0 x 10.0	SV	S.A	O	O	Rt	RR				
1/2MS017A	M-35-2 M-120-2A	2	C	6.0 x 10.0	SV	S.A.	O	O	Rt	RR				
1/2MS017B	M-35-1 M-120-1	2	C	6.0 x 10.0	SV	S.A.	O	O	Rt	RR				
1/2MS017C	M-35-2 M-120-2B	2	C	6.0 x 10.0	SV	S.A.	O	O	Rt	RR				
1/2MS017D	M-35-1 M-120-1	2	C	6.0 x 10.0	SV	S.A	O	O	Rt	RR				
1/2MS018A	M-35-2 M-120-2A	2	B	6.0 x 6.0	PORV	H.O.	C	C	St It Ft	OP RR OP	VR-12		1 2	
1/2MS018B	M-35-1 M-120-1	2	B	6.0 x 6.0	PORV	H.O.	C	C	St It Ft	OP RR OP	VR-12		1 2	
1/2MS018C	M-35-2 M-120-2B	2	B	6.0 x 6.0	PORV	H.O.	C	C	St It Ft	OP RR OP	VR-12		1 2	
1/2MS018D	M-35-1 M-120-1	2	B	6.0 x 6.0	PORV	H.O.	C	C	St It Ft	OP RR OP	VR-12		1 2	
1/2MS101A	M-35-2 M-120-2A	2	B	4.0	GA	A.O.	C	C	St It Ft	OP RR OP			1 2	

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1/2MS101B	M-35-1 M-120-1	2	B	4.0	GA	A.O.	C	C	St It Ft	OP RR OP			1 2	
1/2MS101C	M-35-2 M-120-2B	2	B	4.0	GA	A.O.	C	C	St It Ft	OP RR OP			1 2	
1/2MS101D	M-35-1 M-120-1	2	B	4.0	GA	A.O.	C	C	St It Ft	OP RR OP			1 2	

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1/2OG057A	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	Lt St It	RR OP RR	VR-1		1	
1/2OG079	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	Lt St It	RR OP RR	VR-1		1	
1/2OG080	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	Lt St It	RR OP RR	VR-1		1	
1/2OG081	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	Lt St It	RR OP RR	VR-1		1	
1/2OG082	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	Lt St It	RR OP RR	VR-1		1	
1/2OG083	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	Lt St It	RR OP RR	VR-1		1	
1/2OG084	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	Lt St It	RR OP RR	VR-1		1	
1/2OG085	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	Lt St It	RR OP RR	VR-1		1	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2PR001A	M-78-10 M-151-1	2	A	1.0	GL	A.O.	O	C	Lt Ft St It	RR OP OP RR	VR-1		 2 1	
1/2PR001B	M-78-10 M-151-1	2	A	1.0	GL	A.O.	O	C	Lt Ft St It	RR OP OP RR	VR-1		 2 1	
1/2PR002E	M-78-6	2	A	2.0	GL	M	C	C	Lt	RR	VR-1			Passive
1/2PR002F	M-78-6	2	A	2.0	GL	M	C	C	Lt	RR	VR-1			Passive
1/2PR002G	M-78-6	2	AC	2.0	CK	S.A.	C	C	Lt/Bt	RR	VR-1, 18		3	Passive
1/2PR002H	M-78-6	2	AC	2.0	CK	S.A.	C	C	Lt/Bt	RR	VR-1, 18		3	Passive
1/2PR032	M-78-10 M-151-1	2	AC	1.0	CK	S.A	C	C	Lt/Bt	RR	VR-1, 18		3	Passive
1/2PR033A	M-78-6	2	A	2.0	GL	M	C	C	Lt	RR	VR-1			Passive
1/2PR033B	M-78-6	2	A	2.0	GL	M	C	C	Lt	RR	VR-1			Passive
1/2PR033C	M-78-6	2	A	2.0	GL	M	C	C	Lt	RR	VR-1			Passive
1/2PR033D	M-78-6	2	A	2.0	GL	M	C	C	Lt	RR	VR-1			Passive
1/2PR066	M-78-10 M-151-1	2	A	1.0	GL	A.O	O	C	Lt Ft It St	RR OP RR OP	VR-1 VR-12		 2 1	

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VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2PS228A									Lt	RR	VR-1			
	M-68-7	2	A	0.50	GL	S.O.	O	C	St	OP	VR-12		1	
	M-140-6								Ft	OP			2	
									It	RR		20		
1/2PS228B									Lt	RR	VR-1			
	M-68-7	2	A	0.50	GL	S.O.	O	C	St	OP	VR-12		1	
	M-140-6								Ft	OP			2	
									It	RR		20		
1/2PS229A									Lt	RR	VR-1			
	M-68-7	2	A	0.50	GL	S.O.	O	C	St	OP	VR-12		1	
	M-140-6								Ft	OP			2	
									It	RR		20		
1/2PS229B									Lt	RR	VR-1			
	M-68-7	2	A	0.50	GL	S.O.	O	C	St	OP	VR-12		1	
	M-140-6								Ft	OP			2	
									It	RR		20		
1/2PS230A									Lt	RR	VR-1			
	M-68-7	2	A	1.00	GL	S.O.	C	C	St	OP	VR-12		1	
	M-140-6								Ft	OP			2	
									It	RR		20		
1/2PS230B									Lt	RR	VR-1			
	M-68-7	2	A	1.00	GL	S.O.	C	C	St	OP	VR-12		1	
	M-140-6								Ft	OP			2	
									It	RR		20		
1/2PS231A	M-68-7	2	A	0.75	CK	S.A.	C	C	Lt/Bt	RR	VR-1, 18		3	
	M-140-6							O	Ct	OP		22	3	
1/2PS231B	M-68-7	2	A	0.75	CK	S.A.	C	C	Lt/Bt	RR	VR-1, 18		3	
	M-140-6							O	Ct	OP		22	3	
1/2PS9354A									St	OP			1	
	M-68-1B	2	A	0.375	GL	A.O.	C	C	Lt	RR	VR-1			
	M-140-1								It	RR				
									Ft	OP			2	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2PS9354B									St	OP			1	
	M-68-1B	2	A	0.375	GL	A.O.	C	C	Lt	RR	VR-1			
	M-140-1								It	RR				
									Ft	OP			2	
1/2PS9355A									St	OP			1	
	M-68-1B	2	A	0.375	GL	A.O.	C	C	Lt	RR	VR-1			
	M-140-1								It	RR				
									Ft	OP			2	
1/2PS9355B									St	OP			1	
	M-68-1B	2	A	0.375	GL	A.O.	C	C	Lt	RR	VR-1			
	M-140-1								It	RR				
									Ft	OP			2	
1/2PS9356A									St	OP			1	
	M-68-1A	2	A	0.375	GL	A.O.	C	C	Lt	RR	VR-1			
	M-140-1								It	RR				
									Ft	OP			2	
1/2PS9356B									St	OP			1	
	M-68-1A	2	A	0.375	GL	A.O.	C	C	Lt	RR	VR-1			
	M-140-1								It	RR				
									Ft	OP			2	
1/2PS9357A									St	OP			1	
	M-68-1B	2	A	0.375	GL	A.O.	C	C	Lt	RR	VR-1			
	M-140-1								It	RR				
									Ft	OP			2	
1/2PS9357B									St	OP			1	
	M-68-1B	2	A	0.375	GL	A.O.	C	C	Lt	RR	VR-1			
	M-140-1								It	RR				
									Ft	OP			2	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2RC014A	M-60-1B	1	B	1.0	GL	S.O.	C	O	St	CS	VR-12	7	1	
	M-135-1B							C	Ft	CS		7	2	
								O	It	RR		20		
1/2RC014B	M-60-1B	1	B	1.0	GL	S.O.	C	O	St	CS	VR-12	7	1	
	M-135-1B							C	Ft	CS		7	2	
								O	It	RR		20		
1/2RC014C	M-60-1B	1	B	1.0	GL	S.O.	C	O	St	CS	VR-12	7	1	
	M-135-1B							C	Ft	CS		7	2	
								O	It	RR		20		
1/2RC014D	M-60-1B	1	B	1.0	GL	S.O.	C	O	St	CS	VR-12	7	1	
	M-135-1B							C	Ft	CS		7	2	
								O	It	RR		20		

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2RE1003	M-70-1	2	A	3.0	D	A.O.	C	C	St	OP			1	
	M-141-1								Lt	RR	VR-1			
									It	RR				
									Ft	OP			2	
1/2RE9157	M-70-1	2	A	1.0	D	A.O.	O	C	St	OP	VR-12		1	
	M-141-1								It	RR				
									Ft	OP			2	
									Lt	RR	VR-1			
1/2RE9159A	M-70-1	2	A	0.75	D	A.O.	O	C	St	OP	VR-12		1	
	M-141-1								It	RR				
									Ft	OP			2	
									Lt	RR	VR-1			
1/2RE9159B	M-70-1	2	A	0.75	D	A.O.	C	C	St	OP	VR-12		1	
	M-141-1								Lt	RR	VR-1			
									It	RR				
									Ft	OP			2	
1/2RE9160A	M-70-1	2	A	1.0	D	A.O.	O	C	St	OP	VR-12		1	
	M-141-1								It	RR				
									Ft	OP			2	
									Lt	RR	VR-1			
1/2RE9160B	M-70-1	2	A	1.0	D	A.O.	O	C	St	OP	VR-12		1	
	M-141-1								It	RR				
									Ft	OP			2	
									Lt	RR	VR-1			
1/2RE9170	M-70-1	2	A	3.0	D	A.O.	O	C	St	OP			1	
	M-141-1								It	RR				
									Ft	OP			2	
									Lt	RR	VR-1			

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2RF026	M-48-6B	2	A	2.0	P	A.O.	O	C	Lt	RR	VR-1			
									St	OP			1	
									It	RR				
									Ft	OP			2	
1/2RF027	M-48-6A	2	A	2.0	P	A.O.	O	C	Lt	RR	VR-1			
									St	OP			1	
									It	RR				
									Ft	OP			2	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2RH8701A	M-62 M-137	1	A	12.0	GA	M.O.	C	O	St It Lt	CS RR RR		5 6	1	
1/2RH8701B	M-62 M-137	1	A	12.0	GA	M.O.	C	O	St It Lt	CS RR RR		5 6	1	
1/2RH8702A	M-62 M-137	1	A	12.0	GA	M.O.	C	O	St It Lt	CS RR RR		5 6	1	
1/2RH8702B	M-62 M-137	1	A	12.0	GA	M.O.	C	O	St It Lt	CS RR RR		5 6	1	
1/2RH8705A	M-62 M-137	2	AC	0.75	CK	S.A.	C O	C O	Lt/Bt Ct	RR RR	VR-18 VR-18,	6 24,35	3 3	Passive
1/2RH8705B	M-62 M-137	2	AC	0.75	CK	S.A.	C O	C O	Lt/Bt Ct	RR RR	VR-18 VR-18,	6 24,35	3 3	Passive
1/2RH8708A	M-62 M-137	2	C	3.0 x 4.0	RV	S.A	C	O	Rt	RR				
1/2RH8708B	M-62 M-137	2	C	3.0 x 4.0	RV	S.A.	C	O	Rt	RR				
1/2RH8730A	M-62 M-137	2	C	8.0	CK	S.A.	C	O C	Ct/Xt Bt	CS/OP CS		8	3 3	
1/2RH8730B	M-62 M-137	2	C	8.0	CK	S.A.	C	O C	Ct/Xt Bt	CS/OP CS		8	3 3	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2RY455A	M-60-5	1	B	3.0	PORV	A.O.	C	O	St	OP			1	
	M-135-5								It	RR				
									Ft	OP			2	
1/2RY456	M-60-5	1	B	3.0	PORV	A.O.	C	O	St	OP			1	
	M-135-5								It	RR				
									Ft	OP			2	
1/2RY8000A	M-60-5	1	B	3.0	GA	M.O.	O	C	St	OP			1	
	M-135-5								It	RR				
1/2RY8000B	M-60-5	1	B	3.0	GA	M.O.	O	C	St	OP			1	
	M-135-5								It	RR				
1/2RY8010A	M-60-5	1	C	6.0	SV	S.A	C	O	Rt	RR				
	M-135-5								It	RR				
1/2RY8010B	M-60-5	1	C	6.0	SV	S.A.	C	O	Rt	RR				
	M-135-5								It	RR				
1/2RY8010C	M-60-5	1	C	6.0	SV	S.A.	C	O	Rt	RR				
	M-135-5								It	RR				
1/2RY8025	M-60-6								St	OP			1	
	M-135-6	2	A	0.375	GL	A.O.	C	C	Lt	RR	VR-1	Passive		
									It	RR				
									Ft	OP			2	
1/2RY8026	M-60-6	2	A	0.375	GL	A.O.	O	C	Lt	RR	VR-1			
	M-135-6								St	OP			1	
									It	RR				
									Ft	OP			2	
1/2RY8028	M-60-6	2	A	3.0	D	A.O.	O	C	Lt	RR	VR-1			
	M-135-6								St	OP			1	
									It	RR				
									Ft	OP			2	
1/2RY8033	M-60-6	2	A	0.75	D	A.O.	O	C	Lt	RR	VR-1			
	M-135-6								St	OP	VR-12		1	
									It	RR				
									Ft	OP			2	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2RY8046	M-60-6 M-135-6	2	AC	3.0	CK	S.A	C	C	Lt/Bt	RR	VR-1, 18		3 3	Passive
1/2RY8047	M-60-6 M-135-6	2	AC	0.75	CK	S.A.	C	C	Lt/Bt	RR	VR-1, 18		3 3	Passive

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2SA032	M-54-2	2	A	1.5	GA	A.O	0	C	Lt	RR	VR-1			
									St	OP			1	
									It	RR				
									Ft	OP			2	
1/2SA033	M-54-2	2	A	1.5	GA	A.O.	0	C	Lt	RR	VR-1			
									St	OP			1	
									It	RR				
									Ft	OP			2	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2SD002A	M-48-5A/B	2	A	2.0	GL	A.0	0	C	Lt	RR		34		
									St	OP	VR-12 (U-2)		1	
									It	RR				
									Ft	OP			2	
1/2SD002B	M-48-5A/B	2	A	2.0	GL	A.O.	0	C	Lt	RR		34		
									St	OP	VR-12 (U-2)		1	
									It	RR				
									Ft	OP			2	
1/2SD002C	M-48-5A/B	2	A	2.0	GL	A.0	[illegible]	C	Lt	RR		34		
									St	OP	VR-12 (U-2)		1	
									It	RR				
									Ft	OP			2	
1/2SD002D	M-48-5A/B	2	A	2.0	GL	A.O.	0	C	Lt	RR		34		
									St	OP	VR-12 (U-2)		1	
									It	RR				
									Ft	OP			2	
1/2SD002E	M-48-5A/B	2	A	2.0	GL	A.0	0	C	Lt	RR		34		
									St	OP	VR-12 (U-2)		1	
									It	RR				
									Ft	OP			2	
1/2SD002F	M-48-5A/B	2	A	2.0	GL	A.O.	0	C	Lt	RR		34		
									St	OP	VR-12 (U-2)		1	
									It	RR				
									Ft	OP			2	
1/2SD002G	M-48-5A/B	2	A	2.0	GL	A.0	0	C	Lt	RR		34		
									St	OP	VR-12 (U-2)		1	
									It	RR				
									Ft	OP			2	
1/2SD002H	M-48-5A/B	2	A	2.0	GL	A.O.	0	C	Lt	RR		34		
									St	OP	VR-12 (U-2)		1	
									It	RR				
									Ft	OP			2	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2SD005A	M-48-5A/B	2	A	0.375	GL	A.O	0	C	St	OP			1	
									Lt	RR		34		
									It	RR				
									Ft	OP			2	
1/2SD005B	M-48-5A/B	2	A	0.375	GL	A.O.	0	C	St	OP			1	
									Lt	RR		34		
									It	RR				
									Ft	OP			2	
1/2SD005C	M-48-5A/B	2	A	0.375	GL	A.O	0	C	St	OP			1	
									Lt	RR		34		
									It	RR				
									Ft	OP			2	
1/2SD005D	M-48-5A/B	2	A	0.375	GL	A.O.	0	C	St	OP			1	
									Lt	RR		34		
									It	RR				
									Ft	OP			2	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2SI8801A	M-61-2	2	B	4.0	GA	M.O.	C	O	St	CS		13	1	
	M-136-2								It	RR				
1/2SI8801B	M-61-2	2	B	4.0	GA	M.O.	C	O	St	CS		13	1	
	M-136-2								It	RR				
1/2SI8802A	M-61-3	2	B	4.0	GA	M.O.	C	O	St	CS		14	1	
	M-136-3								It	RR				
1/2SI8802B	M-61-3	2	B	4.0	GA	M.O.	C	O	St	CS		14	1	
	M-136-3								It	RR				
1/2SI8804B	M-61-1A	2	B	8.0	GA	M.O.	C	O	St	OP			1	
	M-136-1								It	RR				
1/2SI8806	M-61-1A	2	B	8.0	GA	M.O.	O	O	St	CS		14	1	
	M-136-1								It	RR				
1/2SI8807A	M-61-1A	2	B	6.0	GA	M.O.	C	O	St	OP			1	
	M-136-1								It	RR				
1/2SI8807B	M-61-1A	2	B	6.0	GA	M.O.	C	O	St	OP			1	
	M-136-1								It	RR				
1/2SI8809A	M-61-4	2	B	8.0	GA	M.O.	O	C	St	CS		14	1	
	M-136-4								It	RR				
1/2SI8809B	M-61-4	2	B	8.0	GA	M.O.	O	C	St	CS		14	1	
	M-136-4								It	RR				
1/2SI8811A	M-61-4	2	B	24.0	GA	M.O.	C	O	St	RR	VR-16		1	
	M-136-3								It	RR				
1/2SI8811B	M-61-4	2	B	24.0	GA	M.O.	C	O	St	RR	VR-16		1	
	M-136-4								It	RR				
1/2SI8812A	M-61-4	2	B	12.0	GA	M.O.	O	C	St	OP			1	
	M-136-4								It	RR				
1/2SI8812B	M-61-4	2	B	12.0	GA	M.O.	O	C	St	OP			1	
	M-136-4								It	RR				
1/2SI8813	M-61-1B	2	B	2.0	GL	M.O.	O	C	St	CS		14	1	
	M-136-1								It	RR				
1/2SI8814	M-61-1A	2	B	1.5	GL	M.O.	O	C	St	OP			1	
	M-136-1								It	RR				

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2SI8815	M-61-2	1	AC	3.0	CK	S.A.	C	O	Ct	CS	VR-15		3	
	M-136-2							C	Lt/Bt	RR	VR-18	6	3	
1/2SI8818A	M-61-4	1	AC	6.0	CK	S.A.	C	O	Xt/CT	CS/RR		9	3	
	M-136-4							C	Lt/Bt	RR	VR-18	6, 23	3	
1/2SI8818B	M-61-4	1	AC	6.0	CK	S.A.	C	O	Xt/Ct	CS/RR		9	3	
	M-136-4							C	Lt/Bt	RR	VR-18	6, 23	3	
1/2SI8818C	M-61-4	1	AC	6.0	CK	S.A.	C	O	Xt/Ct	CS/RR		9	3	
	M-136-4							C	Lt/Bt	RR	VR-18	6, 23	3	
1/2SI8818D	M-61-4	1	AC	6.0	CK	S.A.	C	O	Xt/Bt	CS/RR		9	3	
	M-136-4							C	Lt/Bt	RR	VR-18	6, 23	3	
1/2SI8819A	M-61-3	1	AC	2.0	CK	S.A.	C	C	Lt/Bt	RR	VR-18	6, 23	3	
	M-136-3							O	Ct	RR	VR-15		3	
1/2SI8819B	M-61-3	1	AC	2.0	CK	S.A.	C	C	Lt/Bt	RR	VR-18	6, 23	3	
	M-136-3							O	Ct	RR	VR-15		3	
1/2SI8819C	M-61-3	1	AC	2.0	CK	S.A.	C	C	Lt/Bt	RR	VR-18	6, 23	3	
	M-136-3							O	Ct	RR	VR-15		3	
1/2SI8819D	M-61-3	1	AC	2.0	CK	S.A.	C	C	Lt/Bt	RR	VR-18	6, 23	3	
	M-136-3							O	Ct	RR	VR-15		3	
1/2SI8821A	M-61-3	2	B	4.0	GA	M.O.	O	C	St	OP			1	
	M-136-3								It	RR				
1/2SI8821B	M-61-3	2	B	4.0	GA	M.O.	O	C	St	OP			1	
	M-136-3								It	RR				
1/2SI8835	M-61-3	2	B	4.0	GA	M.O.	O	C	St	CS		14	1	
	M-136-3								It	RR				
1/2SI8840	M-61-3	2	B	12.0	GA	M.O.	C	O	St	CS		14	1	
	M-136-3								It	RR				
1/2SI8841A	M-61-3	1	AC	8.0	CK	S.A.	C	C	Lt	RR	VR-18	6	3	
	M-136-3							O	Xt/Ct	CS/RR	VR-15		3	
1/2SI8841B	M-61-3	1	AC	8.0	CK	S.A.	C	C	Lt	RR	VR-18	6	3	
	M-136-3							O	Xt/Ct	CS/RR	VR-15		3	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2SI8871		2	A	0.75	GL	A.0	C	C	St	OP	VR-12		1	
	M-61-6								Lt	RR	VR-1			Passive
	M-136-6								It	RR				
									Ft	OP			2	
1/2SI8880		2	A	1.0	GL	A.0.	C	C	St	[illegible]			1	
	M-61-6								Lt	RR	VR-1			Passive
	M-136-6								It	RR				
									Ft	OP			2	
1/2SI8888		2	A	0.75	GL	A.0	C	C	St	OP			1	
	M-61-3								Lt	RR	VR-1			Passive
	M-136-3								It	RR				
									Ft	OP			2	
1/2SI8900A	M-61-2	1	AC	1.5	CK	S.A.	C	0	Ct	CS	VR-15		3	
	M-136-2							C	Lt/Bt	RR	VR-18	6	3	
1/2SI8900B	M-61-2	1	AC	1.5	CK	S.A.	C	0	Ct	CS	VR-15		3	
	M-136-2							C	Lt/Bt	RR	VR-18	6	3	
1/2SI8900C	M-61-2	1	AC	1.5	CK	S.A.	C	0	Ct	CS	VR-15		3	
	M-136-2							C	Lt/Bt	RR	VR-18	6	3	
1/2SI8900D	M-61-2	1	AC	1.5	CK	S.A.	C	0	Ct	CS	VR-15		3	
	M-136-2							C	Lt/Bt	RR	VR-18	6	3	
1/2SI8905A	M-61-3	1	AC	2.0	CK	S.A.	C	0	Ct	RR	VR-15		3	
	M-136-3							C	Lt/Bt	RR	VR-18	6	3	
1/2SI8905B	M-61-3	1	AC	2.0	CK	S.A.	C	0	Ct	RR	VR-15		3	
	M-136-3							C	Lt/Bt	RR	VR-18	6	3	
1/2SI8905C	M-61-3	1	AC	2.0	CK	S.A.	C	0	Ct	CS	VR-15		3	
	M-136-3							C	Lt/Bt	RR	VR-18	6	3	
1/2SI8905D	M-61-3	1	AC	2.0	CK	S.A.	C	C	Ct	CS	VR-15		3	
	M-136-3							0	Lt/Bt	RR	VR-18	6	3	
1/2SI8919A	M-61-1A	2	C	1.5	CK	S.A.	C	0	Ct	OP			3	
	M-136-1											31	3	
1/2SI8919B	M-61-1A	2	C	1.5	CK	S.A.	0	0	Ct	OP			3	
	M-136-1											31	3	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2SI8920	M-61-1A M-136-1	2	B	1.5	GL	M.O.	O	C	St It	OP RR			1	
1/2SI8922A	M-61-1A M-136-1	2	C	4.0	CK	S.A.	C	O C	Ct Bt	CS OP	VR-3		3 3	
1/2SI8922B	M-61-1A M-136-1	2	C	4.0	CK	S.A.	C	O C	Ct Bt	CS OP	VR-3		3 3	
1/2SI8924	M-61-1A M-136-1	2	B	6.0	GA	M.O.	O	C	St It	OP RR			1	
1/2SI8926	M-61-1A M-136-1	2	C	8.0	CK	S.A.	C	O	Ct/Xt	CS/OP	VR-6	25	3 3	
1/2SI8948A	M-61-5 M-136-5	1	AC	10.0	CK	S.A.	C	C O	Lt/Bt Xt/Ct	RR CS/RR	VR-18 VR-5	6, 23	3 3	
1/2SI8948B	M-61-5 M-136-5	1	AC	10.0	CK	S.A.	C	C O	Lt/Bt Xt/Ct	RR CS/RR	VR-18 VR-5	6, 23	3 3	
1/2SI8948C	M-61-6 M-136-6	1	AC	10.0	CK	S.A.	C	C O	Lt/Bt Xt/Ct	RR CS/RR	VR-18 VR-5	6	3 3	
1/2SI8948D	M-61-6 M-136-6	1	AC	10.0	CK	S.A.	C	C O	Lt/Bt Xt/Ct	RR CS/RR	VR-18 VR-5	6	3 3	
1/2SI8949A	M-61-3 M-136-3	1	AC	6.0	CK	S.A.	C	C O	Lt/Bt Ct	RR RR	VR-18 VR-15	6	3 3	
1/2SI8949B	M-61-3 M-136-3	1	AC	6.0	CK	S.A.	C	C O	Lt/Bt Ct	RR RR	VR-18 VR-15	6	3 3	
1/2SI8949C	M-61-3 M-136-3	1	AC	6.0	CK	S.A.	C	C O	Lt/Bt Ct	RR RR	VR-18 VR-15	6	3 3	
1/2SI8949D	M-61-3 M-136-3	1	AC	6.0	CK	S.A.	C	C O	Lt/Bt Ct	RR RR	VR-18 VR-15	6	3 3	
1/2SI8956A	M-61-5 M-136-5	1	AC	10.0	CK	S.A.	C	C O	Lt/Bt Ct	RR CS/RR	VR-18 VR-5	6	3 3	
1/2SI8956B	M-61-5 M-136-5	1	AC	10.0	CK	S.A.	C	C O	Lt/Bt Ct	RR CS/RR	VR-18 VR-5	6	3 3	
1/2SI8956C	M-61-6 M-136-6	1	AC	10.0	CK	S.A.	C	C O	Lt/Bt Ct	RR CS/RR	VR-18 VR-5	6	3 3	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2SI8956D	M-61-6	1	AC	10.0	CK	S.A.	C	C	Lt	RR	VR-18	6	3	
	M-136-6							O	Ct	CS/RR	VR-5		3	
1/2SI8958A	M-61-4	2	C	12.0	CK	S.A.	C	O	Ct	CS		9, 27	3	
	M-136-4													
1/2SI8958B	M-61-4	2	C	12.0	CK	S.A.	C	O	Ct	CS		9, 27	3	
	M-136-4													
1/2SI8964	M-61-6								St	OP			1	
	M-136-6	2	A	0.75	GL	A.O.	C	C	Lt	RR	VR-1			Passive
									It	RR				
									Ft	OP			2	
1/2SI8968	M-61-6	2	AC	1.0	CK	S.A.	C	C	Lt/St	RR	VR-1, 18		3	Passive
	M-136-6													

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2SX002A	M-42-1B	3	C	36.0	CK	S.A.	C	O	Ct	OP			3	
								C	Bt	OP			3	
1/2SX002B	M-42-1A	3	C	36.0	CK	S.A.	C	O	Ct	OP			3	
								C	Bt	OP			3	
1/2SX016A	M-42-5B	2	B	16.0	BTF	M.O.	O	O	St	OP			1	Passive
	M-126-3								It	RR				
1/2SX016B	M-42-5A	2	B	16.0	BTF	M.O.	O	O	St	OP			1	Passive
	M-126-3								It	RR				
1/2SX027A	M-42-5B	2	B	16.0	BTF	M.O.	O	O	St	OP			1	Passive
	M-126-3								It	RR				
1/2SX027B	M-42-5A	2	B	16.0	BTF	M.O.	O	O	St	OP			1	Passive
	M-126-3								It	RR				
0SX028A	M-42-6	3	C	8.0	CK	S.A.	C	O	Ct	OP			3	
0SX028B	M-42-6	3	C	8.0	CK	S.A.	C	O	Ct	OP			3	
1/2SX101A	M-42-3	3	B	1.5.	GL	S.O.	C	O	St	OP	VR-17			
	M-126-1								Ft	OP			2	
1/2SX112A	M-42-3	3	B	12.0	BTF	A.O.	O	C	St	OP			1	
	M-126-1								It	RR				
									Ft	OP			2	
1/2SX112B	M-42-3	3	B	12.0	BTF	A.O.	O	C	St	OP			1	
	M-126-1								It	RR				
									Ft	OP			2	
1/2SX114A	M-42-3	3	B	12.0	BTF	A.O.	O	C	St	OP			1	
	M-126-1								It	RR				
									Ft	OP			2	
1/2SX114B	M-42-3	3	B	1[illegible].0	BTF	A.O.	O	C	St	OP			1	
	M-126-1								It	RR				
									Ft	OP			2	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2SX169A	M-42-3	3	B	10.0	BTF	A.O.	C	O	St	OP			1	
	M-126-1								It	RR				
									Ft	OP			2	
1/2SX169B	M-42-3	3	B	10.0	BTF	A.O.	C	O	St	OP			1	
	M-126-1								It	RR				
									Ft	OP			2	
1/2SX173	M-42-3	3	B	6.0	GA	A.O.	C	O	St	OP			1	
	M-126-1								Ft	OP			2	
1/2SX178	M-42-3	3	B	6.0	GA	A.O.	C	O	St	OP			1	
	M-126-1								Ft	OP			2	

INSERVICE TESTING PROGRAM
COMMONWEALTH EDISON
BYRON NUCLEAR POWER STATION

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2VQ001A	M-105-1 M-106-1	2	A	48.0	BTF	H.O.	C	C	Lt St It	S CS RR	VR-1	11 11	1	Passive
1/2VQ001B	M-105-1 M-106-1	2	A	48.0	BTF	H.O.	C	C	Lt St It	S CS RR	VR-1	11 11	1	Passive
1/2VQ002A	M-105-1 M-106-1	2	A	48.0	BTF	H.O.	C	C	Lt St It	S CS RR	VR-1	11 11	1	Passive
1/2VQ002B	M-105-1 M-106-1	2	A	48.0	BTF	H.O.	C	C	Lt St It	S CS RR	VR-1	11 11	1	Passive
1/2VQ003	M-105-1 M-106-1	2	A	8.0	BTF	A.O.	C	C	Lt St It	OP OP RR	VR-1	11	1	Passive
1/2VQ004A	M-105-1 M-106-1	2	A	8.0	BTF	A.O.	C	C	Lt St It	OP OP RR	VR-1	11	1	Passive
1/2VQ004B	M-105-1 M-106-1	2	A	8.0	BTF	A.O.	C	C	Lt St It	OP OP RR	VR-1	11	1	Passive
1/2VQ005A	M-105-1 M-106-1	2	A	8.0	BTF	A.O.	C	C	Lt St It	OP OP RR	VR-1	11	1	Passive
1/2VQ005B	M-105-1 M-106-1	2	A	8.0	BTF	A.O.	C	C	Lt St It	OP OP RR	VR-1	11	1	Passive
1/2VQ005C	M-105-1 M-106-1	2	A	8.0	BTF	A.O.	C	C	Lt St It	OP OP RR	VR-1	11	1	Passive

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2VQ016	M-105-3	2	A	.50	GL	M	C	C	Lt	RR	VR-1			Passive
1/2VQ017	M-105-3	2	A	.50	GL	M	C	C	Lt	RR	VR-1			Passive
1/2VQ018	M-105-3	2	A	.50	GL	M	C	C	Lt	RR	VR-1			Passive
1/2V J019	M-105-3	2	A	.50	GL	M	C	C	Lt	RR	VR-1			Passive

INSERVICE TESTING PROGRAM
COMMONWEALTH EDISON
BYRON NUCLEAR POWER STATION

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2WM190	M-49-1A M-49-1B	2	A	2.0	GL	M	C	C	Lt	RR	VR-1			Passive
1/2WM191	M-49-1A M-49-1B	2	AC	2.0	CK	S.A.	C	C	Lt/Bt	RR	VR-1, 18		3	Passive

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS.	REMARKS
1/2W0006A	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	St Lt It	OP RR RR	VR-1		1	
1/2W0006B	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	St Lt It	OP RR RR	VR-1		1	
1/2W0007A	M-118-5 M-118-7	2	AC	10.0	CK	S.A.	C	C	Lt/Bt	RR	VR-1, 18		3	Passive
1/2W0007B	M-118-5 M-118-7	2	AC	10.0	CK	S.A.	C	C	Lt/Bt	RR	VR-1, 18		3	Passive
1/2W0020A	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	St Lt It	OP RR RR	VR-1		1	
1/2W0020B	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	St Lt It	OP RR RR	VR-1		1	
1/2W0056A	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	St Lt It	OP RR RR	VR-1		1	
1/2W0056B	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	St Lt It	OP RR RR	VR-1		1	

SECTION 4.4

NOTES

NOTE 1

Closure of the Main Steam isolation valves 1MS001A-D or 2MS001A-D during unit operation would result in reactor trip and safety injection actuation. To avoid this transient, these valves will be partially stroked every three months. Full stroke testing will be done during Modes 4, 5, or 6 as plant conditions allow, per IWV-3412.

NOTE 2

The testing of any emergency boration flowpath valves during unit operation is not practical. Stroke testing the Boric Acid injection isolation valve 1CV8104/2CV8104 and check valve 1CV8442/2CV8442, the RH to CV pump suction isolation valve 1CV8804A/2CV8804A, or the RWST to CV pump suction isolation valves 1CV112D,E/2CV112D,E, could result in boration of the RCS, resulting in a cooldown transient. Aligning the system in this configuration even for a short duration is, therefore, unacceptable. These valves will be stroke tested during cold shutdown, in accordance with IWV-3412.

NOTE 3

These valves are the Main Feedwater isolation valves: 1FW009A-D/2FW009A-D, and cannot be fully stroked during operation as feedwater would be terminated causing a reactor trip. They will, however, be partially stroke tested during operation as well as full stroke tested during cold shutdown, per the requirements of IWV-3412.

NOTE 4

Closure of these letdown and makeup valves 1CV112B,C/2CV112B,C, 1CV8105/2CV8105, 1CV8106/2CV8106, 1CV8152/2CV8152, and 1CV8160/2CV8160 during normal unit operation would cause a loss of charging flow which would result in a reactor coolant inventory transient, and possibly, a subsequent reactor trip. These valves will be full stroke/fail safe exercised during cold shutdown as required by IWV-3412.

NOTE 5

The 1RH8701A/B, 1RH8702A/B, 2RH8701A/B, and 2RH8702A/B valves are the isolation boundary between the Residual Heat Removal Pumps and the Reactor Coolant System. Opening one of these valves during unit operation will leave only one valve isolating RHR from the high RCS pressure. This would place the plant in an undesirable condition. Therefore, these valves will be full stroke tested during cold shutdown, per IWV-3522.

NOTE 6

The following valves have been identified as intersystem LOCA valves. They form a pressure boundary between the RCS and other essential components in order to protect these components from damage. These valves will be leak tested in accordance with the Byron Technical Specifications. Performance of the leak test on these valves also satisfies the back-flow test required for check valves by NRC Generic Letter 89-04.

Byron Unit 1 and Unit 2 Intersystem
LOCA Valves

1RH8701A/B	1RH8702A/B	2RH8701A/B	2RH8702A/B
1RH8705A/B	1RH8705A/B	2RH8705A/B	2RH8705A/B
1SI8818A-D	1SI8815	2SI8818A-D	2SI8815
1SI8819A-D	1SI8905A-D	2SI8819A-D	2SI8905A-D
1SI8841A/B	1SI8948A-D	2SI8841A/B	2SI8948A-D
1SI8900A-D	1SI8949A-D	2SI8900A-D	2SI8949A-D
	1SI8956A-D		2SI8956A-D

NOTE 7

The Reactor Pressure Vessel Vent Valves 1RC014A-D and 2RC014A-D cannot be stroked during unit operation, as they provide a pressure boundary between the Reactor Coolant system and containment atmosphere. Failure of one of these valves in the open position would result in leaving only one valve as the high pressure boundary. These valves will be full stroke/fail safe exercised when the RCS pressure is at a minimum during cold shutdown, per IWV-3412.

NOTE 8

The Residual Heat Removal Pump discharge check valves 1RH8730A/B and 2RH8730A/B cannot be full stroke exercised during unit operation due to the high RCS pressure. These check valves will be partial stroke tested, however, on a quarterly basis and full stroke exercised during cold shutdown. This is in accordance with IWV-3522.

NOTE 9

Due to the RCS pressure, the check valves listed below cannot be full stroke exercised during unit operation:

1SI8818A-D	2SI8818A-D	RHR Cold Leg Injection
1SI8958A/B	2SI8958A/B	RWST to RHR Pump Suction

These valves will be full stroke exercised during cold shutdown, in accordance with IWV-3522.

NOTE 10

The 1FW039A-D and 2FW039A-D valves cannot be stroke tested during unit operation as closure of these valves would result in termination of the waterhammer prevention feedwater flow. This would result in undesirable affects on the Steam Generators. These valves will be full stroke/fail safe tested during cold shutdown, per IWV-3412.

NOTE 11

The Primary Containment Purge Supply and Exhaust Valves 1VQ001A/B, 1VQ002A/B, 2VQ001A/B, and 2VQ002A/B cannot be stroke timed during unit operation. These 48-inch valves are the only isolation points between the containment atmosphere and the environment. Stroking these valves at any time other then mode 5 or 6 would be a violation of the Byron Technical Specifications. These valves will be full stroke tested during cold shutdown, in accordance with IWV-3412. These valves will be leak tested semiannually, in accordance with Byron Station Technical Specifications.

The Primary Containment Mini-Purge and Exhaust Valves 1VQ004A/B, 1VQ005A/B/C, 2VQ004A/B, and 2VQ005A//B/C, and the Post LOCA Purge Exhaust Valves 1VQ003/ 2VQ003 will be leak tested every 3 months, in accordance with Byron Station Technical Specifications.

NOTE 12

The Auxiliary Feedwater check valves 1AF001A/B, 1AF003A/B, 1AF014A-H, 1AF029A/B, 2AF001A/B, 2AF003A/B, 2AF014A-H, and 2AF029A/B cannot be full stroke tested during unit operation, as this would induce potentially damaging thermal stresses in the upper feedwater nozzle piping. The 1AF001A/B, 1AF003A/B, 2AF001A/B, and 2AF003A/B valves will be partially stroke tested during operation, and all valves full stroke tested during cold shutdown. This will be performed per Tech Spec 4.7.1.2.2 and is in accordance with IWV-3522.

NOTE 13

The High Head Injection Isolation Valves 1SI8801A/B and 2SI8801A/B cannot be stroke tested during unit operation. These valves isolate the CV system from the RCS. Opening them during operation would enable charging flow to pass directly into the RCS, bypassing the regenerative heat exchanger. The temperature difference of the charging flow and the RCS could result in damaging thermal stresses to the cold leg nozzles as well as cause a reactivity change which would, in turn, cause a plant transient. These valves will be full stroke tested during cold shutdown in accordance with IWV-3412.

NOTE 14

The safety injection system SVAG (Spurious Valve Actuation Group) valves 1SI8802A/B, 1SI8806, 1SI8809A/B, 1SI8813, 1SI8835, 1SI8840, 2SI8802A/B, 2SI8806, 2SI8809A/B, 2SI8813, 2SI8835, and 2SI8840 cannot be stroke tested during unit operation. These valves are required by the Technical Specifications to be de-energized in their proper positions during unit operation. Stroking them would be a violation of the Technical Specifications as well as defeating the de-energized SVAG valve principle. These valves will be stroke tested during cold shutdown when they are not required to be de-energized. This is in accordance with IWV-3412.

NOTE 15

"-DELETE-"

NOTE 16

These feedwater valves are exempt from all ASME Section XI testing requirements per IWV-1100 and IWV-1200. They are included in the program for operability tracking purposes only. The closure of the Main Feedwater Regulating Valves 1FW510, 1FW520, 1FW530, 1FW540, 2FW510, 2FW520, 2FW530, and 2FW540 during unit operation would cause a loss of feedwater to the steam generators, resulting in a plant transient with a possible reactor trip as a result. These valves will be fail safe (Ft) tested pursuant to the Byron Station Technical Specifications.

NOTE 17

These feedwater valves are exempt from all ASME Section XI testing requirements per IWV-1100 and IWV-1200. They are included in the program for operability tracking purposes only. The closure of the Main Feedwater Regulating Bypass Valves 1FW510A, 1FW520A, 1FW530A, 1FW540A, 2FW510A, 2FW520A, 2FW530A, and 2FW540A during unit operation would require the Main Feedwater Regulating Valves to correct for bypassed flow and could result in a plant transient with a possible reactor trip as a result. These valves will be fail safe (Ft) tested pursuant to the Byron Station Technical Specifications.

NOTE 18

"-DELETE-"

NOTE 19

"-DELETE-"
(Incorporated into NOTE 14)

NOTE 20

The remote position indicator for these valves cannot be observed directly due to the encapsulated design of the solenoid valve body. During the indication test, indirect evidence of the necessary valve disk movement shall be used, in accordance with IWV-3412 (b). The valves affected are listed below:

1CV8114	1PS230A/B	2PS228A/B
1CV8116	1RC014A-D	2PS229A/B
1PS228A/B	2CV8114	2PS230A/B
1PS229A/B	2CV8116	2RC014A-D

NOTE 21

The Main Feedwater Tempering Flow Isolation Valves 1/2FW034A-D are exempt from all ASME Section XI testing requirements per IWV-1100 and IWV-1200. They are included in the program for operability tracking purposes only, and will be fail safe (Ft) tested pursuant to the Byron Station Technical Specifications.

NOTE 22

Per NRC request, the post-accident hydrogen monitoring system check valves 1/2PS231A and 1/2PS231B will be stroke exercised open on a quarterly frequency to verify operability.

NOTE 23

1/2SI8818A-D, 1/2SI8819A-D, and 1/2SI8948A/B are Event V check valves, which are defined as two check valves in series at a low pressure/RCS interface whose failure may result in a LOCA that bypasses containment. They are individually leak-tested in accordance with NRC generic letter 89-04, position #4b.

NOTE 24

1/2CC9518, 1/2CC9534, 1/2CV8113, and 1RH8705A/B are check valves designed to relieve pressure between two containment isolation valves. The full flow limiting value is zero, since the safety function of these valves in the open direction is to relieve pressure only. Refer to Relief Request VR-18.

NOTE 25

Check valve 1/2SI8926 prevents flow from the Safety Injection (SI) pump suction line to the Refueling Water Storage Tank (RWST). The SI pumps are normally lined up in the INJECTION MODE to take suction from the RWST. This check valve would stop reverse flow when the SI pumps are transferred to HOT/COLD LEG RECIRCULATION MODE to prevent contamination of the RWST. However, the 1/2SI8806 M.O.V. is in series with this check valve and would be closed to prevent reverse flow as directed by the emergency procedures. Therefore, no backflow test (Bt) is required for 1/2SI8926.

NOTE 26

Check valve 1/2CV8546 prevents flow from the Chemical and Volume Control (CV) pump suction line to the Refueling Water Storage Tank (RWST). The CV pumps are normally lined up in the INJECTION MODE to take suction from the RWST. This check valve would stop reverse flow when the CV pumps are transferred to HOT/COLD LEG INJECTION MODE to prevent contamination of the RWST. However, the 1/2CV112D and 1/2CV112E M.O.V.'s are in series with this check valve and would be closed to prevent reverse flow as directed by the emergency procedures. Therefore, no back flow test (Bt) is required for 1/2CV8546.

NOTE 27

Check valves 1/2SI8958A/B prevent flow from the Residual Heat (RH) Removal pump suction line to the Refueling Water Storage Tank (RWST). The RH pumps are normally lined up in the INJECTION MODE to take suction from the RWST. These check valves would stop reverse flow when the RH pumps are transferred to HOT/COLD LEG RECIRCULATION MODE to prevent contamination of the RWST. However, the 1/2SI8812A/B M.O.V.'s are in series with these check valves and would be closed to prevent reverse flow as directed by the emergency procedures. In addition, the RH suction valves 1/2SI8812A/B, 1/2RH8701A/B or 1/2RH8702A/B, and 1/2SI8811A/B are electrically interlocked to prevent the backflow to the RWST when the RH system is in a RECIRCULATION MODE. Thus, no back flow testing of 1/2SI8958A/B is required.

NOTE 28

NRC Generic Letter 89-04, Attachment 1, Position 3 lists the CVCS Volume Control Tank (VCT) outlet check valve as an example of ASME Code Class check valves that perform a safety function in the closed direction that are frequently not back flow tested. At Byron Station, check valve 1/2CV8440 prevents flow from the Chemical and Volume Control (CV) pump suction to the VCT. The VCT is normally aligned to the CV pumps during normal plant operation. During a Safety Injection signal, the VCT is automatically isolated by closure of the 1/2CV112B and 1/2CV112C M.O.V.'s, which are in series with the 1/2CV8440 check valve. Closure of either M.O.V. will prevent reverse flow to the VCT. Thus, no back flow testing of 1/2CV8440 is required.

NOTE 29

Check valve 1/2CV8442 prevents flow from the Chemical and Volume Control (CV) pump suction header to the boric acid transfer pump. This line is normally isolated by the 1/2CV8104 emergency boration valve. This valve would only be opened during an emergency with the boric acid transfer pump running. This check valve is unnecessary with the current system operation, and thus, no back flow testing of 1/2CV8442 is required.

NOTE 30

Check valves 1/2AF014A-H are verified to be closed each shift by the Operating Department, by verifying that the temperature at 1/2AF005A-H is ≤ 130° F, per BOP 199-A40 (U-1) and BOP 199-A61 (U-2). If the temperature is > 130° F at any 1/2AF005 valve, then abnormal operating procedure 1/2BOA SEC-7, "Auxiliary Feedwater Check Valve Leakage", is entered to isolate and cool down the affected lines. This shiftly monitoring of 1/2AF014A-H in the closed position adequately monitors the status of these valves. No additional monitoring/trending by the IST Group is required.

NOTE 31

Check valves 1/2CV8480A/B and 1/2SI8919A/B are the Centrifugal Charging Pump and Safety Injection Pump mini-flow recirculation line valves which open to prevent full recirculation flow during IST Surveillances. Since full stroke for these valves will depend on the reference point of testing, acceptable full stroke will be verified whenever the recorded mini-recirculation flowrate is within the "acceptable" or "alert" ranges given in the IST Pump Surveillance.

NOTE 32

Check valves 1/2CC9463A/B and 0CC9464 are the Component Cooling Water Pump discharge check valves. The full design accident flow through any one pump cannot be obtained during normal operation without causing low flow alarms in adjacent loops and possible equipment damage due to low cooling water flowrates to the Reactor Coolant Pump (RCP) seals. These valves will be full-stroke exercised during cold shutdowns when plant conditions allow all four RCP's off.

NOTE 33

The Essential Service Water (SX) and Make-Up Pump discharge check valves (0SX028A/B) open to permit make-up water flow from the Rock River to the SX System Basin. These check valves are downstream at the pump discharge tap-off to the SX Make-Up Pump Jacket Water Heat Exchanger and Gear Oil Cooler. Since this tap-off line is orificed, the flowrate through this line, and therefore the flowrate through pump discharge check valves 0SX028A/B, will depend on the reference point of testing. Acceptable 0SX028A/B full stroke will be verified whenever the recorded total pump flow minus the tap-off line flow is within "Acceptable" range contained in the ASME pump surveillance.

NOTE 34

Per Byron Technical Specifications Amendment valves 1/2SD002A-H, 1/2SD005A-D have been removed from the list of valves to be tested under 10CFR50 Appendix J and will now be tested per ASME Code Section XI, IWV-3420.

NOTE 35

The 1/2RH8705A/B check valves will be operability tested by verifying that there is depressurization in line 1/2RH26AA-3/4 and 1/2RH26AB-3/4 when they are opened. This is a test method which was approved by the NRC is SER 9/14/90.

SECTION 4.5

TECHNICAL APPROACHES AND POSITIONS

VA-01
IST Technical Approach and Position

A. Component Identification

1. Description: Method of Stroke Timing Valves - Timing using control board position indication lights (St).

2. Component Numbers: See IST Valve Tables.

3. References: ASME Code, Section XI, Subsection IWV, paragraph IWV-3413(a).

4. Code Class: 1, 2, and 3.

5. Examination Category(s): N/A

6. Item Number(s): N/A

B. Requirement:

Use of the control board open and closed lights to determine the stroke time of power-operated valves has recently become an issue for discussion in the industry. Paragraph IWV-3413 of ASME XI defines "full-stroke time" as "that time interval from initiation of the actuating signal to the end of the actuating cycle." It is common industry practice to measure stroke time as the time interval between placing the operator switch on the control board in the "close" or "open" position and indication that the valve is open or closed on the control board (switch to light).

C. Position:

It is recognized that the way in which the limit switch that operates the remote position indicator lights is set may result in "closed" or "open" indication before the valve obturator has actually completed its travel. This is not considered to be a problem, as the purpose of the test is to determine if degradation of the valve operator system is occurring, which is determined by observing changes in stroke time relative to the reference stroke time. Stroke time measurements should be rounded to the nearest tenth (0.1) of a second, except that stroke times less than one half (0.5) second may be rounded to 0.5 second, if appropriate.

Standard rounding techniques are to be used when rounding stop watch readings during valve stroke time testing (e.g., 10.45 rounds to 10.5 and 10.44 rounds to 10.4). Rounding to the nearest second for stroke times of 10 seconds or less, or 10% of the specified limiting stroke time for stroke times longer than 10 seconds, as allowed by ASME Section XI subparagraph IWV-3413(b), should not be used.

VA-02
IST Technical Approach and Position

A. Component Identification:

1. Description: Method of Fail Safe Testing Valves.

2. Component Numbers: See IST Valve Tables (Ft).

3. References: ASME Code, Section XI, Subsection IWV, paragraph IWV-3415.

4. Code Class: 1, 2, and 3.

5. Examination Category(s): N/A

6. Item Number(s): N/A

B. Requirement:

Paragraph IWV-3415 of ASME XI states that "When practical, valves with fail-safe actuators shall be tested by observing the operation of the valves upon loss of actuator power." Most valves with a fail-safe mechanism to stroke the valve to the fail-safe position during normal operation. For example, an air-operated valve that fails closed may use air to open the valve against spring pressure. When the actuator is placed in the closed position, air is vented from the diaphragm and the spring moves the obturator to the closed position.

C. Position:

In the cases where normal valve operator action moves the valve to the closed position by de-energizing the operator electrically, by venting air or both (e.g., an electric solenoid in the air system of a valve operator moves to the vent position on loss of power), no additional fail-safe testing is required. Valves with fail-safe actuators that do not operate as part of normal actuator operation must be tested by other means. This may be accomplished for motor-operated valves by opening the circuit breaker supplying operator power and observing that the valve moves to its fail-safe position. Lifting leads is not required unless it is the only method of de-energizing the actuator.

Using a valve remote position indicator as verification of proper fail-safe operation is acceptable, provided the indicator is periodically verified to be operating properly as required by ASME Code, Section XI, Subsection IWV, paragraph IWV-3300.

VA-03
IST Technical Approach and Position

A. Component Identification:

1. Description: Method of Full Stroke (Ct) and Back Flow (Bt) Exercising of Check Valves.

2. Component Numbers: See IST Valve Tests (Ct and Bt).

3. References: (a) NRC Generic Letter 89-04, Guidance on Developing Acceptable Inservice Testing Programs, Attachment 1, Positions 1, 2, and 3; (b) ASME Code, Section XI, Subsection IWV, paragraph IWV-3522.

4. Code Class: 1, 2, and 3.

5. Examination Category(s): N/A

6. Item Number(s): N/A

B. Requirement:

Paragraph IWV-3522 of Article XI states "check valves shall be exercised to the position required to fulfill their function unless such operation is not practical during plant operation. If only limited operation is practical, during plant operation the check valve shall be part-stroke exercised during plant operation and full-stroke exercised during cold shutdowns." For check valves with no external position indication devices, the determination of when they are in full open position has proven difficult to determine. The verification of when a valve is the full open position affects the determination of which valves are only part-stroked and thus require additional full-stroke testing during cold shutdowns or refuelings.

C. Position:

Valid full-stroke exercising to the full-open or full-closed position may be accomplished by observing an external position indicator which is considered to be a positive means of determining obturator position. Where external position indicators are not provided, manual stroking of the valve is acceptable. Where a mechanical exerciser is used, the torque required to move the obturator must be recorded and meet the acceptance standards of subparagraph IWV-3522(b). Per the requirements of NRC Generic Letter 89-04, Attachment 1, Position 1, the other acceptable method of full-stroke exercising a check valve to the open position is to verify that the valve passes the maximum required accident condition flow. Any flow less than this is considered as a part-stroke exercise. Flow through the valve must be determined by positive means such as permanently installed flow instruments, temporary flow instruments, or by measuring the pressure drop across the valve or other in-line component. Measuring total flow through multiple parallel lines does not provide verification of flow through individual valves.

C. Position, continued

One exception to the "maximum required accident flow" requirement is the methodology used to verify full-stroke exercising of the Safety Injection (SI) Accumulator Back-up Check Valves, 1/2SI8956A-D. Because of the high maximum design flowrate of these valves, a maximum design accident flowrate test is physically impossible to perform. For those valves, an Engineering calculation has been perform d to determine the minimum flowrate for full disc lift. An accep ble full-stroke exercise of these valves will be performed each refueli g outage by measuring the accumulator level decrease over time, converting these parameters to a flowrate through the valve, and verifying this value is greater than or equal to the engineering calculated minimum flowrate for full disc lift. This method is superior to sample disassembly and inspection of one valve per outage which would require unusual system line-ups, freeze seals, radiation exposure, and possible plant transients.

Other alternatives to measuring full design accident flow or disassembly and inspection of check valves to satisfy full stroke requirements is allowed as long as the requirements of NRC Generic Letter 89-04, Attachment 1, Positions 1, 2, and 3 are utilized OR specific relief requests are approved by the NRC.

Stroking a valve to the full closed position for valves without a manual exerciser or position indicator must be verified using indirect means. These include, but are not limited to, (1) observing pressure indications on both sides of the valve to determine if the differential pressure expected with the valve shut is obtained, or (2) opening a drain connection on the upstream side of the valve to detect leakage rates in excess of that expected with the valve shut.

Valves that cannot be full-stroke tested or where full-stroking cannot be verified, shall be disassembled, inspected, and manually exercised. Valves that require disassembly for full-stroke testing during cold shutdowns or refueling still require quarterly part-stroke testing, where possible.

Testing of check valves by disassembly shall comply with the following:

a. During valve testing by disassembly, the valve internals shall be visually inspected for worn or corroded parts, and the valve disk shall be manually exercised.

b. Due to the scope of this testing, the personnel hazards involved, and system operating restrictions, valve disassembly and inspection may be performed during reactor refueling outages. Since this frequency differs from the Code required frequency, this deviation must be specifically noted in the IST program.

c. Where it is burdensome to disassemble and inspect all applicable valves each refueling outage, a sample disassembly and inspection plan for groups of identical valves in similar applications may be employed. The NRC Generic Letter 89-04 guidelines for this plan are explained below:

The sample disassembly and inspection program involves grouping similar valves and testing one valve in each group during each refueling outage. The sampling technique requires that each valve in the group be the same design (manufacturer, size, model number, and materials of construction) and have the same service conditions including valve orientation. Additionally, at each disassembly the licensee must verify that the disassembled valve is capable of full-stroking and that the internals of the valve are structurally sound (no loose or corroded parts). Also, if the disassembly is to verify the full-stroke capability of the valve, the disk should be manually exercised.

A different valve of each group is required to be disassembled, inspected, and manually full-stroke exercised at each successive refueling outage, until the entire group has been tested. If the disassembled valve is not capable of being full-stroke exercised or there is binding or failure of valve internals, the remaining valves in that group must also be disassembled, inspected, and manually full-stroke exercised during the same outage. Once this is completed, the sequence of disassembly must be repeated unless extension of the interval can be justified.

Extending the valve sample disassembly and inspection interval from disassembly of one valve in the group every refueling outage or expanding the group size would increase the time between testing of any particular valve in the group. With four valves in a group and an 18-month reactor cycle, each valve would be disassembled and inspected every six years. If the fuel cycle is increased to 24 months, each valve in a four-valve sample group would be disassembled and inspected only once every eight years.

Extension of the valve disassembly/inspection interval from that allowed by the Code (quarterly or cold shutdown frequency) to longer than once every 6 years is a substantial change which may not be justified by the valve failure rate data for all valve groupings. When disassembly/inspection data for a valve group show a greater than 25% failure rate, the station should determine whether the group size should be decreased or whether more valves from the group should be disassembled during every refueling outage.

Extensions of the group size will be done on a case by case basis.

VA-04
IST Technical Approach and Position

A. Component Identification:

1. Description: Determining limiting values of full-stroke times for Power-Operated Valves.

2. Component Numbers: See IST Valve Tables (St).

3. References:

   a. ASME Code, Section XI, Subsection IWV, Sub Article IWV-3413.

   b. NRC Generic Letter 89-04, Attachment A, Position 5.

   c. ANSI/ASME OM-1987 through OMb-1989 Addenda, Part 10, Section 4.2

4. Code Class: 1, 2, and 3.

5. Item Number(s): N/A

B. Requirement:

The IST program originally assigned a limiting value of full-stroke time based on the most conservative value from plant Technical Specifications (TS) or Updated Final Safety Analysis Report (UFSAR). For valves not having a specified value of full-stroke, a limiting value was assigned based on manufacturers design input, engineering input, or initial valve preoperational testing. This methodology is contrary to NRC Generic Letter 89-04.

According to NRC Generic Letter 89-04 the limiting value of full-stroke should be based on an average reference stroke time of a valve when it is known to be operating properly. The limiting value should be a reasonable deviation from this reference stroke time based on the valve size, valve type, and actuator type. The deviation should not be so restrictive that it results in a valve being declared inoperable due to reasonable [illegible]e time variations. However, the deviation used to establish the li[illegible] should be such that corrective action would be taken for a valve that may not perform its intended function. When the calculated limiting value for a full-stroke is greater than a TS or safety analysis limit, the TS or safety analysis limit should be used as the limiting value of full-stroke time. Based on this, a review of each valve operating history was performed and an average/reference value of full-stroke determined. In addition, valves were grouped together by system, train, unit, valve type, and actuator type to provide for a more thorough review in determining what would be a "reasonable" deviation from the average/reference full-stroke value.

The 1983 Edition through Summer 1983 Addenda of ASME Section XI does not provide guidance for determining values of full-stroke. However, it does provide requirements for when to start monitoring a valves performance on a more frequent basis, also known as alert range testing. If a valve strokes in 10 seconds or less, a 50% increase over the previous value requires it to be put on a monthly test frequency, and for valves stroking in greater than 10 seconds, a 25% increase over the previous value requires it to be put on a monthly test frequency. The new ANSI/ASME OM Part 10 standard does provide acceptance criteria to be used when comparing valve test results to the reference value of full-stroke. The OM Part 10 standard recognizes that operating characteristics of electric motor valves are more consistent than those of air-operated valves. However, due to the requirements of OM Part 10 delineating different corrective actions to be taken when a valve exceeds its minimum stroke time than those specified in ASME Section XI, using the same criteria would not necessarily be appropriate.

Therefore, the current ASME Section XI alert value will be used as the alert range value (25% or 50%) for motor and solenoid operated valves, and the current CECo Corporate IST Group guidance (75% to 100%) will be used as the required action range limit. This criteria, in conjunction with establishing reference/average values of full-stroke, should allow for reasonable deviations in stroke time measurements without declaring a valve inoperable. The corrective actions specified in IWV-3417(b) of Section XI and as described in IST Program Relief Request VR-20 will be taken when a valve exceeds its limiting value of full stroke.

C. Position:

The following criteria will be used as general guidance to establish ALERT and REQUIRED ACTION ranges for power-operated valves:

MOV's/SOV's/HOV's/AOV's - Less than or equal to 10 seconds:

ALERT RANGE: $(1.50)\ (T_{ref}) - (2.0)\ (T_{ref})$

REQUIRED ACTION VALUE: $> (2.0)\ (T_{ref})$

MOV's/SOV's/HOV's - Greater than 10 seconds:

ALERT RANGE: $(1.25)\ (T_{ref}) - (1.75)\ (T_{ref})$ or
$(T_{ref} + 10\ \text{sec}) - (T_{ref} + 20\ \text{sec})$

REQUIRED ACTION VALUE: $> (1.75)\ (T_{ref})$, but $\leq (T_{ref} + 20\ \text{sec})$

AOV's - Greater than 10 seconds:

ALERT RANGE: $(1.50)\ (T_{ref}) - (2.0)\ (T_{ref})$ or
$(T_{ref} + 15\ \text{sec}) - (T_{ref} + 20\ \text{sec})$

REQUIRED ACTION VALUE: $> (2.0)\ (T_{ref})$, but $\leq (T_{ref} + 20\ \text{sec})$

Notes:

1. T_{ref} is the reference or average stroke value in seconds of an individual valve or valve grouping established when the valve is known to be operating acceptable.

2. Standard rounding techniques are to be used when rounding off stopwatch readings during valve stroke timing (e.g. 10.45 rounds to 10.5, and 10.44 is rounded to 10.4 seconds). Round off all measured stroke time to the nearest tenth of a second.

3. When reference stroke valves or average stroke valves are affected by other parameters or conditions, then these parameters or conditions must be analyzed and the above fa ors adjusted.

4. If the above calculated values exceed a Technical Specification or FSAR value, then the TS or FSAR value must be used for the limiting value of full-stroke.

5. Fast a ting valves (valves which normally stroke in less than 2 seconds consistently) are included in Relief Request VR-12. These valves are NOT assigned ALERT RANGES and are NOT trended.

6. The above criteria is a guide and cannot cover all valves. The ALERT RANGES and REQUIRE ACTION VALUES are selected based on comparison between the REFERENCE VALUE, LIMITING VALUE given in Technical Specifications/UFSAR, operating history, and calculated values using the above criteria.

7. Valves which serve the same function on dual trains (i.e., 1CC9473A and 1CC9473B) and dual units (i.e. 1CC9473A and 2CC9473A) are assigned the same REQUIRED ACTION/ALERT RANGE VALUES based on human factors considerations, unless valve or system design differences exist between the trains/units.

8. Refer to Relief Request VR-20 for related information.

SECTION 4.6

RELIEF REQUESTS

RELIEF REQUEST VR-1

1. Valve Number:

All primary containment isolation valves in this program are listed as Category A:

	VALVE #		VALVE #		VALVE #
1)	1CC685	41)	1PR033B	81)	1SI8964
2)	1CC9413A	42)	1PR033C	82)	1SI8968
3)	1CC9414	43)	1PR033D	83)	1VQ001A
4)	1CC9416	44)	1PR066	84)	1VQ001B
5)	1CC9438	45)	1PS228A	85)	1VQ002A
6)	1CC9486	46)	1PS228B	86)	1VQ002B
7)	1CC9518	47)	1PS229A	87)	1VQ003
8)	1CC9534	48)	1PS229B	88)	1VQ004A
9)	1CS007A	49)	1PS230A	89)	1VQ004B
10)	1CS007B	50)	1PS230B	90)	1VQ005A
11)	1CS008A	51)	1PS231A	91)	1VQ005B
12)	1CS008B	52)	1PS231B	92)	1VQ005C
13)	1CV8100	53)	1PS9354A	93)	1VQ016
14)	1CV8112	54)	1PS9354B	94)	1VQ017
15)	1CV8113	55)	1PS9355A	95)	1VQ018
16)	1CV8152	56)	1PS9355B	96)	1VQ019
17)	1CV8160	57)	1PS9356A	97)	1WM190
18)	1FC009	58)	1PS9356B	98)	1WM191
19)	1FC010	59)	1PS9357A	99)	1WO006A
20)	1FC011	60)	1PS9357B	100)	1WO006B
21)	1FC012	61)	1RE1003	101)	1WO007A
22)	1IA065	62)	1RE9157	102)	1WO007B
23)	1IA066	63)	1RE9159A	103)	1WO020A
24)	1IA091	64)	1RE9159B	104)	1WO020B
25)	1OG057A	65)	1RE9160A	105)	1WO056A
26)	1OG079	66)	1RE9160B	106)	1WO056B
27)	1OG080	67)	1RE9170		
28)	1OG081	68)	1RF026		
29)	1OG082	69)	1RF027		
30)	1OG083	70)	1RY8025		
31)	1OG084	71)	1RY8026		
32)	1OG085	72)	1RY8028		
33)	1PR001A	73)	1RY8033		
34)	1PR001B	74)	1RY8046		
35)	1PR002E	75)	1RY8047		
36)	1PR002F	76)	1SA032		
37)	1PR002G	77)	1SA033		
38)	1PR002H	78)	1SI8871		
39)	1PR032	79)	1SI8880		
40)	1PR033A	80)	1SI8888		

1. Valve Number: (Continued)

	VALVE #		VALVE #		VALVE #
107)	2CC685	147)	2PR033B	187)	2SI8964
108)	2CC9413A	148)	2PR033C	188)	2SI8968
109)	2CC9414	149)	2PR033D	189)	2VQ001A
110)	2CC9416	150)	2PR066	190)	2VQ001B
111)	2C[illegible]	151)	2PS228A	191)	2VQ002A
112)	2C[illegible]	152)	2PS228B	192)	2VQ002B
113)	2CC9518	153)	2PS229A	193)	2VQ003
114)	2CC9534	154)	2PS229B	194)	2VQ004A
115)	2CS007A	155)	2PS230A	195)	2VQ004B
116)	2CS007B	156)	2PS230B	196)	2VQ005A
117)	2CS008A	157)	2PS231A	197)	2VQ005B
118)	2CS008B	158)	2PS231B	198)	2VQ005C
119)	2CV8100	159)	2PS9354A	199)	2VQ016
120)	2CV8112	160)	2PS9354B	200)	2VQ017
121)	2CV8113	161)	2PS9355A	201)	2VQ018
122)	2CV8152	162)	2PS9355B	202)	2VQ019
123)	2CV8160	163)	2PS9356A	203)	2WM190
124)	2FC009	164)	2PS9356B	204)	2WM191
125)	2FC010	165)	2PS9357A	205)	2WO006A
126)	2FC011	166)	2PS9357B	206)	2WO006B
127)	2FC012	167)	2RE1003	207)	2WO007A
128)	2IA065	168)	2RE9157	208)	2WO007B
129)	2IA066	169)	2RE9159A	209)	2WO020A
130)	2IA091	170)	2RE9159B	210)	2WO020B
131)	2OG057A	171)	2RE9160A	211)	2WO056A
132)	2OG079	172)	2RE9160B	212)	2WO056B
133)	2OG080	173)	2RE9170		
134)	2OG081	174)	2RF026		
135)	2OG082	175)	2RF027		
136)	2OG083	176)	2RY8025		
137)	2OG084	177)	2RY8026		
138)	2OG085	178)	2RY8028		
139)	2PR001A	179)	2RY8033		
140)	2PR001B	180)	2RY8046		
141)	2PR002E	181)	2RY8047		
142)	2PR002F	182)	2SA032		
143)	2PR002G	183)	2SA033		
144)	2PR002H	184)	2SI8871		
145)	2PR032	185)	2SI8880		
146)	2PR033A	186)	2SI8888		

2. Number of Items: 212

3. ASME Code Category: A

4. ASME Code, Section XI Requirements:

   Seat Leakage Measurement per IWV-3420.

5. Basis for Relief:

   Primary containment isolation valves will be seat leak tested in accordance with 10 CFR 50, Appendix J. For these valves, Section XI testing requirements are essentially equivalent to those of Appendix J.

6. Alternate Testing:

   Primary containment isolation valves shall be seat leak rate tested in accordance with the requirements of 10 CFR 50, Appendix J. The results of such leak rate measurements shall be analyzed and corrected, as necessary, in accordance with the guidance set forth in ASME Code Section XI, Subsection IWV, paragraphs IWV-3426 and IWV-3427(a). The trending requirements of IWV-3427(b) will not be utilized.

7. Justification:

   No additional information concerning valve leakage would be gained by performing separate tests to both Section XI and Appendix J. Therefore, overall plant safety is not affected. As specified per NRC Generic Letter 89-04, Attachment 1, position 10, the usefulness of IWV-3427(b) does not justify the burden of complying with this requirement.

8. Applicable Time Period:

   This relief is requested once per two years during the first inspection interval.

9. Approval Status:

   a. Relief granted per SER 9/15/88 contengent upon compliance with ASME Section XI IWV-3426, 27.

   b. Revised to comply with ASME Section XI IWV-3426, 27 in Byron SER Response 12/16/88 (Byron Station Letter 88-1321).

   c. Relief granted per NRC Generic Letter 89-04.

   d. Deleted SD valves per Technical Specification Amendment #39.

   e. Relief granted per SER 9/14/90.

RELIEF REQUEST VR-2

1. Valve Number: 1CS020A 2CS020A 1CS020B 2CS020B

2. Number of Items: 4

3. ASME Code Category: C

4. ASME Code, Section XI Requirements:

   Exercise for operability (Ct) of check valves every 3 months, per IWV-3521.

5. Basis for Relief:

   The check valves in the spray additive system cannot be stroked without introducing NaOH into the CS system.

6. Alternate Testing:

   These valves will be dismantled according to the sample disassembly and inspection program identified in Relief Request VR-18 during refueling outages, in order to demonstrate operability. In addition to this, they will be full flow tested once every five years per Byron Station Technical Specifications. The full flow test may be performed in lieu of dismantling these valves, if desired.

7. Justification:

   This alternative will adequately maintain the system in a state of operational readiness, while not sacrificing the safety of the plant, by testing the valves as often as is safely possible.

8. Applicable Time Period:

   This relief is requested once per quarter during the first inspection interval.

9. Approval Status:

   a. Relief granted per SER 9/15/88.

   b. Relief granted per Generic Letter 89-04.

   c. Relief granted per SER 9/14/90.

RELIEF REQUEST VR-3

1. Valve Number: 1SI8922A/B 2SI8922A/B

2. Number of Items: 4

3. ASME Code Category: C

4. ASME Code, Section XI Requirements:

   Exercise for operability (Ct) of check valves every 3 months, per IWV-3521.

5. Basis for Relief:

   These check valves cannot be full flow tested during operation as the shut-off head of the Safety Injection pumps is lower than the reactor coolant system pressure. Performance of this test with the RCS depressurized, but intact, could lead to inadvertent over-pressurization of the system. The alternate method of protecting against over-pressurization by partially draining the RCS to provide a surge volume is not considered a safe practice due to concerns of maintaining adequate water level above the reactor core.

6. Alternative Testing:

   These valves will be full stroke tested during refueling outages as a minimum, but no more frequently than once per quarter.

7. Justification:

   This alternative will adequately maintain the system in a state of operational readiness, while not sacrificing the safety of the plant, by testing the valves as often as safely possible.

8. Applicable Time Period:

   This relief is requested once per quarter during the first inspection interval.

9. Approval Status:

   a. Relief granted per SER 9/15/88.

   b. Relief granted per NRC Generic Letter 89-04.

   c. Relief granted per SER 9/14/90.

RELIEF REQUEST VR-4

1. Valve Number: 1CS008A/B 2CS008A/B
   1CS003A/B 2CS003A/B

2. Number of Items: 8

3. ASME Code Category: AC & C

4. ASME Code, Section XI Requirements:

   Exercise for operability (Ct) of check valves every 3 months, per IWV-3521 and IWV-3412.

5. Basis for Relief:

   These valves cannot be full flow tested as a matter of course during unit operation or cold shutdown as water from the CS pumps would be discharged through the CS ring headers causing undesirable effects on system components inside containment.

   Additionally, the full flow testing of these check valves during periods of cold shutdown, using the CS pumps, would fill the reactor refueling cavity with contaminated water from the refueling water storage tank. The filling of the cavity, via temporarily installed large bore piping, would require the removal of the reactor vessel head so as to preclude equipment damage from borated water.

   Currently, full flow recirculation flow paths do not exist from the discharge of the CS pumps through these check valves to the refueling water storage tank. The addition of such flow paths would require extensive plant modifications to existing plant designs, including penetration of containment integrity.

   Partial stroking of the 1/2CS008A, B valves using air does not provide adequate assurance of valve operability and may be detrimental for the following reasons:

   A. There is no correlation between air flow and angle of disc movement.

   B. Venting and draining the appropriate piping quarterly may cause deposition of boric acid residue which could in turn promote binding of the check valve internals.

RELIEF REQUEST VR-4, cont.

6. Alternate Testing:

The 1/2CS008A, B valves will be either full flow tested or dismantled according to the sample disassembly and inspection program identified in Relief Request VR-18 and VR-19, to demonstrate operability each refueling outage.

The 1/2CS003A, B valves will be partial stroke tested during the quarterly pump surveillance and full flow tested or dismantled according to the sample disassembly and inspection program identified in Relief Request VR-18, to demonstrate operability each refueling outage.

7. Justification:

This alternative will adequately maintain the system in a state of operational readiness, while not sacrificing the safety of the plant, by testing the valves as often as safely possible.

8. Applicable Time Period:

This relief is requested once per quarter during the first inspection interval.

9. Approval Status:

a. Relief granted per SER 9/15/88 for 1/2CS003A, B; relief denied per SER 9/15/88 for 1/2CS008A.

b. Revised to address NRC concerns in Byron SER response 12/16/88 (Byron Station Letter 88-1321).

c. Relief pending per SER 9/14/90. This request is being revised per SER 9/14/90 and will be resubmitted in March of 1991.

RELIEF REQUEST VR-5

1. Valve Number: 1SI8956A-D 2SI8956A-D
   1SI8948A-D 2SI8948A-D

2. Number of Items: 16

3. ASME Code Category: AC

4. ASME Code, Section XI Requirements:

   Exercise for operability (Ct) of check valves every 3 months, per IWV-3521 and IWV-3412.

5. Basis for Relief:

   The accumulator check valves cannot be tested during unit operation due to the pressure differential between the accumulators (650 psig) and the reactor coolant system (2235 psig). Full stroke exercising of these valves could occur only with a rapid depressurization of the reactor coolant system.

6. Alternate Testing:

   Byron Station Technical Specifications require leak testing to be performed on these valves if the unit is in cold shutdown and if such leak rate testing has not been performed within nine months. Therefore, Byron Station will full stroke exercise (Ct) these check valves on the same schedule. This will be accomplished by providing a surge volume in the pressurizer and "burping" the accumulator discharge valves. As a minimum, the accumulators will be discharged into the reactor vessel during refueling outages to perform a full stroke exercise (Ct) of these valves. Positive verification of valve operability will be by noting a change in accumulator level.

7. Justification:

   Stroke exercising the check valves on the same schedule as their required Technical Specification leak rate testing will adequately maintain the system in a state of operational readiness without causing unnecessary personnel radiation exposure.

8. Applicable Time Period:

   This relief is requested once per quarter during the first inspection interval.

9. Approval Status:

   a. Relief granted per SER 9/15/88.

   b. Relief granted per NRC Generic Letter 89-04.

   c. Relief granted per SER 9/14/90.

RELIEF REQUEST VR-6

1. Valve Number: 1SI8926 2SI8926

2. Number of Items: 2

3. ASME Code Category: C

4. ASME Code, Section XI Requirements:

   Exercise for operability (Ct) of check valves every 3 months, per IWV-3521.

5. Basis for Relief:

   Full stroke exercising of the Safety Injection pump suction check valves, 1SI8926 and 2SI8926 cannot be demonstrated during unit operation as the reactor coolant system pressure prevents the pumps from reaching full flow injection conditions. Performance of this test with the reactor coolant system intact could lead to an inadvertent over-pressurization of the system. The alternate method of protecting against over-pressurization by partial draining of the reactor coolant system to provide a surge volume is not considered a safe practice due to concerns of maintaining adequate water level above the reactor core.

6. Alternate Testing:

   The 1SI8926 and 2SI8926 valves will be partial stroke tested during periodic inservice tests with the SI pumps in the recirculation mode. Full stroke exercising for the valves will be done during refueling outages as a minimum, but no more frequently than once per quarter.

7. Justification:

   This alternative will adequately maintain the system in a state of operational readiness, while not sacrificing the safety of the plant, by testing the valves as often as safely possible.

8. Applicable Time Period:

   This relief is requested once per quarter during the first inspection interval.

9. Approval Status:

   a. Relief granted per SER 9/15/88.

   b. Relief granted per NRC Generic Letter 89-04.

   c. Relief granted per SER 9/14/90.

RELIEF REQUEST VR-7

"-DELETED-"

Deleted relief request VR-7. Incorporated valves formerly covered by VR-7 into VR-12 and VR-17. Added maximum stroke times to the valve tables for all valves in VR-12 per EG & G request.

RELIEF REQUEST VR-8

1. Valve Number:

1CC685	1CC9438	2CC9414
1CC9413A	1CC9486	2CC9416
1CC9414	2CC685	2CC9438
1CC9416	2CC9413A	2CC9486

2. Number of Items: 12

3. ASME Code Category: A

4. ASME Code, Section XI Requirements:

   Exercise for operability (St) of Category A and B valves every 3 months, per IWV-3411.

5. Basis for Relief:

   Component cooling water flow to the reactor coolant pumps is required at all times while the pumps are in operation and for an extended period of time while in cold shutdown. Failure of one of these valves in a closed position during an exercise test would result in a loss of cooling flow to the pumps and eventual pump damage and/or trip.

6. Alternate Testing:

   These valves will be exercised during cold shutdown, provided all of the reactor coolant pumps are not in operation. This testing period will be each refueling outage as a minimum, but no more frequently than once per quarter.

   Check valves 1/2CC9486 will be back flow tested (Bt) closed on the same frequency as the seat leakage test per IWV-3420. This frequency is at least once per two years, to be performed during reactor refueling outages.

7. Justification:

   This alternative will adequately maintain the system in a state of operational readiness, while not sacrificing the safety of the plant, by testing the valves as often as safely possible.

   Stroke exercising check valves 1/2CC9486 on the same schedule as their leak rate testing will adequately maintain the system in a state of operational readiness without causing unnecessary personnel radiation exposure or possible damage to the Reactor Coolant Pumps.

8. Applicable Time Period:

   This relief is requested once per quarter during the first inspection interval.

9. Approval Status:

   a. Relief granted per SER 9/15/88.
   b. Relief granted per NRC Generic Letter 89-04.
   c. Relief granted per SER 9/14/90.

RELIEF REQUEST VR-9

1. Valve Number: 1CV8100 2CV8100
   1CV8112 2CV8112

2. Number of Items: 4

3. ASME Code Category: A

4. ASME Code, Section XI Requirements:

   Exercise for operability (St) of Category A & B valves every 3 months per IWV-3411.

5. Basis for Relief:

   These valves cannot be tested during unit operation as seal water flow to the reactor coolant pumps is required at all times while the pumps are in operation. Failure of one of these valves in the closed position during an exercise test would result in seal water return flow being diverted to the PRT by lifting a relief valve upstream of the isolation valves.

6. Alternate Testing:

   These valves will be exercise tested during cold shutdown, providing all reactor coolant pumps are not in operation. This testing period will be each refueling outage as a minimum, but no more frequently than once per quarter.

7. Justification:

   This alternative will adequately maintain the system in a state of operational readiness, while not sacrificing the safety of the plant, by testing the valves as often as safely possible.

8. Applicable Time Period:

   This relief is requested once per quarter during the first inspection interval.

9. Approval Status:

   a. Relief granted per SER 9/15/88.

   b. Relief granted per NRC Generic Letter 89-04.

   c. Relief granted per SER 9/14/90.

RELIEF REQUEST VR-10

1. Valve Number: 1IA066 2IA066
   1IA065 2IA065

2. Number of Items: 4

3. ASME Code Category: A

4. ASME Code, Section XI Requirements:

   Exercise for operability (St and Ft) of category A and B valves every 3 months per IWV-3411.

5. Basis for Relief:

   Stroke testing of these valves during plant operation or cold shutdown would, by design, isolate the air operated instruments and valves inside the containment building.

6. Alternate Testing:

   These valves will be exercised during refueling outages.

   This testing period will be each refueling outage as a minimum, but no more frequently than once per quarter.

7. Justification:

   The full stroke exercising of the instrument air containment isolation valves during unit power operations or cold shutdowns, introduces the possibility of causing major operating perturbations and/or personnel safety concerns should these valves fail to re-open during testing activities.

   The failure of these valves in the closed position, as a result of testing activities during plant operation or cold shutdown, would subsequently isolate the air operated instruments and valves inside the containment building thus resulting in one or more of the following scenarios:

   A. Loss of Pressurizer Pressure Control

      The pressurizer spray valves 1/2 RY455B & C and the pressurizer auxiliary spray valve 1/2 CV8145 would fail closed and not be available for pressurizer pressure control.

RELIEF REQUEST VR-10

B. Loss of Chemical Volume Control System Letdown Flow (both normal and excess) and Charging Flow -

The loss of instrument air would cause a disruption in the unit letdown flow paths resulting in pressurizer level increases. Such valves as the letdown orifice containment outlet header isolation valve 1/2 CV81[illegible], the letdown line isolation valves 1/2 CV459 and 1/2 CV460, the letdown orifice outlet isolation valves 1/2 CV8[illegible]49 A, B & C, the excess letdwon heat exchanger inlet isolation valves 1/2 CV8153A & B, and the regen heat exchanger letdown inlet isolation valves 1/2 CV8389 A & B would go to their fail closed positions. Additionally, the ability to normally make up reactor coolant inventory and adjust the reactor chemical shim (i.e. normal boration/dilution) would also be lost as the regenerative heat exchanger inlet isolation valves 1/2 CV8324 A & B would fail to their respective closed positions.

C. Loss of Component Cooling to Containment Penetrations -

The loss of instrument air supply would cause the penetration cooling supply flow control valve 1/2 CC053 to go to its fail closed position. The loss of penetration cooling would result in elevated temperatures being imposed on the penetrations being supported by the component cooling system.

D. Loss of Personnel Breathing Air -

The loss of instrument air supply to the service air downstream isolation valve 1/2 SA033 would cause this valve to go to its fail closed position. This loss of service air in the containment building would eliminate the normal source of supplied breathing air needed to support numerous maintenance and component inspection activities in a contaminated radiological environment.

8. Applicable Time Period:

This relief is requested once per quarter during the first inspection interval.

9. Approval Status:

a. Relief denied per SER 9/15/88.

b. Revised (to address NRC concerns) in Byron response to SER 12/16/88 (Byron Station Letter 88-1321).

c. Relief granted per SER 9/14/90.

RELIEF REQUEST VR-11

"-DELETED-"

Deleted relie' request VR-11 per EG & G recommendation. This was a request for ext[illegible] of position indication tests from every two years to every three y[illegible]

RELIEF REQUEST VR-12

1. Valve Number: Valves that normally stroke in 2 seconds or less:

VALVE #	VALVE #	VALVE#	VALVE#
1MS018A-D	2MS018A-D		
1PR066	2PR066	1RE9157	2RE9157
1PS228A, B	2PS228A, B	1RE9159A, B	2RE9159A,B
1PS229A, B	2PS229A, B	1RE9160A, B	2RE9160A, B
1PS230A, B	2PS230A, B	1RY8033	2RY8033
1RC014A-D	2RC014A-D	1SI8871	2SI8871
			2SD002A-H

2. Number of Items: 52

3. ASME Code Category: A & B

4. ASME Code, Section XI Requirements:

   Verification, by trending of power operated valve times, that an increase in stroke time of 50% or more, from the previous test, does not occur, per IWV-3417(a).

5. Basis for Relief:

   Minor timing inaccuracies, with small stroke times can lead to substantial increases (percent wise) in stroke times. For example, a valve with a stroke time of 1 second in an initial test, and 1.6 seconds in the subsequent test, has experienced an apparent 60% increase in stroke time. If the accuracy requirements of IWV-3413(b) are utilized, it could be argued that stroke times between 1 and 2 seconds could constitute as much as a 100% increase in stroke time when, in fact, only a 0.2 second increase occurred. For instance, if the initial time was 1.4 seconds, (measured to the nearest second is 1.0 second) and if the next time is then 1.6 seconds, (measured to the nearest second is 2.0 seconds) the percent increase is 100%.

6. Alternate Testing:

Fast acting valves can be defined as those valves that normally stroke in 2 seconds or less. No trending of stroke time will be required, and upon exceeding 2 seconds, corrective action shall be taken immediately in accordance with IWV-3417(b).

7. Justification:

For small stroke times, the trending requirements are too stringent for the accuracies specified in the Code. The alternative specified will adequately maintain the system in a state of operational readiness, while not imposing undue hardships or sacrificing the safety of the plant.

8. Applicable Time Period:

This relief is requested once per quarter, during the first inspection interval.

9. Approval Status:

a. Relief denied per SER 9/15/88.

b. Revised (to address NRC concerns) in Byron response to SER 12/16/88 (Byron Station Letter 88-1321).

c. Relief granted per SER 9/14/90.

RELIEF REQUEST VR-13

1. Valve Numbers: 1DG5182A,B 2DG5182A,B
1DG5183A,B 2DG5183A,B
1DG5184A,B 2DG5184A,B
1DG5185A,B 2DG5185A,B

2. Number of Items: 16

3. ASME Code Category: B & C

4. ASME Code Section XI Requirements:

These valves are not within the scope of ASME Code, Section XI, Subsection IWV requirements. However, the requirements for stroke timing and trending of the valves associated with the Diesel Air Start System are being mandated by the NRC as an augmented testing requirement pursuant to 10CFR50.55 (a) (g).

Therefore, valves associated with the Diesel Air Start System shall be exercised to the position required to fulfill their function during plant operation per IWV-3412 and IWV-3522. Additionally, the stroke testing of power operated valves shall be measured to the nearest second and such stroke times trended to document continued valve operational readiness per IWV 3413 (b) and IWV-3417.

5. Basis for Relief:

The monthly Diesel Generator testing program, outlined in Byron Station's Technical Specifications and implemented by station operating procedures, exceeds the intent of the quarterly valve testing program which would be required by ASME Code, Section XI. Additionally, the stroke timing of solenoid operated valves associated with the Diesel Air Start System is impractical due to the fast actuation of these valves.

6. Alternate Testing:

The performance of Byron Station's Diesel Generator operability monthly surveillance will verify the operational readiness of the valves associated with the Diesel Air Start System.

This surveillance testing will require the recording of the air pressures contained in both trains A & B of the Diesel Generator Air Start Receiver Tanks both before and immediately after diesel generator start.

By the comparison of these valves between trains, the satisfactory operation of the power operated and self-actuated check valves associated with the Diesel Air Start System can be adequately demonstrated.

7. Justification:

Proper valve operation will be demonstrated on a monthly basis by the verification of diesel generator air start capability. Such verification will compare the air pressures contained in the receiver tanks both before and after the diesel generator start, thus verifying the operability of the air start control valves. The proposed testing methodology at the increased frequency satisfies the intent of the Section XI requirements without posing undue hardships or difficulties.

8. Applicable Time Period:

This relief is requested once per quarter during the first inspection interval.

9. Approval Status:

a. Relief granted per SER 9/15/88.

b. Relief granted NRC Generic Letter 89-04.

c. Relief granted per SER 9/14/90.

RELIEF REQUEST VR-14

"-DELETED-"

Deleted relief request VR-14. This was a request for exemption for position indicating tests for solenoid operated valves. Alternate testing allowed by the ASME Code will be used instead.

RELIEF REQUEST VR-15

1. Valve Numbers:

1CV8481A, B	2CV8481A, B
1CV8546	2CV8546
1SI8815	2SI8815
1SI8819A-D	2SI8819A-D
1SI8841A,B	2SI8841A,B
1SI8900A-D	2SI8900A-D
1SI8905A-D	2SI8905A-D
1SI8949A-D	2SI8949A-D

2. Number of Valves: 44

3. ASME Code Category: AC

4. ASME Code, Section XI Requirements:

Check valves that cannot be exercised during plant operation shall be specifically identified by the owner and shall be full stroke exercised during cold shutdowns per IWV-3412 and IWV-3522.

5. Basis for Relief:

The full stroke exercising of check valves not stroked quarterly is required to be performed during cold shutdowns. However, the stroking of check valves 1(2)SI8815, 1(2)SI8900A-D, 1(2)SI8949A-D, and 1(2)SI8841A-B, associated with Emergency Core Cooling System, during cold shutdowns will induce thermal stresses on their respective reactor vessel nozzles as the Reactor Coolant System (maintained approximately 180° F) is injected with water from the Refueling Water Storage Tank (maintained approximately 65° F. This also applies to the stroking of check valves 1(2)CV8546 and 1(2)CV8481A,B because the full stroke of these check valves causes stroking of 1(2)SI8815 and 1(2)SI8900A-D located in the full flow path.

Additionally, Byron Station Technical Specifications require all Safety Injection Pumps and all but one Charging Pump to be inoperable during Modes 4, 5, and 6, except when the reactor vessel head is removed. This requirement minimizes the possibility of low temperature over-pressurization of the Reactor Coolant System. Therefore, check valves 1(2)SI8819A-D, 1(2)SI8905A-D, and 1(2)SI8949A-D, cannot be full stroke exercised during routine Mode 5 cold shutdowns as required by IWV-3412 and IWV-3522.

In addition to the stroke test exercise used to verify operational readiness of these check valves, the act of such stroking cause the necessity for Technical Specification required leak rate testing of these valves prior to unit criticality. This testing, in conjunction with the stroke exercising of these check valves, adds approximately one week to the duration of any outage and additional radiation exposure to workers who must connect flowmeters and differential pressure gauges directly to pipes containing radioactive fluids.

Alternate Testing:

6. Byron Station's Technical Specifications require routine leak rate testing to be performed on these Reactor Coolant System Boundary Isolation check valves if the unit is in Cold Shutdown for greater than 72 hours and such leak rate testing has not been performed within the previous nine months. Therefore, Byron Station will stroke exercise check valves 1(2)SI8815, 1(2)SI8900A-D, and 1(2)SI8841A,B on the same schedule. To prevent unnecessary stroking of check valves 1(2)SI8815 and 1(2)SI8900A-D, check valves 1(2)CV8546 and 1(2)CV8481A,B will be stroke exercised on the same schedule as check valves 1(2)SI8815, 1(2)SI8900A-D and 1(2)SI8841A,B. Additionally, stroke exercising of check valves 1(2)SI8819A-D, 1(2)SI8949A-D, and 1(2)SI8905A-D can only be safely performed in Mode 6 with the Reactor Vessel head removed. Full stroke exercising of these check valves will be performed at a minimum frequency of once each refueling outage.

7. Justification:

   Stroke exercising the 1(2)CV8481A, B, 1(2)CV8546, and 1(2)SI8815, 1(2)8900A-D, and 1(2)SI8841A, B check valves on the same schedule as their required Technical Specification Reactor Coolant System Boundary Isolation leak rate testing will allow the coordination of testing activities without imposing additional check valve leak rate testing requirements. Such activity coordination will optimize testing efforts and resources while adequately maintaining the system in a state of operational readi[illegible]. Valves 1(2)SI8949A-[illegible] 1(2)SI8905A-D and 1(2)SI88[illegible]9A-D ca[illegible] be stroked [illegible]g c[illegible]ld shutdown without exceeding Technical Specifi[illegible] limiting condition for operation (LCO 3/4.5.3) Since stroking these valves requires starting an SI pump. Stroke exercising check valves 1(2)SI8819A-D, 1(2)SI8905A-D and 1(2)SI8949A-D at least once per Reactor Refueling mode of operation, will insure compliance with Byron Station technical Specifications and minimize the possibility of low temperature over-pressurization of the reactor Coolant System.

8. Applicable Time Period:

   This rel[illegible]ef is requested once per quarter during the first inspection interval.

9. Approval Status:

   a. Relief granted per SER 9/15/88 for valves 1/2SI8819A-D, 1/2SI8905A-D, and 1/2SI8949A-D; relief denied per SER 9/15/88 for valves 1/2SI8815, 1/2SI8841A-B, 1/2SI8900A-D.

   b. Revised (to address NRC concerns) in Byron response to SER 12/16/90 ([illegible]yron Station Letter 88-1321).

   c. [illegible]lief granted per NRC Generic Letter 89-04.

   d. Relief granted per SER 9/14/90.

RELIEF REQUEST VR-16

1. Valve Numbers: 1SI8811A, B 2SI8811A, B

2. Number of Valves: 4

3. ASME Code Category: B

4. ASME Code, Section XI Requirements:

   Valves that cannot be exercised during plant operation shall be specifically identified by the owner and shall be full stroke exercised during cold shutdowns per IWV-3412.

5. Basis for Relief:

   The full stroke exercising of valves not stroked quarterly is required to be performed during cold shutdowns. However, the stroking of the Containment Sump Outlet Isolation Valves, 1/2SI8811A,B requires the suction of the Residual Heat Removal Pumps to be drained, thus rendering one train of the system inoperable.

   For Cold Shutdown operations with the Reactor Coolant Loops filled and one train of Residual Heat Removal declared inoperable, Byron Station's Technical Specifications require two steam generators with a secondary side narrow range water level greater than 41% (Unit 1) and greater than 18% (Unit2). However, if the cold shutdown was necessitated by a problem requiring draining of the secondary side of the Steam Generators (i.e. tube leaks), Byron Station's Technical Specification 3.4.1.4.1 would preclude the testing of the containment sump outlet isolation valves until such time as the affected steam generators had been refilled.

   For Cold Shutdown operations with the Reactor Coolant Loops not filled (i.e. drained down to support Reactor Vessel Incore Seal Table, Loop Stop Valve, Reactor Coolant Pump and Seal Maintenance or primary leakage), Byron Station's Technical Specification 3.4.1.4.2 would preclude the testing of the Containment Sump Outlet Isolation Valves as it mandates that "two residual heat removal (RHR) Loops shall be operable and at least one RHR Loop shall be in operation.

6. Alternate Testing:

   Byron Station will full stroke exercise the Containment Sump Outlet Isolation Valves, 1/2SI8811A, B during refueling outages vice cold shutdown.

7. Justification:

The full stroke testing of the 1/2SI8811A, B valves; in conjunction with system draining, filling and venting of each train, accounts for an additional six days (3 days per train) of scheduling requirements and increased radiation dose to operators and radiological control personnel. Processing of thousands of gallons of contaminated water, and subsequent required liquid effluent discharges would also result from the draining, refilling and venting of the RHR system. This time duration required to perform the surveillance testing of the Containment Sump Outlet Isolation Valves during Cold Shutdown activities, could, as a result, cause a violation of the action requirements for Byron Station's Technical specifications 3.4.1.4.1 and 3.4.1.4.2. The violations would occur since these action statements require (as noted in their respective foot note sections) the return of the inoperable residual heat removal loop to service within 2 hours, if such loop was removed for surveillance testing provided the other RHR Loop is operable and in operation.

In addition, NRC Generic Letter 88-17, Loss of Decay Heat Removal, highlights the consequences of a loss of RH during reduced Reactor Coolant System inventory (below three feet below the reactor vessel flange). If the operating RH pump is lost due to air entrainment, and the other train is inoperable for the stroke test, then the "operable" train must be vented to restore decay heat removal. Under worst conditions, boiling in the core would occur in approximately 10 minutes, the core would be uncovered in approximately 30 minutes, and fuel damage would occur in approximately 1 hour.

Given the apparent disparity between the Technical Specification time requirements for an inoperable RHR Loop return to service (2 hours) and the time required to perform surveillance stroke testing of the Containment Sump Outlet Isolation valves (3 days) during Cold Shutdown, the proposed alternate testing frequency of refueling outage periodicity will adequately maintain the system in a state of operational readiness, while not imposing undue hardships or sacrificing the safety of the plant.

8. Applicable Time Period:

This relief is requested once per quarter, during the first inspection interval.

9. Approval Status:

a. Relief denied per SER 9/15/88.

b. Revised (to address NRC concerns) in Byron response to SER 12/16/90.

c. Relief granted per SER 9/14/90.

RELIEF REQUEST VR-17

1. Valve Numbers: 1SX101A 2SX101A

2. Number of Valves: 2

3. ASME Code Category: B

4. ASME Code, Section XI Requirements:

   Stroke time and trend the stroke time for power operated valves per IWV-3413 and IWV-3417.

5. Basis for Relief:

   1/2SX101A are the essential service water outlet isolation valves for the Unit 1/2 motor driven auxiliary feedwater pump lube oil coolers. These valves are completely encapsulated per design and do not have local or remote position indicators which could be used to time the valve stroke.

6. Alternate Testing:

   1/2SX101A will be verified to open during each quarterly ASME surveillance of the motor driven auxiliary feedwater pumps. In addition, these valves are stroked monthly during auxiliary feedwater pump surveillances required by Byron Station Technical Specifications.

7. Justification:

   These valves will be stroke exercised to their required safety positions each month during the motor driven auxiliary feedwater pump surveillances. This testing will adequately maintain the system in a state of operational readiness, while not sacrif'cing the safety of the plant.

8. Applicable Time Period:

   This relief is requested once per quarter during the first inspection interval.

9. Approval Status:

   a. Relief granted per SER 9/15/88.

   b. Relief granted per NRC Generic Letter 89-04.

   c. Relief granted per SER 9/14/90.

RELIEF REQUEST VR-18

1. Valve Numbers: See Table below:

2. Number of Valves: 106

3. ASME Code Category: AC and C

4. ASME Code, Section XI Requirement:

   Exercise for operability of check valves every three (3) months, per IWV-3521.

5. Basis for Relief:

   The valves listed in the Table below cannot be safely full-stroke exercised (Ct) open and/or back-flow tested (Bt) closed during plant operation or cold shutdowns, as required by the ASME Code. NRC Generic Letter 89-04, Attachment 1, Positions 1, 2, and 3 provide guidelines for method and frequency of testing check valves. This request for relief in order to test these valves during refueling outages follows the guidelines set forth in NRC Generic Letter 89-04.

6. Alternate Testing:

   Refer to the Table below for a list of valves, direction, and alternate testing frequency requested:

VALVES	DIRECTION	ALTERNATE TESTING FREQUENCY
1/2AF001A,B	Close	Note 3
1/2CC9486	Close/Open	Note 1/Note 3
1/2CC9518	Close/Open	Note 1/Note 1
1/2CC9534	Close	Note 1
1/2CS008A,B	Close	Note 3
1/2CV8113	Close/Open	Note 1/Note 1
1/2IA091	Close	Note 1
1/2PR002G,H	Close	Note 1
1/2PR032	Close	Note 1
1/2PS231A,B	Close	Note 1
1/2RH87[illegible]A,B	Close/Open	Note2/Note 5
1/2RY8046	Close	Note 1
1/2RY8047	Close	Note 1
1/2SI8815	Close	Note 2
1/2SI8818A-D	Close	Note 2
1/2SI8819A-D	Close	Note 2
1/2SI8841A,B	Close	Note 2
1/2SI8900A-D	Close	Note 2
1/2SI8905A-D	Close	Note 2
1/2SI8948A-D	Close	Note 2
1/2SI8949A-D	Close	Note 2
1/2SI8956A-D	Close	Note 2
1/2SI8968	Close	Note 1
1/2WM191	Close	Note 1
1/2WO007A,B	Close	Note 1

Table Notes:

1) Perform test during refueling outages in conjunction with Appendix J, Local Leak Rate Test. See IST Program Relief Request VR-1.

2) Perform test during refueling outages in conjunction with Byron Station Technical Specification seat leakage testing. See IST Program Note 6.

3) Perform test during refueling outages by sample disassembly and inspection in accordance with NRC Generic Letter 89-04. See IST Program Relief Request VR-19.

4) See IST Program Relief Requests VR-2, VR-3, VR-4, VR-5, VR-6, VR-8, and VR-15 for additional check valve testing frequency extensions.

5) These valves are verified to be operable by observation of depressurization in the applicable line. This is a test method which was approved by the NRC in SER 9/14/90.

7. Justification:

Testing these check valves on the same schedule as their required seat leakage tests will allow for coordination of testing activities without imposing additional check valve leak rate testing requirements. Such activity coordination will optimize testing efforts and resources while adequately maintaining the system in a state of operational readiness. This frequency will also minimize personnel exposure to radiation by minimizing the amount of work performed inside containment during power operations. Testing of 1/2AF001A,B (close), 1/2CS008A,B (close), and 1/2RH8705A,B (open) can only be performed by disassembly and inspection due to system design and operating constraints. These tests can only be safely performed during refueling outages when the affected systems are isolated and drained.

8. Applicable Time Period:

This relief is requested once per quarter during the first inspection interval.

9. Approval Status:

a. Relief granted per NRC Generic Letter 89-04.

RELIEF REQUEST VR-19

1. Valve Numbers: 1AF001A,B 2AF001A,B
   1CS003A,B 2CS003A,B
   1CS008A,B 2CS008A,B
   1CS020A,B 2CS020A,B

2. Number of Valves: 16

3. ASME Code Category: AC and C

4. ASME Code, Section XI Requirement:

   Exercise check valves to the position required to fulfill their function (open = Ct; closed = Bt), unless such operation is not practical during plant operation, per IWV-3522.

5. Basis for Relief:

   These check valves cannot be full-stroked exercised (Ct) using NRC Generic Letter 89-04, Attachment 1, Position 1, because the "maximum required accident flow" cannot be passed through the CC, CS, and RH valves and a backflow test (Bt) cannot be performed on the AF valves. These tests cannot be performed due to system design and operation configurations.

6. Alternate Testing:

   These valves will be selected for sample disassembly and inspection by choosing one valve from each of the groups listed below during each refueling outage. Normally, valves selected for disassembly will be alternated such that a different train is inspected each outage.

GROUP	DIRECTION	VALVES
1	Closed	1/2AF001A,B
2	Open	1/2CS003A,B
3	Open/Closed	1/2CS008A,B
4	Open	1/2CS020A,B

   Each valve will be manually stroked when disassembled, to verify the valve is capable of stroking acceptably in both directions. Each valve will receive an internal visual inspection to insure that the valve is structurally sound (no loose or corroded parts).

   If the disassembled valve is not capable of being manually stroked or there is binding or failure of valve internals, the remaining valves in the same group on the affected unit will be disassembled and inspected during the same refuel outage, and the unaffected unit valves in the same group shall be disassembled and inspected at the next scheduled refueling outage.

Extension of the valve disassembly and inspection interval must meet the extension justification requirements of NRC Generic Letter 89-04, Attachment 1, Position 2.

Note that relief from CS System check valve testing has previously been approved by Relief Requests VR-2 and VR-4, but are included in this relief request due to the addition of sampling groups. Also reference Section 4.5, IST Technical Approach and Position VA-03, which describes Byron Station's position on check valve testing.

7. Justification:

This alternative testing is in compliance with specific guidance on check valve testing as required by NRC Generic Letter 89-04, Attachment 1, Positions 1, 2, and 3. This testing will adequately maintain the components in a state of operational readiness and, by testing the valves during refuel outages when the valves can be safely examined, will not sacrifice the safety of the plant.

8. Applicable Time Period:

This relief is requested once per quarter during the first inspection interval.

9. Approval Status:

a. Relief granted per NRC Generic Letter 89-04.

DRAFT
RELIEF REQUEST VR-20

1. Valve Numbers:

1/2AF006A	1/2CV8116	1/2PS9357A,B	1/2SI8813
1/2AF006B	1/2CV8152	1/2RE1003	1/2SI8814
1/2AF013A-H	1/2CV8160	1/2RE9170	1/2SI8821A,B
1/2AF017A,B	1/2CV8804A	1/2RF026	1/2SI8835
1/2CC685	1/2FP010	1/2RF027	1/2SF8840
1/2CC9412A,B	1/2FW009A-D	1/2RH8701A,B	1/2SI8880
1/2CC9413A	1/2FW035A-D	1/2RH8702A,B	1/2SI8888
1/2CC9414	1/2FW039A-D	1/2RY455A	1/2SI8920
1/2CC9416	1/2FW043A-D	1/2RY456	1/2SI8924
1/2CC9437A,B	1/2IA065	1/2RY8000A,B	1/2SI8964
1/2CC9438	1/2IA066	1/2RY8025	1/2SX016A,B
1/2CC9473A,B	1/2MS001A-D	1/2RY8026	1/2SX027A,B
1/2CS001A,B	1/2MS101A-D	1/2RY8028	1/2SX112A,B
1/2CS007A,B	1/2OG057A	1/2SA032	1/2SX114A,B
1/2CS009A,B	1/2OG079	1/2SA033	1/2SX169A,B
1/2CS019A,B	1/2OG080	1SD002A-H	1/2SX173
1/2CV112B-E	1/2OG081	1/2SD005A-D	1/2SX178
1/2CV8100	1/2OG082	1/2SI8801A,B	1/2VQ001A,B
1/2/CV8104	1/2OG083	1/2SI8802A,B	1/2VQ002A,B
1/2CV8105	1/2OG084	1/2SI8804B	1/2VQ003
1/2CV8106	1/2OG085	1/2SI8806	1/2VQ004A,B
1/2CV8110	1/2PR001A,B	1/2SI8807A,B	1/2VQ005A-C
1/2CV8111	1/2PS9354A,B	1/2SI8809A,B	1/2WO006A,B
1/2CV8112	1/2PS9355A,B	1/2SI8811A,B	1/2WO020A,B
1/2CV8114	1/2PS9356A,B	1/2SI8812A,B	1/2WO056A,B

2. Number of Items: 340

3. ASME Code Category: A and B

4. ASME Code, Section XI Requirements:

Verification by trending of power-operated valve stroke times, that an increase in stroke time of 25% or more from the previous test (for valves with full stroke times greater than 10 seconds), or 50% or more (for valves with full stroke times less than or equal to 10 seconds) does not occur, per IWV-3417(a).

5. Basis for Relief:

Trending stroke times, based on the percent change from the previous test, as ASME Section XI requires, allows gradual degradation to occur over a long period of time without triggering the additional trending attention that increased testing frequency requires. An improved method of component performance monitoring is proposed, which will require a valve to be placed on increased test frequency based on the percent change from the fixed reference value established via NRC Generic Letter 89-04, Attachment 1, Position 5.

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RELIEF REQUEST VR-20

6. Alternate Testing:

For all power-operated valves which normally stroke in greater than two seconds, an ALERT RANGE will be established based on reaching a given percent change from the reference value established via NRC Generic Letter 89-04. The following table will be used as a starting point in evaluation of this fixed ALERT RANGE:

VALUE TYPE	REFERENCE STROKE TIME (Tref)	ALERT RANGE	REQUIRED ACTION VALUE
MOV's SOV's HOV's AOV's	≤ 10 sec.	(1.5)(Tref)-(2)(Tref)	> (2)(Tref)
MOV's SOV's HOV's	> 10 sec.	(1.25)(Tref)-(1.75)(Tref) or (Tref+10 sec)-(Tref+20 sec)	> (1.75)(Tref), but ≤ (Tref + 20 sec)
AOV's	> 10 sec.	(1.5)(Tref)-(2)(Tref) or (Tref+15 sec)-(Tref+20 sec)	> (2)(Tref), but ≤ (Tref + 20 sec)

Notes: A. Fast acting valves (valves which normally stroke in less than 2 seconds consistently) are included in Relief Request VR-12. These valves are not assigned ALERT RANGES and are not trended.

B. In all cases, the REQUIRED ACTION VALUE cannot exceed Technical Specification or UFSAR values, regardless of calculated values.

C. The above Table is a guideline and cannot cover all valves. The ALERT RANGES and REQUIRED ACTION VALUES are selected based on the comparison between the REFERENCE VALUE, limiting value given in Technical Specifications/UFSAR, and calculated values using the table above:

1) All values are rounded to the nearest whole second.

2) Valves which serve the same function on dual trains (i.e., 1CC9473A and 1CC9473B) and dual units (i.e., 1CC9473A and 2CC9473A) are assigned the same REQUIRED ACTION/ALERT RANGE VALUES based on human factors considerations, unless valve or system design differences exist between the trains/units.

Refer to IST Technical Approach and Position VA-04 for related information.

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RELIEF REQUEST VR-20

7. Justification:

Using fixed ALERT RANGES based on the valve REFERENCE VALUE established when the valve was known to be operating acceptably will ensure that gradual valve performance degradation is monitored and evaluated, by placing the valve on increased testing frequency when the stroke time exceeds a fixed multiple of the REFERENCE VALUE. This method is superior to that required by the ASME Code in that the point of reference used to evaluate the performance trend on a valve remains fixed. This alternative utilizes the same stroke time percentage change values as required by the ASME Code to place a valve on increased frequency testing, except for air-operated valves, which frequently exhibit fluctuating valve stroke times.

8. Applicable Time Period:

This relief is requested once per quarter, during the first inspection interval.

9. Approval Status:

Since this relief request is a new submittal and is not specifically addressed in NRC Generic Letter 89-04, it is NOT approved for use. Formal written approval from the NRC is required prior to implementation. Expeditious review and approval is requested.

DRAFT
RELIEF REQUEST VR-21

"WITHDRAWN"

This relief request was in draft form and was later withdrawn per SER 9/14/90.

INTERIM
RELIEF REQUEST VR-22

1. Valve Numbers: 1/2SI8818A 1/2SI8948A 1/2SI8841A
1/2SI8818B 1/2SI8948B 1/2SI8841B
1/2SI8818C 1/2SI8948C
1/2SI8818D 1/2SI8948D

2. Number of Items: 20

3. ASME Code Category: AC

4. ASME Code, Section XI Requirements:

Exercise check valves to the position required to fulfill their function (open = Ct; closed = Bt), unless such operation is not practical during plant operations, per IWV-3522. Byron Station's testing methodology meets this requirement. However, NRC Generic Letter 89-04, Attachment 1, Position 1 requires that the flow through individual valves be known, and specifically states that knowledge of total flow through multiple lines does not provide verification of flow rates through the individual valves and is not a valid full-stroke exercise.

5. Basis for Relief:

The current Byron Station testing methodology uses available flowmeters to measure the total flow through two parallel check valves. These are given below:

CHECK VALVES	FLOW INDICATION
1SI8818A & 1SI8818D	1FI - 618
1SI8818B & 1SI8818C	1FI - 619
1SI8841A & 1SI8841B	1FI - 618
1SI8948A & 1SI8948D	1FI - 618
1SI8948B & 1SI8948C	1FI - 619

There is currently no method available to measure the flow rates through the individual check valves. Modifications to these lines to install flow measurement devices for the individual valves is not warranted due to the following reasons:

A. Flow indications exist for each pair of check valves. It would be readily apparent from the flowrates recorded during each refuel outage if individual check valves were not opening or were only partially opening by comparing the flowrates recorded through each pair of check valves.

B. Byron Station Technical Specifications disregard the highest branch line flowrate when determining the minimum required flowrates through these parallel injection lines. Therefore, slight differences in individual branch flowrates which could exist by measuring the total flowrate through two parallel injection lines was anticipated and accounted for when Byron Station's Technical Specifications were formulated.

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C. Installation of individual injection line flow indicators would pose an increased safety hazard to operation of the plant due to installation of additional instrument lines, welds, and valves which are unisolatable from the Reactor Coolant System. This modification would increase the probability of small break LOCA's (due to pipe/weld/valve failures), forced outages (due to leaking valves/welds), and degradation of plant equipment (due to boric acid leaks).

D. A modification to install such indications would be expensive, increase radiation dose, and possibly impact safe operation of the plant. The modification would require extensive engineering and installation costs, along with replacement power costs, to install. Byron Station Technical Specifications require an ECCS full-flow balance test to be performed as part of the modification test. This test would extend outage durations and require a complete core offload to perform. Several man-rem would be expended on each unit to install this modification. This modification would have to be installed during an outage by use of individual injection line freeze seals and/or complete core offload. Both of these activities pose an increased safety hazard to plant personnel and equipment, by requiring unusual system alignments for extended periods of time during a refuel outage when other activities inside containment are at their highest level.

The alternative to individual check valve flowrate measurement required by NRC Generic Letter 89-04 is disassembly and inspection. Disassembly and inspection is not a viable option for the ECCS injection line check valves due to the following concerns:

A. Radiation Dose:
The radiation dose increase to disassemble, inspect, and reassemble these check valves each refuel outage would be several man-rem.

B. Safe Operation:
A total core offload and Reactor Coolant System drain down or individual injection line freeze seals would be required each outage in order to perform these inspections. These actions place the plant in unusual operating line-ups for extended periods of time and decrease the availability of shutdown cooling options. These actions increase the probability of loss of residual heat removal capabilities by depending on freeze seals to isolate RCS branch connections during refueling outages.

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C. Check Valve Operating History:
A search of maintenance history (TJM) on these valves for both Byron and Braidwood Nuclear Power Stations revealed the following past maintenance activities on these check valves:

1/2SI8818A	None
1/2SI8818B	None
1/2SI8818C	None
1/2SI8818D	None
1/2SI8841A	None
1/2SI8841B	None
1/2SI8948A	None
1SI8948B	Replaced disc arm assembly and gasket, retorqued flange bolts 10/20/84 (Byron)
2SI8948B	None
1SI8948C	Inspected internals, no parts repaired or replaced, retorqued flange bolts 9/10/84 (Byron)
2SI8948C	None
1/2SI8948D	None

This history does not indicate any adverse operating history for these valves; therefore, disassembly and inspection of these valves is not warranted based on previous maintenance history.

6. Alternative Testing:

In lieu of disassembly, Byron Station proposes the following tests (which are already being performed):

A. A full stroke test of each check valve is verified at least once per 18 months during refuel outages by verifying the total flow through each set of two parallel check valves utilizing existing permanently installed flow indicators.

B. A seat leakage test of each check valve is performed as required by Byron Station's Technical Specification on RCS leakage. These leak tests are performed:

1) At least once/18 months,
2) Prior to Mode 2, whenever the plant has been in COLD SHUTDOWN for 72 hours and if leakage testing has not been performed in the previous nine (9) months,
3) Prior to returning the valve to service following maintenance, repair, or replacement work on the valve, and
4) Within 24 hours following valve actuation due to automatic or manual action or flow through the valve.

C. An ECCS full flow balance test is performed following the completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics as required by Byron Station Technical Specifications.

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7. Justification:

Byron Station's Technical Specifications require these check valves to be full stroke tested and seat leakage tested at a minimum frequency of once per 18 months. These tests satisfy all of the ASME check valve exercise requirements (open and close) and all of the NRC Ge 'n Letter 89-04 full-stroke and backflow testing requirements, excepu .. at flow is measured through pairs of injection line check valves instead of individual injection line check valves.

The burden imposed by either disassembly and inspection or modification of these check valves to comply with the NRC Generic Letter 89-04 individual flow measurement requirement is costly in terms of capital expense, radiation dose, and possibly safe operation of the plant during refueling operations. This burden is unjustified, based on the fact that Byron Station has previously received a favorable Safety Evaluation Report (SER) on its Inservice Testing Program after years of in-depth review by the NRC. Also, it is readily apparent that Byron Station was not originally designed to allow for either individual injection line flow measurement or for disassembly and inspection of the injection line check valves on a regular basis without extreme hardship on plant operations and maintenance during critical refueling outage periods.

The current testing requirements of Byron Station Technical Specifications for these check valves will adequately monitor their performance and any future degradation, and maintain safe operation of the plant.

8. Applicable Time Period:

This relief is requested once per quarter during the first inspection interval.

9. Approval Status:

a. Interim relief granted for six (6) month period per SER 9/14/90.