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March 20, 1989

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attn: Document Control Desk

Subject: Braidwood Station Units 1 and 2
Inservice Testing (IST) Programs for
Pumps and Valves
NRC Docket Nos. 50-456 and 50-457

Reference: (a) September 15, 1988, L.N. Olshan letter to H.E. Bliss
(b) December 21, 1988 R. Chrzanowski letter to T.E. Murley
(c) August 31, 1987 S.C. Hunsader letter to T.E. Murley
(d) January 31, 1989 S.C. Hunsader letter to T.E. Murley

Dear Dr. Murley:

Reference (d) provided the Braidwood Station (IST) Programs for Pumps (Revision 4) and Valves (Revision 4) that included changes based on the meeting held in response to reference (a) at the NRC White Flint Offices on October 27, 1988, and per the comments presented in the teleconference held on December 12, 1988. These revisions included changes presented in reference (b) for Byron Station as they apply to Braidwood Station.

Upon further review, Commonwealth Edison has determined that a change needs to be made to Relief Request VR-12 to make it more consistent with the Relief Request submitted for Byron Station. As a result, Relief Request VR-12 for Braidwood Station has been changed from Revision 4 to Revision 4A.

The Valve Relief Request VR-12, Revision 4A, deletes valves 1/2RF026 and 1/2RF027 since they no longer apply and includes a rewording in the alternative testing section to match the corresponding Byron Station Relief Request. For the ease of review by the NRC Staff, the IST Program Revision 4/4A that now includes the new VR-12 Relief Request is being transmitted in its entirety. No changes have been made to other parts of the IST Programs.

Attachment A to this letter describes the differences between the Byron and Braidwood programs. Attachment B to this letter presents the differences or changes made between Revision 3 which had been submitted previously in reference (c) for Braidwood Station and Revision 4/4A as provided herein.

LTR Encl. D001
ADD: Bob Pulsifer

Pump Program

As noted in previous submittals, the IST Pump Program for Braidwood consists of a tabular listing of the pumps which are identified in the Byron/Braidwood "FSAR as Active, and that have an emergency power source; plus a series of Notes and Relief Requests. Active pumps are defined as those pumps called on to perform a safety function as well as to accomplish and maintain a safe reactor shutdown. The only exception are the diesel drive auxiliary feedwater pumps (1/2AF01PB) which are included in the program although they are not supplied by an emergency power source.

Two (2) essential service water makeup pumps (0SX02PA, 0SX02PB) are included in the Byron program. These pumps supply makeup water for the essential service water cooling towers. Due to a difference in design, Braidwood does not have these cooling towers, and hence does not have these pumps.

Valve Program

The IST Valve Program for Braidwood consists of a tabular listing of ASME Section Class 1, II, and III valves which have been assigned a specific Code category, plus a series of notes and relief requests.

Valves 0SX028A and B are part of the essential service water makeup system and like the two pumps listed above, are part of the Byron installation but are not installed at Braidwood.

Because of differences in valve stroke times, the valves listed in VR-12 (the fast acting valves) are different. Byron Station includes the valves 1/2PR066 and 1/2S(88)1 while Braidwood Station does not.

These programs are being submitted for NRC review and acceptance. Please address any questions you may have regarding these programs to this office.

Very truly yours,

S.C. Hunsader

S.C. Hunsader
Nuclear Licensing Administrator

/scl:0031V:1-2

cc: S. Sands-NRR
Resident Inspector-Braidwood
Julian Hinds-Region III

ATTACHMENT "A"

IST PROGRAM PLAN
BYRON/BRAIDWOOD DIFFERENCES

The following presents the differences between the Byron and Braidwood Pump and Valve IST Program Plans:

	Byron	Braidwood
A)	Byron Pump Program (Rev. 7)	Braidwood Pump Program (Rev. 4)
	-Byron program includes SX Makeup Pumps.	-N/A, since Braidwood does not have SX Makeup Pumps or the related OSX028A and B valves.
	-Byron Control Volume (CV) Pumps are included in PR-5	-Braidwood Control Volume (CV) Pumps have permanently installed flow measurement devices and, thus do not require the use of an ultrasonic flowmeter in PR-3.
B)	Byron Valve Program (Rev. 8)	Braidwood Valve Program (Rev. 4/4A)
	-Byron program includes for valves 1/2CS019A,B a Stroke time of 30 seconds.	-Braidwood program includes a 15 second stroke time to more closely match the response time surveillance requirements.
	-Byron program includes valves with fast acting stroke times, per VR-12.	-Braidwood program does not include certain valves previously in this relief request that have a slower stroke time history and have been deleted.

/scl:0031V:3

ATTACHMENT "B"

BRAIDWOOD IST PROGRAM PLAN
REVISION 3 TO REVISION 4/4A
DIFFERENCES AND CHANGES

The primary difference between Revision 3 and Revision 4/4A is the addition of Braidwood Unit 2 Pump and Valve EPN's to the Tables, Notes and Relief Requests. Other changes made are as follows:

A) Pumps

1) Page 3-9 added a statement for vertical line shaft pumps to more clearly define test methodology, per ASME OM-6.

2) Page 3-12 deleted Control Volume (CV) pumps from PR-3. These pumps have permanently installed flow measurement equipment and thus do not use the ultrasonic flow meter.

B) Valves

1) Removed XT designation for 1/2CS008A,B in 5 of 42 tables, as this was inadvertently left in, in Revision 3. VR-4 states partial stroking using air is not practical.

2) In 5 of 42 tables, for 1/2CS019A,B revised maximum stroke time of 30 seconds to read 15 seconds to coincide with response time requirements.

3) For the following valves, fast acting valve Relief Request VR-12, no longer applies.

EPN	Page
1/2CV8152	7 of 42
1/2CV8160	7 of 42
1/2PR066	20 of 42
1/2SD005A-D	31 of 42
1/2SI8871	34 of 42
1/2SI8880	34 of 42
1/2SI8964	36 of 42
1/2SI8888	34 of 42

4) In 7 of 42, 1/2CV8481A,B and 1/2CV8546 have Relief Request VR-15 designated. Note 8 has been removed from 1/2CV8481A,B as it no longer applies.

5) In 8 of 42, revised 1/2DG5185A,B and 1/2DG5184A,B valve category from Type B to Type C, typo.

6) In 15 of 42, revised 1/2IA065 and 1/2IA066 for ST and FT in RR as per VR-10 revisions.

7) In 17 of 42, revised stroke times of 1/2MS018A-D to reflect VR-12 requirements.

8) In 21 of 42, revised stroke times of 1/2PS228A,B, 1/2PS229A,B and 1/2PS230A,B to reflect VR-12 requirements. Revised 1/2PS231A,B valve category to AC.

9) Valves Continued

9) In 24 of 42, revised stroke times for 1/2RE9156, 1/2RE9159A,B and 1/2RE9160A,B per VR-12.

10) In 25 of 42, revised stroke times per VR-12.

11) In 26 of 42, revised 1/2RH8705A,B valve category to AC.

12) In 33 of 42, revised typo for 1/2SI8819A-D so that test mode is RR.

13) In 34 of 42, revised typo for 1/2SI8905A-D so that test mode is RR.

14) In 35 of 42, revise 1/2SI8949A-D so that test mode is RR.

15) In page 35 of 42, deleted reference to XT for valves 1/2SI8948C,D as it was a typo.

16) In the note section page 4-11 for Note 8 deleted reference to 1/2CV8481A,B valves as these are now in VR-15.

17) In page 4-12, for Note 12, corrected typo on valve EPN's.

18) In the Relief Request section for VR-1 page 4-18 added a clarification of section XI testing for leak rates.

19) In VR-4 page 4-21, added more justification for not testing the affected valves during operations or cold shutdown.

20) In VR-12, page 4-29, deleted valves 1/2CV8152, 1/2CV8160, 1PR066, 1/2SD005A-D, 1/2SI8871, 1/2SI8880, 1/2SI8888, 1/2SI8964. Rewrote alternate testing to clarify testing trending requirements.

22) In VR-15, page 4-34, added 1/2CV8481A,B and 1/2CV8546. Revised wording to clarify basis for relief, alternate testing and justification.

23) In VR-16, page 4-36, rewrote basis for relief and justification.

SECTION 3.0

PRESERVICE/INSERVICE TESTING

PROGRAM PLAN FOR PUMPS

Table of Contents

3.1

PROGRAM DESCRIPTION

Program Description

The Pump Preservice/Inservice Testing Program for Braidwood Nuclear Power Station Unit 1 and Unit 2, is implemented in accordance with the requirements of Subsection IWP of Section XI of the ASME Boiler and Pressure Vessel Code, 1983 Edition. Where these requirements are determined to be impractical, specific relief is requested. Additional pump relief requests may be necessary and these will be identified during subsequent inservice tests. The pumps subject to ISI testing are those pumps which are identified in the Braidwood FSAR as Active, and have an emergency power source. Active pumps are defined as those which are called on to perform a safety function as well as to accomplish and maintain a safe reactor shutdown. The only exception are the diesel driven auxiliary feedwater pumps, 1/2AF01PB which are included in the program although they are not supplied by an emergency power source.

Pump reference values shall be determined from the results of a preservice test, which may be run during preoperational testing, or from the results of the first inservice test run during power operation. Reference values shall be at points of operation readily duplicated during subsequent inservice testing. Additional reference values may be necessary and these will be taken in accordance with IWP-3111 and 3112.

In the event a pump must be declared inoperable as a result of inservice testing, limitations on plant operation 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 any Technical Specification.

3.2

PROGRAM TABLES

Table Description

The following information is included in the summary tables:

The first four columns include the unique Braidwood Station Equipment Piece Number, the Pump Name, the Code Class, and the P&ID on which the pumps are located.

Speed: Speed will be measured by a tachometer or stroboscope for variable speed drives.

Inlet pressure: Inlet pressure will be measured via permanently installed gauges or other means, provided the equipment accuracy meets the requirements of IWP-4150. This is to be measured both before pump startup and during the test.

Differential pressure: Differential pressures will be measured using calibrated differential pressure gauges or by recording the difference between calibrated inlet and outlet pressure gauges.

Flow rate: Flow rates will be measured using permanently installed instrumentation or other means, provided that equipment accuracy meets the requirements of IWP-4150.

Vibration: Vibration measurement shall be made using portable or hand held instruments at locations as marked on the pumps.

Bearing Temperature: Bearing temperature will be measured by permanently installed devices where such devices are present. Portable measurement devices will be used where temperature wells are provided.

Per IWP-3300, bearing temperatures are required only once per year. Braidwood Station takes the data for bearing temperatures once per year during summer testing.

Test Interval: An inservice test shall be run on each pump nominally every 3 months during normal plant operation, in accordance with IWP-3400.

Lubrication Level: Lubrication level will be observed through sight glasses for the pumps listed in the program.

Revision: The current revision of the program is listed.

Table Page: The table pages are numbered sequentially and show the total number of pages.

3.3

NOTES

NOTE 1

The Diesel Oil Transfer (1DO01PA-D and 2DO01PA-D), Residual Heat Removal (1RH01PA,B and 2RH01PA,B) and Containment Spray (1CS01PA,B and 2CS01PA,B) pumps cannot be measured for lubrication level. These pumps are lubricated by the fluid pumped and hence have no indication for lubrication level.

NOTE 2

The Component Cooling pumps (0CC01P, 1CC01PA,B and 2CC01PA,B) Essential Service Water Pumps (1SX01PA,B and 2SX01PA,B), and Control Room Chill Water Pumps (0WO01PA,B) are in systems which are in continuous operation. The idle inlet pressure for these pumps cannot be obtained without interrupting normal system operation and causing system transients. The idle inlet pressure will be recorded only if the pump to be tested is not in operation at the start of the test. Proper pump operation is assured by continuous pump operation as well as quarterly monitoring of the remaining ISI pump parameters.

NOTE 3

-DELETED-

3.4

RELIEF REQUESTS

RELIEF REQUEST NO. PR-1

1. PUMP NUMBER: All pumps in the program plan.

2. NUMBER OF ITEMS: 39 pumps.

3. ASME CODE CLASS: 2 & 3

4. ASME CODE, SECTION XI REQUIREMENTS: In reference to Table IWP-3100-2, "Allowable Ranges of Test Quantities", pump vibration is to be measured in and compared to values given in mils displacement.

5. BASIS FOR RELIEF: The measurement of pump vibration is required so that developing problems can be detected and repairs initiated prior to a pump becoming inoperable. Measurement of vibration only in displacement quantities does not take into account frequency which is also an important factor in determining the severity of the vibration.

6. ALTERNATE TESTING: The ASME Code minimum standards require measurement of the vibration amplitude in mils (displacement). Braidwood Station proposes an alternate program of measuring vibration velocity (inches per second) which is more comprehensive than that required by Section XI. This technique is an industry-accepted method which is much more meaningful and sensitive to small changes that are indicative of developing mechanical problems. These velocity measurements detect not only high amplitude vibration, that indicate a major mechanical problem such as misalignment or unbalance, but also the equally harmful low amplitude, high frequency vibration due to bearing wear that usually go undetected by simple displacement measurements.

   The allowable ranges of vibration and their associated action levels will be patterned after the guidelines established in ANSI/ASME OM-6 Draft 8, Table 6100-1 and Figure 6100-1. These ranges will be used to assess equipment operational readiness for all components.

The acceptable performance range will be ≤ 2.5 times the reference value, not to exceed .325 inches per second. The alert range, at which time the testing frequency would be doubled, will be > 2.5 to 6 times the reference value, not to exceed .70 inches per second. Any vibrating velocity greater than 6 times the reference value or greater than .70 inches per second will require corrective actions to be performed on the affected component.

Vibration measurements for all pumps will be obtained and recorded in velocity, inches per second, and will be broadband unfiltered peak measurements. The monitored locations for vibration analysis will be marked so as to permit subsequent duplication in both location and plane.

The frequency response range of the vibration transducers and their readout system shall be capable of frequency responses from one-third minimum pump shaft rotational speed to at least one thousand hertz.

The Vertical Line Shaft Pumps in the program will have vibration measurements taken on the upper motor bearing housing in three orthogonal directions, one of which is the axial direction.

7. JUSTIFICATION: Measurement of vibration in mils displacement is not as sensitive as velocity measurements to small changes that are indicative of developing mechanical problems. Therefore, the proposed alternate of measuring vibration amplitude in inches/second provides added assurance of the continued operability of the pumps.

8. APPLICABLE TIME PERIOD: This relief is requested once per quarter during the first inspection interval.

RELIEF REQUEST NO. PR-2

1. PUMP NUMBER: 0CC01P, 1CC01PA&B, 2CC01PA&PB, 1CS01PA&B, 2CS01PA&PB, 1RH01PA&B, 2RH01PA&PB, 1DO01PA-D, 2DO01PA-D, 0WO01PA, 0WO01PB

2. NUMBER OF ITEMS: 23 pumps

3. ASME CODE CLASS: 2 & 3

4. ASME CODE, SECTION XI REQUIREMENTS: Per IWP-3100, Inservice Test Procedure pump bearing temperatures are required to be measured to detect any change in the mechanical characteristics of a bearing. IWP-3500(b) requires three successive readings taken at ten minute intervals that do not vary more than 3%.

5. BASIS FOR RELIEF:

   a. These pumps' bearings are not provided with permanent temperature detectors or thermal wells. Therefore, gathering data on bearing temperature is impractical.

   b. The only temperature measurements possible are from the bearing housing. To detect high bearing temperature at the bearing housing would require that the bearings in question be seriously degraded.

   c. Measurement of housing temperature on these pumps does not provide information on bearing condition or degradation. For example, the bearings on the Diesel Oil Transfer Pumps (1DO01PA-D, 2DO01PA-D) are cooled by the fluid pumped.

      Therefore, any heat generated by degraded bearings is carried away by the cooling fluid and would not be directly measured at the bearing housing.

6. ALTERNATE TESTING: No direct alternate test is proposed for bearing temperatures. However, measurement of hydraulic parameters and vibration readings do provide a more positive method of monitoring pump condition and bearing degradation.

7. JUSTIFICATION: By measuring pump hydraulic parameters and vibration velocity, (as described in PR-1), pump operability and the trending of mechanical degradation is assured. Also, since these parameters (i.e., Hydraulic parameters and vibration) are measured quarterly, the pump mechanical condition will be more accurately determined than would be possible by measuring bearing temperature on a yearly basis.

8. APPLICABLE TIME PERIOD: This relief is requested once per year, during the first inspection interval.

RELIEF REQUEST NO. PR-3

1. PUMP NUMBER: 0CC01P, 1CC01PA&B, 2CC01PA&B, 1SX01PA&B, 2SX01PA&B, 1D001PA-D, 2D001PA-D

2. NUMBER OF ITEMS: 17 pumps

3. ASME CODE CLASS: 2 & 3

4. ASME CODE, SECTION XI REQUIREMENTS: Per IWP-4120, the full scale range of each instrument shall be three times the reference value or less.

5. BASIS FOR RELIEF: The full scale range of ultrasonic flowmeters, used to collect Section XI flow data, exceed three times the reference value.

6. ALTERNATE TESTING: Ultrasonic flowmeters, with digital readouts and totalizer features will be utilized to obtain Section XI flow data.

7. JUSTIFICATION: Ultrasonic flowmeters provide an accurate means of measuring flowrate. They utilize a digital display whose accuracy is independent of the full scale range. The ultrasonic flowmeter is well within the requirements of IWP-4110 and IWP-4120, which refer to an instrument accuracy of ± 2% of full scale for an instrument with a range of one and one-half to three times the reference value. The following examples will illustrate this point. The component cooling pumps (0CC01P, 1CC01PA, and 1CC01PB) have a reference value of approximately 4500 gpm. Using the Code requirements, an instrument with a full scale range of 13,500 gpm (3 x 4500 gpm), the acceptable instrument accuracy is ± 270 gpm (.02 x 13500 gpm). Using the ultrasonic flowmeter, with an accuracy of ± 3% of the indicated reading, provide an instrument accuracy of ± 135 (.03 x 4500 gpm).

The diesel oil transfer pumps (1D001PA-D) have a reference value of approximately 25 gpm. Using the Code requirements, an instrument with a full scale of 75 gpm (3 x 25 gpm) the acceptable instrument accuracy is ± 1.5 gpm (.02 x 75 gpm). Using the ultrasonic flowmeter with an accuracy of ± 3% of indicated reading will provide an instrument accuracy of ± 0.75 gpm (.03 x 25 gpm).

RELIEF REQUEST NO. PR-3

Use of an ultrasonic flowmeter, with totalizer and integrator feature, instead of other instruments allowed by IWP-4110 and IWP-4120, will provide more precise and accurate flow measurements.

8. APPLICABLE TIME PERIOD: This relief is requested once per quarter, during the first inspection interval.

RELIEF REQUEST NO. PR-4

1. PUMP NUMBER: 1DO01PA-D, 2DO01PA-D.

2. NUMBER OF ITEMS: 8 pumps

3. ASME CODE CLASS: 3

4. ASME CODE, SECTION XI REQUIREMENTS: Per IWP-3100, differential pressure shall be measured on all pumps that are tested.

5. BASIS FOR RELIEF: These pumps are positive displacement Diesel Oil Transfer Pumps. The pump differential pressure is not a factor affecting pump performance, but rather dependent only on the inlet pressure to the pump. As the pump discharge pressure is constant, and the inlet pressure varies with tank level, the differential pressure is not a valid operational parameter.

6. ALTERNATE TESTING: Pump discharge pressure for positive displacement pumps is a valid operational parameter. This will be used to evaluate the Diesel Oil Transfer Pumps performance.

7. JUSTIFICATION: Using pump discharge pressure in lieu of pump differential pressure will provide meaningful pump performance data for evaluation of operational readiness of the Diesel Oil Transfer Pumps.

8. APPLICABLE TIME PERIOD: This relief is requested once per quarter during the first inspection interval.

PUMP NUMBER	PUMP NAME	CLASS	SYSTEM P & ID	TEST PARAMETERS: SPEED	INLET PRES	DIFF PRES	FLOW RATE	VIBRATION	BEARING TEMP	TEST INTERVAL	LUBRICATION LEVEL	REMARKS
1AF01PA	Auxiliary Feedwater Pump	3	M-37	No	Yes	Yes	Yes	PR-1	Yes	Quarterly	Yes	
1AF01PB	Auxiliary Feedwater Pump (Diesel)	3	M-37	Yes	Yes	Yes	Yes	PR-1	Yes	Quarterly	Yes	
2AF01PA	Auxiliary Feedwater Pump	3	M-122	No	Yes	Yes	Yes	PR-1	Yes	Quarterly	Yes	
2AF01PB	Auxiliary Feedwater Pump	3	M-122	Yes	Yes	Yes	Yes	PR-1	Yes	Quarterly	Yes	
0CC01P	Component Cooling Pump	3	M-66	No	Yes	Yes	PR-3	PR-1	PR-2	Quarterly	Yes	Note 2
1CC01PA	Component Cooling Pump	3	M-66	No	Yes	Yes	PR-3	PR-1	PR-2	Quarterly	Yes	Note 2
1CC01PB	Component Cooling Pump	3	M-66	No	Yes	Yes	PR-3	PR-1	PR-2	Quarterly	Yes	Note 2
2CC01PA	Component Cooling Pump	3	M-66	No	Yes	Yes	PR-3	PR-1	PR-2	Quarterly	Yes	Note 2
2CC01PB	Component Cooling Pump	3	M-66	No	Yes	Yes	PR-3	PR-1	PR-2	Quarterly	Yes	Note 2
1CS01PA	Containment Spray Pump	2	M-46	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 1
1CS01PB	Containment Spray Pump	2	M-46	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 1

PUMP NUMBER	PUMP NAME	CLASS	SYSTEM P & ID	TEST PARAMETERS								
				SPEED	INLET PRES	DIFF PRES	FLOW RATE	VIBRATION	BEARING TEMP	TEST INTERVAL	LUBRICATION LEVEL	REMARKS
2CS01PA	Containment Spray Pump	2	M-129	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 1
2CS01PB	Containment Spray Pump	2	M-129	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 1
1CV01PA	Centrifugal Charging Pump	2	M-64	No	Yes	Yes	Yes	PR-1	Yes	Quarterly	Yes	
1CV01PB	Centrifugal Charging Pump	2	M-64	No	Yes	Yes	Yes	PR-1	Yes	Quarterly	Yes	
2CV01PA	Centrifugal Charging Pump	2	M-138	No	Yes	Yes	Yes	PR-1	Yes	Quarterly	Yes	
2CV01PB	Centrifugal Charging Pump	2	M-138	No	Yes	Yes	Yes	PR-1	Yes	Quarterly	Yes	
1DO01PA	Diesel Oil Transfer Pump	3	M-50	No	Yes	PR-4	PR-3	PR-1	PR-2	Quarterly	No	Note 1
1DO01PB	Diesel Oil Transfer Pump	3	M-50	No	Yes	PR-4	PR-3	PR-1	PR-2	Quarterly	No	Note 1
1DO01PC	Diesel Oil Transfer Pump	3	M-50	No	Yes	PR-4	PR-3	PR-1	PR-2	Quarterly	No	Note 1
1DO01PD	Diesel Oil Transfer Pump	3	M-50	No	Yes	PR-4	PR-3	PR-1	PR-2	Quarterly	No	Note 1
2DO01PA	Diesel Oil Transfer Pump	3	M-130	No	Yes	PR-4	PR-3	PR-1	PR-2	Quarterly	No	Note 1

PUMP NUMBER	PUMP NAME	CLASS	SYSTEM P & ID	TEST PARAMETERS						TEST INTERVAL	LUBRICATION LEVEL	REMARKS
				SPEED	INLET PRES	DIFF PRES	FLOW RATE	VIBRATION	BEARING TEMP			
2DO01PB	Diesel Oil Transfer Pump	3	M-130	No	Yes	PR-4	PR-3	PR-1	PR-2	Quarterly	No	Note 1
2DO01PC	Diesel Oil Transfer Pump	3	M-130	No	Yes	PR-4	PR-3	PR-1	PR-2	Quarterly	No	Note 1
2DO01PD	Diesel Oil Transfer Pump	3	M-130	No	Yes	PR-4	PR-3	PR-1	PR-2	Quarterly	No	Note 1
1RH01PA	Residual Heat Removal Pump	2	M-62	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 1
1RH01PB	Residual Heat Removal Pump	2	M-62	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 1
2RH01PA	Residual Heat Removal Pump	2	M-137	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 1
2RH01PB	Residual Heat Removal Pump	2	M-137	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 1
1SI01PA	Safety Injection Pump	2	M-61	No	Yes	Yes	Yes	PR-1	Yes	Quarterly	Yes	
1SI01PB	Safety Injection Pump	2	M-61	No	Yes	Yes	Yes	PR-1	Yes	Quarterly	Yes	

ASME CLASS 2 & 3 PUMPS
BRAIDWOOD NUCLEAR POWER STATION REVISION 4 TABLE PAGE 4 of 4

PUMP NUMBER	PUMP NAME	CLASS	SYSTEM P & ID	TEST PARAMETERS								
				SPEED	INLET PRES	DIFF PRES	FLOW RATE	VIBRATION	BEARING TEMP	TEST INTERVAL	LUBRICATION LEVEL	REMARKS
2SI01PA	Safety Injection Pump	2	M-136	No	Yes	Yes	Yes	PR-1	Yes	Quarterly	Yes	
2SI01PB	Safety Injection Pump	2	M-136	No	Yes	Yes	Yes	PR-1	Yes	Quarterly	Yes	
1SX01PA	Essential Service Water Pump	3	M-42	No	Yes	Yes	PR-3	PR-1	Yes	Quarterly	Yes	Note 2
1SX01PB	Essential Service Water Pump	3	M-42	No	Yes	Yes	PR-3	PR-1	Yes	Quarterly	Yes	Note 2
2SX01PA	Essential Service Water Pump	3	M-42	No	Yes	Yes	PR-3	PR-1	Yes	Quarterly	Yes	Note 2
2SX01PB	Essential Service Water Pump	3	M-42	No	Yes	Yes	PR-3	PR-1	Yes	Quarterly	Yes	Note 2
0WO01PA	Control Room Chilled Water	3	M-118	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	Yes	Note 2
0WO01PB	Control Room Chilled Water	3	M-118	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	Yes	Note 2

4.0

PRESERVICE/INSERVICE TESTING

PROGRAM PLAN FOR VALVES

Table of Contents

4.1

PROGRAM DESCRIPTION

Program Description

The Preservice/Inservice Testing Program for Class 1, 2, & 3 valves meets the requirements of Subsection IWV of the ASME Section XI Code, 1983 Edition. 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 during subsequent inservice tests. The tables list all code Class 1, 2 & 3 valves which have been assigned a specific code category as directed by Subsection IWV of Section XI. The tables are organized by system and further identified by code class and code category, using P&ID references.

After installation and prior to service, all valves identified in this program will be tested as required by Subsection IWV-3100 of Section XI of the ASME Code. These tests will be 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.

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.

4.2

PROGRAM TABLES

Table Description

The following information is included in the summary tables:

A. SYSTEM

The system in which a valve is located is denoted by the abbreviated system identification.

B. REVISION

The revision corresponds to the current revision of the program.

C. PAGE

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

D. VALVE NUMBER

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

E. P & ID

The P & ID column references the specific P & ID number and sheet number, which the valves are located on.

F. CLASS

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

G. VALVE CATEGORY

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

H. VALVE SIZE

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

I. 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

J. ACT. TYPE

The actuator type identifies the valve actuator. The following 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.

K. NORMAL POSITION

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

L. 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 power operated valves will involve stroking the valves to both its open and closed positions. 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.

M. TEST METHOD

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

1. Seat Leakage Test (Lt)

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.

2. Full Stroke Test (St)

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.

3. Check Valve Exercise Test (Ct)

The check valve disc will be exercised to the position required to fulfill its safety function in accordance with IWV-3520.

4. Safety Valve Setpoint Check (Rt)

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

5. Fail Safe Test (Ft)

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 out of its fail 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 position. This condition simulates loss of actuating power (Electric and/or Air) and hence satisfies the fail test requirements of IWV-3415.

6. Position Indication Check (IT)

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

7. Part-Stroke Test (Xt)

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.

N. MAX STROKE TIME

For power operated valves requiring a full stroke test (St), in order to meet the requirements of IWV-3413, the maximum allowable stroke time is specified in seconds. N/A indicates that time is not a factor affecting valve operability.

O. TEST MODE

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

1. Normal Operation (OP)

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

2. Semiannual (S)

Tests designated (S) will be conducted once every 6 months, except in those modes in which the valve is not required to be operable.

3. 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 testings 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 ISI 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.

4. Reactor Refueling (RR)

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

P. RELIEF REQUEST

Relief requests reference a specific request for relief from code requirements. All relief requests are included immediately following the presentation tables.

4.3

NOTFS

NOTE 1

Closure of the Main Steam isolation valves, 1MS001A-D and 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 Mode 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 1CV8104/2CV8104 (Boric Acid Injection Isolation Valves), check valves 1CV8442/2CV8442, 1CV8546/2CV8546 (RWST to CV Pump Suction Valves), 1CV8801A/2CV8804A (RH to CV Pump Suction Iso Valves), or 1CV112D,E/2CV112D,E (RWST to CV Pump Suction Iso Valves) could cause 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 exercised during cold shutdown as required by IWV-3412.

NOTE 5

The 1RH8701A,B, 1RH8702A,B, 2RH8701A,B, 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, the 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 Braidwood Technical Specifications.

1RH8701A,B	1RH8702A,B	2RH8701A-B	2RH8702A-B
1RH8705A,B	1SI8815	2RH8705A-B	2SI8815
1SI8818A-D	1SI8905A-D	2SI8818A-D	2SI8905A-D
1SI8819A-D	1SI8948A-D	2SI8819A-D	2SI8948A-D
1SI8841A,B	1SI8949A-D	2SI8841A,B	2SI8949A-D
1SI8900A-D	1SI8956A-D	2SI8900A-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 stroked 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 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-D	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 tested during cold shutdown per IWV-3412.

NOTE 11

The Primary Containment Purge Supply and Exhaust Valves, 1VQ001A,B, 1VQ002A,B, 2VQ001A,B, 2VQ002A,B, and 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 than mode 5 or 6 would be a violation of the Braidwood Technical Specifications. These valves will be full stroke tested during cold shutdown in accordance with IWV-3412. These valves will be leak tested semi-annually in accordance with Braidwood Technical Specifications.

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

NOTE 12

The Auxiliary Feedwater check valves, 1AF001A-B, 1AF003A-B, 1AF014A-H, 1AF029A-B, 2AF001A-B, 2AF003A,B, 2AF014A-H, 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 and 2AF001A-B, 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 causing 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 deenergized in their proper positions during unit operation. Stroking then 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
- DELETED -

NOTE 16

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 tested (Ft) per the Braidwood Technical Specifications. These valves are noncode valves and as such, do not require the full scope of Section XI required testing. They are included in the program for operability tracking purposes only.

NOTE 17

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 tested (Ft) per the Braidwood Technical Specifications. These valves are noncode valves and as such, do not require the full scope of section XI required testing. They are included in the program for operability tracking purposes only.

NOTE 18

The Feedwater Tempering Flow control valves 1FW034A-D and 2FW034A-D will be tested per the Braidwood Technical Specifications. These valves are noncode, and as such do not require the full scope of ASME Section XI required testing. They are included in the program for operability tracking purposes only.

NOTE 19

- DELETED -
(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

Per NRC mandated augmented testing requirements, the 1PS231A,B and 2PS231A,B check valves shall be stroke tested open (Ct), to ensure post accident operability of the Hydrogen Monitoring System.

4.4

RELIEF REQUESTS

VR-1

1. Valve Number:

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

	VALVE #		VALVE #		VALVE #
1)	1CC685	45)	1PS9354A	89)	1VQ002A
2)	1CC9413A	46)	1PS9354B	90)	1VQ002B
3)	1CC9414	47)	1PS9355A	91)	1VQ003
4)	1CC9416	48)	1PS9355B	92)	1VQ004A
5)	1CC9438	49)	1PS9356A	93)	1VQ004B
6)	1CC9486	50)	1PS9356B	94)	1VQ005A
7)	1CC9518	51)	1PS9357A	95)	1VQ005B
8)	1CC9534	52)	1PS9357B	96)	1VQ005C
9)	1CS007A	53)	1RE9157	97)	1VQ016
10)	1CS007B	54)	1RE9159A	98)	1VQ017
11)	1CS008A	55)	1RE9159B	99)	1VQ018
12)	1CS008B	56)	1RE9160A	100)	1VQ019
13)	1CV8100	57)	1RE9160B	101)	1WM190
14)	1CV8112	58)	1RE9170	102)	1WM191
15)	1CV8113	59)	1RE1003	103)	1WO006A
16)	1CV8160	60)	1RF026	104)	1WO006B
17)	1CV8152	61)	1RF027	105)	1WO007A
18)	1FC009	62)	1RY8025	106)	1WO007B
19)	1FC010	63)	1RY8026	107)	1WO020A
20)	1FC011	64)	1RY8028	108)	1WO020B
21)	1FC012	65)	1RY8033	109)	1WO056A
22)	1IA065	66)	1RY8046	110)	1WO056B
23)	1IA066	67)	1RY8047	111)	1PR002E
24)	1IA091	68)	1SA032	112)	1PR002G
25)	1OG057A	69)	1SA033	113)	1PR033A
26)	1OG079	70)	1SD002A	114)	1PR033B
27)	1OG080	71)	1SD002B	115)	1PR002F
28)	1OG081	72)	1SD002C	116)	1PR002H
29)	1OG082	73)	1SD002D	117)	1PR033C
30)	1OG083	74)	1SD002E	118)	1PR033D
31)	1OG084	75)	1SD002F		
32)	1OG085	76)	1SD002G		
33)	1PR001A	77)	1SD002H		
34)	1PR001B	78)	1SD005A		
35)	1PR032	79)	1SD005B		
36)	1PR066	80)	1SD005C		
37)	1PS228A	81)	1SD005D		
38)	1PS228B	82)	1SI8871		
39)	1PS229A	83)	1SI8880		
40)	1PS229B	84)	1SI8888		
41)	1PS230A	85)	1SI8964		
42)	1PS230B	86)	1SI8968		
43)	1PS231A	87)	1VQ001A		
44)	1PS231B	88)	1VQ001B		

1. Valve Number: (continued)

	VALVE #		VALVE #		VALVE #
119)	2CC685	163)	2PS9354A	207)	2VQ002A
120)	2CC9413A	164)	2PS9354B	208)	2VQ002B
121)	2CC9414	165)	2PS9355A	209)	2VQ003
122)	2CC9416	166)	2PS9355B	210)	2VQ004A
123)	2CC9438	167)	2PS9356A	211)	2VQ004B
124)	2CC9486	168)	2PS9356B	212)	2VQ005A
125)	2CC9518	169)	2PS9357A	213)	2VQ005B
126)	2CC9534	170)	2PS9357B	214)	2VQ005C
127)	2CS007A	171)	2RE9157	215)	2VQ016
128)	2CS007B	172)	2RE9159A	216)	2VQ017
129)	2CS008A	173)	2RE9159B	217)	2VQ018
130)	2CS008B	174)	2RE9160A	218)	2VQ019
131)	2CV8100	175)	2RE9160B	219)	2WM190
132)	2CV8112	176)	2RE9170	220)	2WM191
133)	2CV8113	177)	2RE1003	221)	2WO006A
134)	2CV8160	178)	2RF026	222)	2WO006B
135)	2CV8152	179)	2RF027	223)	2WO007A
136)	2FC009	180)	2RY8025	224)	2WO007B
137)	2FC010	181)	2RY8026	225)	2WO020A
138)	2FC011	182)	2RY8028	226)	2WO020B
139)	2FC012	183)	2RY8033	227)	2WO056A
140)	2IA065	184)	2RY8046	228)	2WO056B
141)	2IA066	185)	2RY8047	229)	2PR002E
142)	2IA091	186)	2SA032	230)	2PR002G
143)	2OG057A	187)	2SA033	231)	2PR033A
144)	2OG079	188)	2SD002A	232)	2PR033B
145)	2OG080	189)	2SD002B	233)	2PR002F
146)	2OG081	190)	2SD002C	234)	2PR002H
147)	2OG082	191)	2SD002D	235)	2PR033C
148)	2OG083	192)	2SD002E	236)	2PR033D
149)	2OG084	193)	2SD002F		
150)	2OG085	194)	2SD002G		
151)	2PR001A	195)	2SD002H		
152)	2PR001B	196)	2SD005A		
153)	2PR032	197)	2SD005B		
154)	2PR066	198)	2SD005C		
155)	2PS228A	199)	2SD005D		
156)	2PS228B	200)	2SI8871		
157)	2PS229A	201)	2SI8880		
158)	2PS229B	202)	2SI8888		
159)	2PS230A	203)	2SI8964		
160)	2PS230B	204)	2SI8968		
161)	2PS231A	205)	2VQ001A		
162)	2PS231B	206)	2VQ001B		

2. Number of Items: 236.

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 will be seat leak tested in accordance with the Appendix J requirements of 10 CFR 50.

The results of such leak rate measurements shall be analyzed and corrected, as necessary in accordance with the guidelines set forth in ASME Code Section XI, Subsection IWV, Paragraphs IWV-3426 and IWV-3427 (A).

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.

8. Applicable Time Period:

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

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:

These 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 each refueling outage in order to demonstrate operability. In addition to this, they will be full flow tested once every five years, per Braidwood Technical Specifications. The full flow test may be performed in lieu of dismantling the 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.

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 shutoff head of the Safety Injection pump is lower than the reactor coolant system pressure. Performance of this test with the RCS depressurized, but intact, could lead to inadvertent overpressurization of the system. The alternate method of protecting against overpressurization 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.

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.

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:

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 this cavity, via temporarily installed large bore piping connected at spool piece hookups, would by neccessity 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 at the CS pumps through the afore noted check valves to the Refueling Water Storage Tank. The addition of such flow paths would require extensive plant modifications to existing plant designs, to and include penetrating unit containment integrity.

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

Partial stroking of the 1CS008A,B and 2CS008A,B valves using air does not provide adequate insurance 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.

6. Alternate Testing:

The 1CS008A,B and 2CS008A,B valves will be either full flow tested, or dismantled to demonstrate operability each refueling outage.

The 1CS003A,B and 2CS003A,B valves will be partial stroke tested during the quarterly pump surveillance and full flow tested, or dismantled, 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.

VR-5

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

Braidwood 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, Braidwood 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.

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 valves 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 depressurized, but intact could lead to an inadvertent overpressurization of the system. The alternate method of protecting against overpressurization 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 this valve will be done during refueling outages at 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.

VR-7

-DELETED-

Incorporated into Valve Relief Request VR-12 and VR-17.

VR-8

1. Valve Number:

1CC685	1CC9438	2CC9914
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 1CC9486 and 2CC9486 will be stroke tested (Ct) 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 1CC9486 and 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.

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 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.

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.

B) Loss of Chemical Volume Control System Let Down 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 CV8160, the letdown line isolation valves 1/2 CV459 and 1/2 CV460, the letdown orifice outlet isolation valves 1/2 CV8149 A, B & C, the excess letdown 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 temperature 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 is 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.

VR-11

- DELETED -

VR-12

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

Valve #	Valve #	Valve #	Valve #
1MS018A-D	1RE9160A,B	2MS018A-D	2RE9160A,B
1PS228A,B		2PS228A,B	
1PS229A,B		2PS229A,B	
1PS230A,B	1RY8033	2PS230A,B	2RY8033
1RC014A-D		2RC014A-D	
1RE9157		2RE9157	
1RE9159A,B		2RE9159A,B	

2. Number of Items: 40

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 stroke time was 1.4 seconds, (which measured to the nearest second is 1.0 seconds) and the next stroke time is 1.6 seconds, (which 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 times will be required and upon exceeding 2 seconds, corrective action shall be taken immediately in accordance with IWV-3417(b).

VR-12

7. Justification

For short 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 hardship or sacrificing the safety of the plant.

8. Applicable Time Period:

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

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 Braidwood 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 Braidwood 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 values between starts, the satisfactory operation of the power operated and self-actuated check valves associated with the Diesel Air Start System can be adequately demonstrated.

VR-13

7. Justification

Proper valve ope.'tion 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 'efore and a/ter 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 pe quarter during the first inspection interval.

VR-14

- DELETED -

VR-15

1. Valve Number:

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 1SI8815, 1SI8900A-D, 1SI8841A-B, 2SI8815, 2SI8900A-D and 2SI8841A,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 the 1/2 SI8815 and 1/2 SI8900A-D located in the full flow path.

Additionally, Braidwood 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 overpressurization of the Reactor Coolant System. Therefore, check valves 1SI8819A-D, 1SI8905A-D, 1SI8949A-D, 2SI8819A-D, 2SI8905A-D, and 2SI8949A-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.

6. Alternate Testing:

Braidwood Stations's Technical Specifications require leak rate 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, Braidwood Station will stroke exercise check valves 1SI8815, 1SI8900A-D, 1SI8841A-B, 2SI8815, 2SI8900A-D, and 2SI8841A,B on the same schedule. To prevent unnecessary stroking of check valves 1/2 SI8815 and 1/2 SI8900A-D, check valves 1/2 SI8546 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. Stroke exercising of check valves 1SI8819A-D, 1SI8905A-D, 1SI8949A-D, 2SI8819A-D, 2SI8905A-D, and 2SI8949A-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 as plant conditions allow, but at a minimum frequency of once each refueling outage.

7. Justification:

Stroke exercising the 1SI8815, 1SI8900A-D, 1SI8841A&B, 2SI8815, 2SI8900A-D, and 2SI8841A&B, 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 creating additional undue hardship. Valves 1/2 SI8949A-D, 1/2 SI8905A-D and 1/2 SI8819A-D can not be stroked during cold shutdown without exceeding Technical Specification limiting condition for operation (LCO 3/4.5.3). Since stroking these valves requires starting an SI pump. Stroke exercising check valves 1SI8819A-D, 1SI8905A-D, 1SI8949A-D, 2SI8819A-D, 2SI8905A-D, and 2SI8949A-D, at least once per reactor refueling will insure compliance with Braidwood Station Technical Specifications and minimize the possibility of low temperature overpressurization of the reactor Coolant System.

8. Applicable Time Period:

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

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, 1SI8811A,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, Braidwood 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% (Unit 2). However, if the cold shutdown was necessitated by a problem requiring draining of the secondary side of the Steam Generators (i.e. tube leaks), Braidwood 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 suport Reactor Vessel Incore Seal Table, Loop Stop Valve, Reactor Coolant Pump and Seal Maintenance or primary leakage), Braidwood 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:

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

7. Justification:

The full stroke testing of the 1/2 SI8811A,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 violaiton of the action requirements for Braidwood 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 requirments 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.

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 nd IWV-3417.

5. Basis for Relief:

1SX101A and 2SX101A are the essential service water outlet isolation valves for the 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:

1SX101A and 2SX101A will be verified to open during each quarterly surveillance of the motor driven auxiliary feedwater pumps. No stroke timing or trending will be performed.

7. Justification:

These valves will be stroke exercised to their required safety position each quarter during the applicable motor driven auxiliary feedwater pump ASME surveillance. These pumps are also tested monthly for proper equipment operation per Technical Specification requirements. This testing will adequately maintain the systems in a state of operational readiness, while not sacrificing the safety of the plant.

8. Applicable Time Period:

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

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2AF001A	M-37 M-122	3	C	6.0	CK	S.A.	C	0	N/A	XL/Ct	OP/CS		Note 12
1/2AF001B	M-37 M-122	3	C	6.0	CK	S.A.	C	0	N/A	XL/Ct	OP/CS		Note 12
1/2AF003A	M-37 M-122	3	C	6.0	CK	S.A.	C	0	N/A	XL/Ct	OP/CS		Note 12
1/2AF003B	M-37 M-122	3	C	6.0	CK	S.A.	C	0	N/A	XL/Ct	OP/CS		Note 12
1/2AF006A	M-37 M-122	3	B	6.0	GA	M.O.	C	0	15.0	St It	OP RR		
1/2AF006B	M-37 M-122	3	B	6.0	GA	M.O.	C	0	15.0	St It	OP RR		
1/2AF013A	M-37 M-122	2	B	4.0	GL	M.O.	O	C	30.0	St It	OP RR		
1/2AF013B	M-37 M-122	2	B	4.0	GL	M.O.	O	C	30.0	St It	OP RR		
1/2AF013C	M-37 M-122	2	B	4.0	GL	M.O.	O	C	30.0	St It	OP RR		
1/2AF013D	M-37 M-122	2	B	4.0	GL	M.O.	O	C	30.0	St It	OP RR		
1/2AF013E	M-37 M-122	2	B	4.0	GL	M.O.	O	C	30.0	St It	OP RR		
1/2AF013F	M-37 M-122	2	B	4.0	GL	M.O.	O	C	30.0	St It	OP RR		
1/2AF013G	M-37 M-122	2	B	4.0	GL	M.O.	O	C	30.0	St It	OP RR		
1/2AF013H	M-37 M-122	2	B	4.0	GL	M.O.	O	C	30.0	St It	OP RR		
1/2AF014A	M-37 M-122	2	C	4.0	CK	S.A.	C	O	N/A	Ct	CS		Note 12
1/2AF014B	M-37 M-122	2	C	4.0	CK	S.A.	C	O	N/A	Ct	CS		Note 12

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	CSC MODE	RELIEF REQUEST	REMARKS
1/2AF014C	M-37 M-122	2	C	4.0	CK	S.A.	C	0	N/A	Ct	CS		Note 12
1/2AF014D	M-37 M-122	2	C	4.0	CK	S.A.	C	0	N/A	Ct	CS		Note 12
1/2AF014E	M-37 M-122	2	C	4.0	CK	S.A.	C	0	N/A	Ct	CS		Note 12
1/2AF014F	M-37 M-122	2	C	4.0	CK	S.A.	C	0	N/A	Ct	CS		Note 12
1/2AF014G	M-37 M-122	2	C	4.0	CK	S.A.	C	0	N/A	Ct	CS		Note 12
1/2AF014H	M-37 M-122	2	C	4.0	CK	S.A.	C	0	N/A	Ct	CS		Note 12
1/2AF017A	M-37 M-122	3	B	6.0	GA	M.O.	C	0	15.0	St It	OP RR		
1/2AF017B	M-37 M-122	3	B	6.0	GA	M.O.	C	0	15.0	St It	OP RR		
1/2AF029A	M-37 M-122	3	C	6.0	CK	S.A.	C	0	N/A	Ct	CS		Note 12
1/2AF029B	M-37 M-122	3	C	6.0	CK	S.A.	C	0	N/A	Ct	CS		Note 12

COMMONWEALTH EDISON

INSERVICE TESTING PROGRAM

BRAIDWOOD NUCLEAR POWER STATION

REVISION 4

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
0CC9464	M-66-3	3	C	12.0	CK	S.A.	C	0	N/A	Ct	OP		
1/2CC685	M-66-1 M-139-1	2	A	4.0	GA	M.O.	O	C	10.0	St It Lt	CS RR RR	VR-6 VR-1	
1/2CC9412A	M-66-2 M-139-2	3	B	12.0	GA	M.O.	C	O	120.0	St It	OP RR		
1/2CC9412B	M-66-2 M-139-2	3	B	12.0	GA	M.O.	C	O	120.0	St It	OP RR		
1/2CC9413A	M-66-1A M-139-1	2	A	6.0	GA	M.O.	O	C	10.0	St It Lt	CS RR RR	VR-6 VR-1	
1/2CC9414	M-66-1A M-139-1	2	A	6.0	GA	M.O.	O	C	10.0	St It Lt	CS RR RR	VR-6 VR-1	
1/2CC9416	M-66-1A M-139-1	2	A	6.0	GA	M.O.	O	C	10.0	St It Lt	CS RR RR	VR-6 VR-1	
1/2CC9437A	M-66-1A M-139-1	2	B	3.0	GA	A.O.	C	C	10.0	St It	OP RR		Passive
1/2CC9437B	M-66-1A M-139-1	2	B	3.0	GA	A.O.	O	C	10.0	St It Lt	OP RR OP		
1/2CC9438	M-66-1A M-139-1	2	A	4.0	GA	M.O.	O	C	10.0	Lt It St	RR RR CS	VR-1 VR-6	
1/2CC9463A	M-66-3B	3	C	12.0	CK	S.A.	C	O	N/A	Ct	OP		
1/2CC9463B	M-66-3B	3	C	12.0	CK	S.A.	C	O	N/A	Ct	OP		
1/2CC9473A	M-66-3B	3	B	16.0	GA	M.O.	C	O	120.0	St It	OP RR		

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2CC9473B	M-66-3B	3	B	16.0	GA	M.O.	C	O	120.0	St Lt	OP RR		
1/2CC9486	M-66-1A M-139-1	2	AC	6.0	CK	S.A.	O	C	N/A	Lt cS	RR RR	VR-1 VR-8	
1/2CC9541B	M-66-1A M-139-1	2	AC	0.75	CK	S.A.	C	C	N/A	Lt	RR	VR-1	Passive
1/2CC9534	M-66-1A M-139-1	2	AC	0.75	CK	S.A.	C	C	N/A	Lt	RR	VR-1	Passive

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2CS001A	M-61-4 M-136-4	2	B	14.0	GA	M.O.	O	C	30.0	St Lt	OP RR		
1/2CS001B	M-61-4 M-136-4	2	B	14.0	GA	M.O.	O	C	30.0	St Lt	OP RR		
1/2CS003A	M-46-1A M-129-1A	2	C	10.0	CK	S.A.	C	O	N/A	Xt/Ct	OP/RR	VR-4	
1/2CS003B	M-46-1A M-129-1A	2	C	10.0	CK	S.A.	C	O	N/A	Xt/Ct	OP/RR	VR-4	
1/2CS007A	M-46-1C M-129-1C	2	A	10.0	GA	M.O.	C	O	30.0	Lt St Lt	RR OP RR	VR-1	
1/2CS007B	M-46-1C M-129-1C	2	A	10.0	GA	M.O.	C	O	30.0	Lt St Lt	RR OP RR	VR-1	
1/2CS008A	M-46-1C M-129-1C	2	AC	10.0	CK	S.A.	C	O	N/A	Ct Lt	RR RR	VR-1 VR-1	
1/2CS008B	M-46-1C M-129-1C	2	AC	10.0	CK	S.A.	C	O	N/A	Ct Lt	RR RR	VR-1 VR-1	
1/2CS009A	M-61-4 M-136-4	2	B	16.0	GA	M.O.	C	O	30.0	St Lt	OP RR		
1/2CS009B	M-61-4 M-136-4	2	B	16.0	GA	M.O.	C	O	30.0	St Lt	OP RR		
1/2CS011A	M-46-1A M-129-1A	2	C	6.0	CK	S.A.	C	O	N/A	Ct	OP		
1/2CS011B	M-46-1A M-129-1A	2	C	6.0	CK	S.A.	C	O	N/A	Ct	OP		
1/2CS019A	M-46-1B M-129-1B	2	B	3.0	GA	M.O.	C	O	15.0	St Lt	OP RR		
1/2CS019B	M-46-1B M-129-1B	2	B	3.0	GA	M.O.	C	O	15.0	St Lt	OP RR		
1/2CS020A	M-46-1B M-129-1A	2	C	3.0	CK	S.A.	C	O	N/A	Ct	RR	VR-2	
1/2CS020B	M-46-1B M-129-1A	2	C	3.0	CK	S.A.	C	O	N/A	Ct	RR	VR-2	

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2CV112B	M-64-4 M-138-4B	2	B	4.0	GA	M.O.	O	C	10.0	St It	CS RR		Note 4
1/2CV112C	M-64-4 M-138-4B	2	B	4.0	GA	M.O.	O	C	10.0	St It	CS RR		Note 4
1/2CV112D	M-64-4 M-138-4A	2	B	8.0	GA	M.O.	C	O	15.0	St It	CS RR		Note 2
1/2CV112E	M-64-4 M-138-4A	2	B	8.0	GA	M.O.	C	O	15.0	St It	CS RR		Note 2
1/2CV8100	M-64-2 M-138-2	2	A	2.0	GL	M.O.	O	C	10.0	St It Lt	CS RR RR	VR-4 VR-1	
1/2CV8104	M-64-4 M-138-4A	2	B	2.0	GL	M.O.	C	O	10.0	St It	CS RR		Note 2
1/2CV8105	M-64-3B M-138-3B	2	B	3.0	GA	M.O.	O	C	10.0	St It	CS RR		Note 4
1/2CV8106	M-64-3B M-138-3B	2	B	3.0	GA	M.O.	O	C	10.0	St It	CS RR		Note 4
1/2CV8110	M-64-3A M-138-3A	2	B	2.0	GL	M.O.	O	C	10.0	St It	OP RR		
1/2CV8111	M-64-3A M-138-3A	2	B	2.0	GL	M.O.	O	C	10.0	St It	OP RR		
1/2CV8112	M-64-2 M-138-2	2	A	2.0	GL	M.O.	O	C	10.0	St It Lt	CS RR RR	VR-4 VR-1	
1/2CV8113	M-64-2 M-138-2	2	AC	.75	CK	S.A.	C	C	N/A	It	RR	VR-1	Passive
1/2CV8114	M-64-3A M-138-3A	2	B	2.0	GL	S.O.	O	C	5.0	St It	OP RR		Note 20
1/2CV8116	M-64-3A M-138-3A	2	B	2.0	GL	S.O.	O	C	5.0	St It	OP RR		Note 20

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2CV8152	M-64-5 M-138-5	2	A	3.0	GL	A.O.	O	C	10.0	St It	CS RR		Note 4
										Ft Lt	CS RR	VR-1	Note 4
1/2CV8160	M-64-5 M-138-5	2	A	3.0	GL	A.O.	O	C	10.0	St It	CS RR		Note 4
										Ft Lt	CS RR	VR-1	Note 4
1/2CV8442	M-64-4 M-138-4A	2	C	2.0	CK	S.A.	C	O	N/A	Ct	CS		Note 2
1/2CV8480A	M-64-3A M-138-3A	2	C	2.0	CK	S.A.	C	O	N/A	Ct	OP		
1/2CV8480B	M-64-3A M-138-3A	2	C	2.0	CK	S.A.	C	O	N/A	Ct	OP		
1/2CV8481A	M-64-3A M-138-3A	2	C	4.0	CK	S.A.	C	O	N/A	Ct/Xt	CS/OP	VR-15	
1/2CV8481B	M-64-3A M-138-3A	2	C	4.0	CK	S.A.	C	O	N/A	Ct/Xt	CS/OP	VR-15	
1/2CV8546	M-64-4 M-138-4A	2	C	8.0	CK	S.A.	C	O	N/A	Ct	CS	VR-13	Note 2
1/2CV8804A	M-64-4 M-138-4A	2	B	8.0	GA	M.O.	C	O	10.0	St It	CS RR		Note 2

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2DG518ZA	M-54-4	NONE	B	3	GA	S.O.	C	O	N/A	St	OP	VR-1.	
1/2DG518ZB	M-152-20	NONE	B	3	GA	S.O.	C	O	N/A	St	OP	VR-13	
1/2DG5183A	M-54-4	NONE	B	3	GA	S.O.	C	O	N/A	St	OP	VR-13	
1/2DG5183B	M-54-4	NONE	B	3	GA	S.O.	C	O	N/A	St	OP	VR-13	
1/2DG5184A	M-152-20	NONE	C	3	CK	S.A.	C	O	N/A	Ct	OP	VR-13	
1/2DG5184B	M-152-20	NONE	C	3	CK	S.A.	C	O	N/A	Ct	OP	VR-13	
1/2DG5185A	M-152-20	NONE	C	3	CK	S.A.	C	O	N/A	Ct	OP	VR-13	
1/2DG5185B	M-152-20	NONE	C	3	CK	S.A.	C	O	N/A	Ct	OP	VR-13	

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2D0003A	M-50-1B M-130-1A	3	C	1.5	CK	S.A.	C	0	N/A	Ct	OP		
1/2D0003B	M-50-1A M-130-1B	3	C	1.5	CK	S.A.	C	0	N/A	Ct	OP		
1/2D0003C	M-50-1B M-130-1A	3	C	1.5	CK	S.A.	C	0	N/A	Ct	OP		
1/2D0003D	M-50-1A M-130-1B	3	C	1.5	CK	S.A.	C	0	N/A	Ct	OP		

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

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2FP010	M-52-1	2	B	4.0	GA	A.O.	O	C	12.0	ST	OP		
										IT	RR		
										IT	OP		

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2FW009A	M-36-1 M-121-1B	2	B	16.0	GA	M.O.	O	C	5.0	St/Xt It	CS/OP RR		Note 1
1/2FW009B	M-36-1 M-121-1D	2	B	16.0	GA	M.O.	O	C	5.0	St/Xt It	CS/OP RR		Note 1
1/2FW009C	M-36-1 M-121-1A	2	B	16.0	GA	M.O.	O	C	5.0	St/Xt It	CS/OP RR		Note 1
1/2FW009D	M-36-1 M-121-1C	2	B	16.0	GA	M.O.	O	C	5.0	St/Xt It	CS/OP RR		Note 1
1/2FW034A	M-36-1 M-121-1B	NONE	B	2.0	GL	A.O.	O	C	N/A	Lt	RR		Note 18
1/2FW034B	M-36-1 M-121-1D	NONE	B	2.0	GL	A.O.	O	C	N/A	Lt	RR		Note 18
1/2FW034C	M-36-1 M-121-1A	NONE	B	2.0	GL	A.O.	O	C	N/A	Lt	RR		Note 18
1/2FW034D	M-36-1 M-121-1C	NONE	B	2.0	GL	A.O.	O	C	N/A	Lt	RR		Note 18
1/2FW035A	M-36-1 M-121-1B	2	B	3.0	GL	A.O.	O	C	6.0	St It Lt	OP RR OP		
1/2FW035B	M-36-1 M-121-1D	2	B	3.0	GL	A.O.	O	C	6.0	St It Lt	OP RR OP		
1/2FW035C	M-36-1 M-121-1A	2	B	3.0	GL	A.O.	O	C	6.0	St It Lt	OP RR OP		
1/2FW035D	M-36-1 M-121-1C	2	B	3.0	GL	A.O.	O	C	6.0	St It Lt	OP RR OP		
1/2FW039A	M-36-1 M-121-1B	2	B	6.0	GA	A.O.	O	C	6.0	St It Lt	CS RR CS		Note 19 Note 19

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2FW039B	M-36-1 M-121-1D	2	B	6.0	GA	A.O.	O	C	6.0	St It Ft	CS RR CS		Note 10
1/2FW039C	M-36-1 M-121-1A	2	B	6.0	GA	A.O.	O	C	6.0	St It Ft	CS RR CS		Note 10
1/2FW039D	M-36-1 M-121-1C	2	B	6.0	GA	A.O.	O	C	6.0	St It Ft	CS RR CS		Note 10
1/2FW043A	M-36-1 M-121-1B	2	B	3.0	GL	A.O.	C	C	6.0	St IT Ft	OP RR OP		
1/2FW043B	M-36-1 M-121-1D	2	B	3.0	GL	A.O.	C	C	6.0	St IT Ft	OP RR OP		
1/2FW043C	M-36-1 M-121-1A	2	B	3.0	GL	A.O.	C	C	6.0	St It Ft	OP RR OP		
1/2FW043D	M-36-1 M-121-1C	2	B	3.0	GL	A.O.	C	C	6.0	St It Ft	OP RR OP		
1/2FW510	M-36-1 M-121-1	NONE	B	16.0	AN	A.O.	O	C	N/A	Ft	RR		Note 16
1/2FW510A	M-36-1 M-121-1	NONE	B	4.0	GA	A.O.	C	C	N/A	Ft	RR		Note 17
1/2FW520	M-36-1 M-121-1	NONE	B	16.0	AN	A.O.	O	C	N/A	Ft	RR		Note 0
1/2FW520A	M-36-1 M-121-1	NONE	B	4.0	GA	A.O.	C	C	N/A	Ft	RR		Note 17
1/2FW530	M-36-1 M-121-1A	NONE	B	16.0	AN	A.O.	O	C	N/A	Ft	RR		Note 16

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

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2IA065	M-55-2 M-55-2	2	A	3.0	GL	A.O.	O	C	15.0	Ft St Ft Lt	RR RR RR RR	VR-1 VR-10 VR-10	
1/2IA066	M-55-2 M-55-2	2	A	1.0	GL	A.O.	O	C	15.0	Ft St Ft Lt	RR RR RR RR	VR-1 VR-10 VR-10	
1/2IA091	M-55-2 M-55-2	2	AC	0.75	CK	S.A.	C	C	N/A	Ft	RR	VR-1	Passive

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELief REQUEST	REMARKS
1/2MS001A	M-35-2 M-120-2	2	B	30.75	GA	M.O.	O	C	5.0	St/Xt It	CS/OP RR		Note 1
1/2MS001B	M-35-1 M-120-1	2	B	32.75	GA	M.O.	O	C	5.0	St/Xt It	CS/OP RR		Note 1
1/2MS001C	M-35-2 M-120-2	2	B	32.75	GA	M.O.	O	C	5.0	St/Xt It	CS/OP RR		Note 1
1/2MS001D	M-35-1 M-120-1	2	B	30.75	GA	M.O.	O	C	5.0	St/Xt It	CS/OP RR		Note 1
1/2MS013A	M-35-2 M-120-2	2	C	6.0X10.0	SV	S.A.	C	O	N/A	Rt	RR		
1/2MS013B	M-35-1 M-120-1	2	C	6.0X10.0	SV	S.A.	C	O	N/A	Rt	R		
1/2MS013C	M-35-2 M-120-2	2	C	6.0X10.0	SV	S.A.	C	O	N/A	Rt	RR		
1/2MS013D	M-35-1 M-120-1	2	C	6.0X10.0	SV	S.A.	C	O	N/A	Rt	RR		
1/2MS014A	M-35-2 M-120-2	2	C	6.0X10.0	SV	S.A.	C	O	N/A	Rt	RR		
1/2MS014B	M-35-1 M-120-1	2	C	6.0X10.0	SV	S.A.	C	O	N/A	Rt	RR		
1/2MS014C	M-35-2 M-120-2	2	C	6.0X10.0	SV	S.A.	C	O	N/A	Rt	RR		
1/2MS014D	M-35-1 M-120-1	2	C	6.0X10.0	SV	S.A.	C	O	N/A	Rt	RR		
1/2MS015A	M-35-2 M-120-2	2	C	6.0X10.0	SV	S.A.	C	O	N/A	Rt	RR		
1/2MS015B	M-35-1 M-120-1	2	C	6.0X10.0	SV	S.A.	C	O	N/A	Rt	RR		
1/2MS015C	M-35-2 M-120-2	2	C	6.0X10.0	SV	S.A.	C	O	N/A	Rt	RR		

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2MS015D	M-35-1 M-120-1	2	C	6.0X10.0	SV	S.A.	C	0	N/A	Rt	RR		
1/2MS016A	M-35-2 M-120-2	2	C	6.0X10.0	SV	S.A.	C	0	N/A	Rt	RR		
1/2MS016B	M-35-1 M-120-1	2	C	6.0X10.0	SV	S.A.	C	0	N/A	Rt	RR		
1/2MS016C	M-35-2 M-120-2	2	C	6.0X10.0	SV	S.A.	C	0	N/A	Rt	RR		
1/2MS016D	M-35-1 M-120-1	2	C	6.0X10.0	SV	S.A.	C	0	N/A	Rt	RR		
1/2MS017A	M-35-2 M-120-2	2	C	6.0X10.0	SV	S.A.	C	0	N/A	Rt	RR		
1/2MS017B	M-35-1 M-120-1	2	C	6.0X10.0	SV	S.A.	C	0	N/A	Rt	RR		
1/2MS017C	M-35-2 M-120-2	2	C	6.0X10.0	SV	S.A.	C	0	N/A	Rt	RR		
1/2MS017D	M-35-1 M-120-1	2	C	6.0X10.0	SV	S.A.	C	0	N/A	Rt	RR		
1/2MS018A	M-35-2 M-120-2	2	B	6.0X6.0	PORV	M.O.	C	C	2.0	St It Ft	OP RR OP	VR-12	
1/2MS018B	M-35-1 M-120-1	2	B	6.0X6.0	PORV	M.O.	C	C	2.0	St It Ft	OP RR OP	VR-12	
1/2MS018C	M-35-2 M-120-2	2	B	6.0X6.0	PORV	M.O.	C	C	2.0	St It Ft	OP RR OP	VR-12	
1/2MS018D	M-35-1 M-120-1	2	B	6.0X6.0	PORV	M.O.	C	C	2.0	St It Ft	OP RR OP	VR-12	

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2MS101A	M-35-2									St	OP		
	M-120-2	2	B	4.0	GA	A.O.	C	C	6.0	Tt	RR		
										Ft	OP		
1/2MS101B	M-35-1									St	OP		
	M-120-1	2	B	4.0	GA	A.O.	C	C	6.0	Tt	RR		
										Ft	OP		
1/2MS101C	M-35-2									St	OP		
	M-120-2	2	B	4.0	GA	A.O.	C	C	6.0	Tt	RR		
										Ft	OP		
1/2MS101D	M-35-1									St	OP		
	M-120-1	2	B	4.0	GA	A.O.	C	C	6.0	Tt	RR		
										Ft	OP		

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2CC357A	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	60.0	Lt St It	RR OP RR	VR-1	
1/2CC079	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	60.0	Lt St It	RR OP RR	VR-1	
1/2CC080	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	60.0	Lt St It	RR OP RR	VR-1	
1/2CC081	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	60.0	Lt St It	RR OP RR	VR-1	
1/2CC082	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	60.0	Lt St It	RR OP RR	VR-1	
1/2CC083	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	60.0	Lt St It	RR OP RR	VR-1	
1/2CC084	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	60.0	Lt St It	RR OP RR	VR-1	
1/2CC085	M-47-2 M-150-2	2	A	3.0	BTF	M.O.	C	C	60.0	Lt St It	RR OP RR	VR-1	

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2PR001A	M-78-10 M-151-1	2	A	1.0	GL	A.O.	O	C	4.5	Lt Ft St It	RR OP OP RR	VR-1	
1/2PR001B	M-78-10 M-151-1	2	A	1.0	GL	A.O.	O	C	4.5	Lt Ft St It	RR OP OP RR	VR-1	
1/2PR002E	M-78-6	2	A	2.0	GL	M	C	C	N/A	Lt	RR	VR-1	Passive
1/2PR002F	M-78-6	2	A	2.0	GL	M	C	C	N/A	Lt	RR	VR-1	Passive
1/2PR002G	M-78-6	2	AC	2.0	CK	S.A.	C	C	N/A	Lt	RR	VR-1	Passive
1/2PR002H	M-78-6	2	AC	2.0	CK	S.A.	C	C	N/A	Lt	RR	VR-1	Passive
1/2PR032	M-78-10 M-151-1	2	AC	1.0	CK	S.A.	C	C	N/A	Lt	RR	VR-1	Passive
1/2PR033A	M-78-6	2	A	2.0	GL	M	C	C	N/A	Lt	RR	VR-1	Passive
1/2PR033B	M-78-6	2	A	2.0	GL	M	C	C	N/A	Lt	RR	VR-1	Passive
1/2PR033C	M-78-6	2	A	2.0	GL	M	C	C	N/A	Lt	RR	VR-1	Passive
1/2PR033D	M-78-6	2	A	2.0	GL	M	C	C	N/A	Lt	RR	VR-1	Passive
1/2PR066	M-78-10 M-151-1	2	A	1.0	GL	A.O.	O	C	5.0	Lt Ft It St	RR OP RR OP	VR-1	

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2PS228A	M-68-1 M-140-6	2	A	0.50	GL	S.O.	O	C	2.0	Lt St Ft It	RR OP OP RR	VR-1 VR-12	Note 20
1/2PS228B	M-68-1 M-140-6	2	A	0.50	GL	S.O.	O	C	2.0	Lt St Ft It	RR OP OP RR	VR-1 VR-12	Note 20
1/2PS229A	M-68-1 M-140-6	2	A	0.50	GL	S.O.	O	C	2.0	Lt St Ft It	RR OP OP RR	VR-1 VR-12	Note 20
1/2PS229B	M-68-1 M-140-6	2	A	0.50	GL	S.O.	O	C	2.0	Lt St Ft It	RR OP OP RR	VR-1 VR-12	Note 20
1/2PS230A	M-68-1 M-140-6	2	A	1.00	GL	S.O.	C	C	2.0	Lt St Ft It	RR OP OP RR	VR-1 VR-12	Note 20
1/2PS230B	M-68-1 M-140-6	2	A	1.00	GL	S.O.	C	C	2.0	Lt St Ft It	RR OP OP RR	VR-1 VR-12	Note 20
1/2PS231A	M-68-1 M-140-6	2	AC	0.75	CK	S.A.	C O	C O	N/A N/A	Lt Ct	RR OP	VR-1	Note 21
1/2PS231B	M-68-1 M-140-6	2	AC	0.75	CK	S.A.	C O	C O	N/A N/A	Lt Ct	RR OP	VR-1	Note 21
1/2PS9354A	M-68-1 M-140-1	2	A	.375	GL	S.O.	C	C	10.0	St Lt Lt Ft	OP RR RR OP	VR-1	

VALVE NUMBER	P & ID	CI	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2PS9355B	M-68-1 M-140-1	2	A	.375	GL	A.O.	C	C	10.0	St Lt It Ft	OP RR RR OP	VR-1	
1/2PS9356A	M-68-1 M-140-1	2	A	.375	GL	A.O.	C	C	10.0	St Lt It Ft	OP RR RR OP	VR-1	
1/2PS9356B	M-68-1 M-140-1	2	A	.375	GL	A.O.	C	C	10.0	St Lt It Ft	OP RR RR OP	VR-1	
1/2PS9357A	M-68-1 M-140-1	2	A	.375	GL	A.O.	C	C	10.0	St Lt It Ft	OP RR RR OP	VR-1	
1/2PS9357B	M-68-1 M-140-1	2	A	.375	GL	A.O.	C	C	10.0	St Lt It Ft	OP RR RR OP	VR-1	

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2RC014A	M-60-1B M-135-1B	1	B	1.0	GL	S.O.	C	O C	2.0	St Ft It	CS FS RR	VR-12	Note 7 Note 7 Note 20
1/2RC014B	M-60-1B M-135-1B	1	B	1.0	GL	S.O.	C	O C	2.0	St Ft It	CS CS RR	VR-12	Note 7 Note 7 Note 20
1/2RC014C	M-60-1B M-135-1B	1	B	1.0	GL	S.O.	C	O C	2.0	St Ft It	CS CS RR	VR-12	Note 7 Note 7 Note 20
1/2RC014D	M-60-1B M-135-1B	1	B	1.0	GL	S.O.	C	O C	2.0	St Ft It	CS CS RR	VR-12	Note 7 Note 7 Note 20

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2RF1003	M-70-1 M-141-1	2	A	1.0		A.O.	C	C	10.0	St Lt Et Ft	OP RR RR OP	VR-1	
1/2RE9157	M-70-1 M-141-1	2	A	1.0			B	C	2.0	St Lt Et Lt	O* RR OP RR	VR-12 VR-1	
1/2RE9159A	M-70-1 M-141-1	2	A	.75	D	A.O.	B	C	2.0	St Lt Et Lt	OP RR OP RR	VR-12 VR-1	
1/2RE9159B	M-70-1 M-141-1	2	A	.75	D	A.O.	C	C	2.0	St Lt Et Ft	OP RR OP OP	VR-12 VR-1	
1/2RE9160A	M-70-1 M-141-1	2	A	1.0	D	A.O.	B	C	2.0	St Lt Et Lt	OP RR OP RR	VR-12 VR-1	
1/2RE9160B	M-70-1 M-141-1	2	A	1.0	D	A.O.	B	C	2.0	St Lt Et Lt	OP RR OP RR	VR-12 VR-1	
1/2RE9170	M-70-1 M-141-1	2	A	3.0	D	A.O.	B	C	10.0	St Lt Et Lt	OP RR OP RR	VR-1	

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2RF026	M-48-6	2	A	2.0	P	A.O.	O	C	35.0	It	RR	VR-1	
										St	OP		
										It	RR		
										Ft	OP		
1/2RF027	M-46-6	2	A	2.0	P	A.O.	O	C	35.0	It	RR	VR-1	
										St	OP		
										It	RR		
										Ft	OP		

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2RH8701A	M-62-1 M-137-1	1	A	12.0	GA	M.O.	C	B	120.0	St It Lt	CS RR RR		Note 5 Note 6
1/2RH8701B	M-62-1 M-137-1	1	A	12.0	GA	M.O.	C	B	120.0	St It Lt	CS RR RR		Note 5 Note 6
1/2RH8702A	M-62-1 M-137-1	1	A	12.0	GA	M.O.	C	B	120.0	St It Lt	CS RR RR		Note 5 Note 6
1/2RH8702B	M-62-1 M-137-1	1	A	12.0	GA	M.O.	C	B	120.0	St It Lt	CS RR RR		Note 5 Note 6
1/2RH8705A	M-62-1 M-137-1	2	AC	8.75	CK	S.A.	C	C	N/A	Lt	RR		Note 6 Passive
1/2RH8705B	M-62-1 M-137-1	2	AC	8.75	CK	S.A.	C	C	N/A	Lt	RR		Note 6 Passive
1/2RH8708A	M-62-1 M-137-1	2	C	1.0X1.0	RV	S.A.	C	B	N/A	Rt	RR		
1/2RH8708B	M-62-1 M-137-1	2	C	1.0X1.0	RV	S.A.	C	B	N/A	Rt	RR		
1/2RH8730A	M-62-1 M-137-1	2	C	8.0	CK	S.A.	C	B	N/A	Ct/Rt	CS/OP		Note 8
1/2RH8730B	M-62-1 M-137-1	2	C	8.0	CK	S.A.	C	B	N/A	Ct/Rt	CS/OP		Note 8

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2RY455A	M-60-5 M-135-5	1	B	3.0	PORV	A.O.	C	O	2.5	St Lt Lt	OP RR OP		
1/2RY456	M-60-5 M-135-5	1	B	3.0	PORV	A.O.	C	O	2.5	St Lt Lt	OP RR OP		
1/2RY8000A	M-60-5 M-135-5	1	a	3.0	GA	M.O.	O	C	10.0	St Lt	OP RR		
1/2RY8000B	M-60-5 M-135-5	1	b	3.0	GA	M.O.	O	C	10.0	St Lt	OP RR		
1/2RY8010A	M-60-5 M-135-5	1	C	6.0	SV	S.A.	C	O	N/A	Rt Lt	RR RR		
1/2RY8010B	M-60-5 M-135-5	1	C	6.0	SV	S.A.	C	O	N/A	Rt Lt	RR RR		
1/2RY8010C	M-60-5 M-135-5	1	C	6.0	SV	S.A.	C	O	N/A	Rt Lt	RR RR		
1/2RY8025	M-60-6 M-135-6	2	A	.375	GA	A.O.	C	C	10.0	St Lt Lt Lt	OP RR RR OP	VR-1	Passive
1/2RY8026	M-60-6 M-135-6	2	A	.375	GA	A.O.	O	C	10.0	Lt St Lt Lt	RR OP RR OP	VR-1	
1/2RY8028	M-60-6 M-135-6	2	A	3.0	B	A.O.	O	C	10.0	Lt St Lt Lt	RR OP RR OP	VR--	
1/2RY8033	M-60-6 M-135-6	2	A	.75	B	A.O.	O	C	2.9	Lt St Lt Lt	RR OP RR OP	VR-1 VR-12	

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIR.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2RY8046	M-60-6 M-135-6	2	AC	1.0	GA	S.A.	C	C	N/A	LT	RR	VR-1	Passive
1/2RY8047	M-60-6 M-135-6	2	AC	.75	GY	S.A.	C	C	N/A	LT	RR	VR-1	Passive

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2SA032	M-54-2	2	A	1.5	GA	A.O.	O	C	4.5	It	RR	VR-1	
										St	OP		
										It	RR		
										Ft	OP		
1/2SA033	M-54-2	2	A	1.5	GA	A.O.	O	C	4.5	It	RR	VR-1	
										St	OP		
										It	RR		
										Ft	OP		

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2SD002A	M-18-5A M-48-5B	2	A	2.0	GL	A.O.	O	C	7.5	Lt St It Ft	RR OP RR OP	VR-1	
1/2SD002B	M-48-5A M-48-5B	2	A	2.0	GL	A.O.	O	C	7.5	Lt St It Ft	RR OP RR OP	VR-1	
1/2SD002C	M-48-5A M-28-5B	2	A	2.0	GL	A.O.	O	C	7.5	Lt St It Ft	RR OP RR OP	VR-1	
1/2SD002D	M-48-5A M-28-5B	2	A	2.0	GL	A.O.	O	C	7.5	Lt St It Ft	RR OP RR OP	VR-1	
1/2SD002E	M-48-5A M-28-5B	2	A	2.0	GL	A.O.	O	C	7.5	Lt St It Ft	RR OP RR OP	VR-1	
1/2SD002F	M-48-5A M-28-5B	2	A	2.0	GL	A.O.	O	C	7.5	Lt St It Ft	RR OP RR OP	VR-1	
1/2SD002G	M-48-5A M-28-5B	2	A	2.0	GL	A.O.	O	C	7.5	Lt St It Ft	RR OP RR OP	VR-1	
1/2SD002H	M-48-5A M-28-5B	2	A	2.0	GL	A.O.	O	C	7.5	Lt St It Ft	RR OP RR OP	VR-1	

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2SI005A	M-48-5	2	A	.375	GL	A.O.	O	C	1.0	St	OP		
										Lt	RR	VR-1	
										It	RR		
										Ft	OP		
1/2SI005B	M-48-5	2	A	.375	GL	A.O.	O	C	1.0	St	OP		
										Lt	RR	VR-1	
										It	RR		
										Ft	OP		
1/2SI005C	M-48-5	2	A	.375	GL	A.O.	O	C	1.0	St	OP		
										Lt	RR	VR-1	
										It	RR		
										Ft	OP		
1/2SI005D	M-48-5	2	A	.375	GL	A.O.	O	C	1.0	St	OP		
										Lt	RR	VR-1	
										It	RR		
										Ft	OP		

COMMONWEALTH EDISON

INSERVICE TESTING PROGRAM

BRAIDWOOD NUCLEAR POWER STATION

REVISION 4

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2SI8801A	M-61-2 M-136-2	2	B	4.0	GA	M.O.	C	0	10.0	St It	CS RR		Note 11
1/2SI8801B	M-61-2 M-136-2	2	B	4.0	GA	M.O.	C	0	10.0	St It	CS RR		Note 11
1/2SI8802A	M-61-3 M-136-3	2	B	4.0	GA	M.O.	C	0	10.0	St It	CS RR		Note 14
1/2SI8802B	M-61-3 M-136-3	2	B	4.0	GA	M.O.	C	0	10.0	St It	CS RR		Note 14
1/2SI8804B	M-61-1 M-136-1	2	B	8.0	GA	M.O.	C	0	10.0	St It	OP RR		
1/2SI8806	M-61-1 M-136-1	2	B	8.0	GA	M.O.	0	C	15.0	St It	CS RR		Note 14
1/2SI8807A	M-61-1 M-136-1	2	B	6.0	GA	M.O.		0	15.0	St It	OP RR		
1/2SI8807B	M-61-1 M-136-1	2	B	6.0	GA	M.O.	C	0	15.0	St It	OP RR		
1/2SI8809A	M-61-4 M-136-4	2	B	8.0	GA	M.O.	0	C	10.0	St It	CS RR		Note 14
1/2SI8809B	M-61-4 M-136-4	2	B	8.0	GA	M.O.	0	C	10.0	St It	CS RR		Note 14
1/2SI8811A	M-61-4 M-136-4	2	B	24.0	GA	M.O.	C	0	100.0	St It	RR RR	VR-16	
1/2SI8811B	M-61-4 M-136-4	2	B	24.0	GA	M.O.	C	0	100.0	St It	RR RR	VR-16	
1/2SI8812A	M-61-4 M-136-4	2	B	12.0	GA	M.O.	0	C	15.0	St It	OP RR		
1/2SI8812B	M-61-4 M-136-4	2	B	12.0	GA	M.O.	0	C	15.0	St It	OP RR		
1/2SI8813	M-61-1 M-136-1	2	B	2.0	GL	M.O.	0	C	10.0	St It	CS RR		Note 14
1/2SI8814	M-61-1 M-136-1	2	B	1.5	GL	M.O.	0	C	10.0	St It	OP RR		

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2SI8815	M-61-2	1	AC	3.0	CK	S.A.	C	0	N/A	Ct	CS	VR-15	
	M-136-2									Lt	RR		Note 6
1/2SI8818A	M-61-4	1	AC	6.0	CK	S.A.	C	0	N/A	Ct	CS		Note 9
	M-136-4									Lt	RR		Note 6
1/2SI8818B	M-61-4	1	AC	6.0	CK	S.A.	C	0	N/A	Ct	CS		Note 9
	M-136-4									Lt	RR		Note 6
1/2SI8818C	M-61-4	1	AC	6.0	CK	S.A.	C	0	N/A	Ct	CS		Note 9
	M-136-4									Lt	RR		Note 6
1/2SI8818D	M-61-4	1	AC	6.0	CK	S.A.	C	0	N/A	Ct	CS		Note 9
	M-136-4									Lt	RR		Note 6
1/2SI8819A	M-61-3	1	AC	2.0	CK	S.A.	C	0	N/A	Lt	RR		Note 6
	M-136-3									Ct	RR	VR-15	
1/2SI8819B	M-61-3	1	AC	2.0	CK	S.A.	C	0	N/A	Lt	RR		Note 6
	M-136-3									Ct	RR	VR-15	
1/2SI8819C	M-61-3	1	AC	2.0	CK	S.A.	C	0	N/A	Lt	RR		Note 6
	M-136-3									Ct	RR	VR-15	
1/2SI8819D	M-61-3	1	AC	2.0	CK	S.A.	C	0	N/A	Lt	RR		Note 6
	M-136-3									Ct	RR	VR-15	
1/2SI8821A	M-61-3	2	B	4.0	GA	M.O.	0	C	15.0	St	OP		
	M-136-3									It	RR		
1/2SI8821B	M-61-3	2	B	4.0	GA	M.O.	0	C	10.0	St	OP		
	M-136-3									It	RR		
1/2SI8835	M-61-3	2	B	4.0	GA	M.O.	0	C	10.0	St	CS		Note 14
	M-136-3									It	RR		
1/2SI8840	M-61-3	2	B	12.0	GA	M.O.	C	O	35.0	St	CS		Note 14
	M-136-3									It	RR		
1/2SI8841A	M-61-3	1	AC	8.0	CK	S.A.	C	0	N/A	Lt	RR		Note 6
	M-136-3									Ct	CS	VR-15	
1/2SI8841B	M-61-3	1	AC	8.0	CK	S.A.	C	0	N/A	Lt	RR		Note 6
	M-136-3									Ct	CS	VR-15	

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2SI8871	M-61-6 M-136-6	2	A	.75	GL	A.O.	C	C	10.0	St Lt It Ft	OP RR RR OP	VR-1	Passive
1/2SI8880	M-61-6 M-136-6	2	A	1.0	GL	A.O.	C	C	10.0	St Lt It Ft	OP RR RR OP	VR-1	Passive
1/2SI8888	M-61-3 M-136-3	2	A	.75	GL	A.O.	C	C	10.0	St Lt It Ft	OP RR RR OP	VR-1	Passive
1/2SI8900A	M-61-2 M-136-2	1	AC	1.5	CK	S.A.	C	O	N/A	Ct Lt	CS RR	VR-15	Note 6
1/2SI8900B	M-61-2 M-136-2	1	AC	1.5	CK	S.A.	C	O	N/A	Ct Lt	CS RR	VR-15	Note 6
1/2SI8900C	M-61-2 M-136-2	1	AC	1.5	CK	S.A.	C	O	N/A	Ct Lt	CS RR	VR-15	Note 6
1/2SI8900D	M-61-2 M-136-2	1	AC	1.5	CK	S.A.	C	O	N/A	Ct Lt	CS RR	VR-15	Note 1
1/2SI8905A	M-61-3 M-136-3	1	AC	2.0	CK	S.A.	C	O	N/A	Ct Lt	RR RR	VR-15	Note 6
1/2SI8905B	M-61-3 M-136-3	1	AC	2.0	CK	S.A.	C	O	N/A	Ct Lt	RR RR	VR-15	Note 6
1/2SI8905C	M-61-3 M-136-3	1	AC	2.0	CK	S.A.	C	O	N/A	Ct Lt	RR RR	VR-15	Note 6
1/2SI8905D	M-61-3 M-136-3	1	AC	2.0	CK	S.A.	C	O	N/A	Ct Lt	RR RR	VR-15	Note 6
1/2SI8919A	M-61-1 M-136-1	2	C	1.5	CK	S.A.	C	O	N/A	Ct	OP		
1/2SI8919B	M-61-1 M-136-1	2	C	1.5	CK	S.A.	C	O	N/A	Ct	OP		

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2SI8920	M-61-1 M-136-1	2	B	1.5	GA	M.O.	O	C	10.0	St Lt	OP RR		
1/2SI8922A	M-61-1 M-136-1	2	C	4.0	CK	S.A.	C	O	N/A	Ct	RR	VR-1	
1/2SI8922B	M-61-1 M-136-1	2	C	4.0	CK	S.A.	C	O	N/A	Ct	RR	VR-1	
1/2SI8924	M-61-1 M-135-1	2	B	6.0	GA	M.O.	O	C	15.0	St Lt	OP RR		
1/2SI8926	M-61-1 M-136-1	2	C	8.0	CK	S.A.	C	O	N/A	Ct/Xt	RR/OP	VR-4	
1/2SI8948A	M-61-5 M-136-5	1	AC	10.0	CK	S.A.	C	O	N/A	Lt Ct	RR CS/RR	VR-5	Note 6
1/2SI8948B	M-61-5 M-136-5	1	AC	10.0	CK	S.A.	C	O	N/A	Lt Ct	RR CS/RR	VR-5	Note 6
1/2SI8948C	M-61-6 M-136-6	1	AC	10.0	CK	S.A.	C	O	N/A	Lt Ct	RR CS/RR	VR-5	Note 6
1/2SI8948D	M-61-6 M-136-6	1	AC	10.0	CK	S.A.	C	O	N/A	Lt Ct	RR CS/RR	VR-5	Note 6
1/2SI8949A	M-61-3 M-136-3	1	AC	6.0	CK	S.A.	C	O	N/A	Lt Ct	RR RR	VR-15	Note 6
1/2SI8949B	M-61-3 M-136-3	1	AC	6.0	CK	S.A.	C	O	N/A	Lt Ct	RR RR	VR-15	Note 6
1/2SI8949C	M-61-3 M-136-3	1	AC	6.0	CK	S.A.	C	O	N/A	Lt Ct	RR RR	VR-15	Note 6
1/2SI8949D	M-61-3 M-136-3	1	AC	6.0	CK	S.A.	C	O	N/A	Lt Ct	RR RR	VR-15	Note 6
1/2SI8956A	M-61-5 M-136-5	1	AC	10.0	CK	S.A.	C	O	N/A	Lt Ct	RR CS/RR	VR-5	Note 6
1/2SI8956B	M-61-5 M-136-5	1	AC	10.0	CK	S.A.	C	O	N/A	Lt Ct	RR CS/RR	VR-5	Note 6
1/2SI8956C	M-61-6 M-136-6	1	AC	10.0	CK	S.A.	C	O	N/A	Lt Ct	RR CS/RR	VR-5	Note 6

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIR'D	MAX STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2SI8956D	M-61-6 M-136-6	1	AC	10.0	GA	S.A.	C	O	N/A	Pt Ct	RR CS/KR	VR-5	Note 6
1/2SI8958A	M-61-4 M-136-4	2	C	12.0	CK	S.A.	C	O	N/A	Ct	CS		Note 9
1/2SI8958B	M-61-4 M-136-4	2	C	12.0	CK	S.A.	C	O	N/A	Ct	CS		Note 9
1/2SI8964	M-61-6 M-136-6	2	A	.75	GL	A.O.	C	C	10.0	St Ct Ir It	OP RR RR OP	VR-1	Passive
1/2SI8968	M-61-6 M-136-6	2	AC	1.0	CK	S.A.	C	C	N/A	It	RR	VR-1	Passive

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2SX002A	M-42-1B	3	C	36.0	CK	S.A.	C	0	N/A	Ex	OP		
1/2SX002B	M-42-1A	3	C	36.0	CK	S.A.	C	0	N/A	Ex	OP		
1/2SX016A	M-42-5B M-126-3	2	B	16.0	BTF	M.O.	O	O	15.0	St It	OP RR		Passive
1/2SX016B	M-42-5A M-126-3	2	B	16.0	BTF	M.O.	O	O	15.0	St It	OP RR		Passive
1/2SX027A	M-42-5B M-126-3	2	B	16.0	BTF	M.O.	O	O	15.0	St It	OP RR		Passive
1/2SX027B	M-42-5A M-126-3	2	B	16.0	BTF	M.O.	O	O	15.0	St It	OP RR		Passive
1/2SX101A	M-42-3 M-126-1	3	B	1.5	GL	S.O.	C	O	N/A	St Ft	OP OP	VR-17	
1/2SX112A	M-42-3 M-126-1	3	B	12.0	BTF	A.O.	O	C	6.0	St It Ft	OP RR OP		
1/2SX112B	M-42-3 M-126-1	3	B	12.0	BTF	A.O.	O	C	6.0	St It Ft	OP RR OP		
1/2SX114A	M-42-3 M-126-1	3	B	12.0	BTF	A.O.	O	C	6.0	St It Ft	OP RR OP		
1/2SX114B	M-42-3 M-126-1	3	B	12.0	BTF	A.O.	O	C	6.0	St It Ft	OP RR OP		

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2SX169A	M-42-3 M-126-.	3	B	10.0	BTF	A.O.	C	B	20.0	St Lt Ft	OP RR OP		
1/2SX169B	M-42-3 M-126-7	3	B	10.0	BTF	A.O.	C	B	20.0	St Lt Ft	OP RR OP		
1/2SX173	M-42-3 M-126-1	3	B	6.0	GA	A.O.	C	B	10.0	St Ft	OP OP		
1/2SX178	M-42-3 M-126-1	3	B	6.0	GA	A.O.	C	B	10.0	St Ft	OP OP		

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST FREQ.	RELIEF REQUEST	REMARKS
1/2VQ001A	M-105-1 M-106-1	2	A	48.0	BTF	M.O.	C	C	5.0	Lt St Lt	S CS RR	VR-1	Note 11 Passive
1/2VQ001B	M-105-1 M-106-1	2	A	48.0	BTF	M.O.	C	C	5.0	Lt St Lt	S CS RR	VR-1	Note 11 Passive
1/2VQ002A	M-105-1 M-106-1	2	A	48.0	BTF	M.O.	C	C	5.0	Lt St Lt	S CS RR	VR-1	Note 11 Passive
1/2VQ002B	M-105-1 M-106-1	2	A	48.0	BTF	M.O.	C	C	5.0	Lt St Lt	S CS RR	VR-1	Note 11 Passive
1/2VQ003	M-105-1 M-106-1	2	A	8.0	BTF	A.O.	C	C	5.0	Lt St Lt	OP OP RR	VR-1	Note 11 Passive
1/2VQ004A	M-105-1 M-106-1	2	A	8.0	BTF	A.O.	C	C	5.0	Lt St Lt	OP OP RR	VR-1	Note 11 Passive
1/2VQ004B	M-105-1 M-106-1	2	A	8.0	BTF	A.O.	C	C	5.0	Lt St Lt	OP OP RR	VR-1	Note 11 Passive
1/2VQ005A	M-105-1 M-106-1	2	A	8.0	BTF	A.O.	C	C	5.0	Lt St Lt	OP OP RR	VR-1	Note 11 Passive
1/2VQ005B	M-105-1 M-106-1	2	A	8.0	BTF	A.O.	C	C	5.0	Lt St Lt	OP OP RR	VR-1	Note 11 Passive
1/2VQ005C	M-105-1 M-106-1	2	A	8.0	BTF	A.O.	C	C	5.0	Lt St Lt	OP OP RR	VR-1	Note 11 Passive
1/2VQ016	M-105-3	2	A	.50	GL	M	C	C	N/A	Lt	RR	VR-1	Passive

INSERVICE TESTING PROGRAM

COMMONWEALTH EDISON

BRAIDWOOD NUCLEAR POWER STATION

ISION 4

PAGE 40 of 42

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQUEST	REMARKS
1/2VQ017	M-105-3	2	A	.50	GL	M	C	C	N/A	Lt	RR	VR-1	Passive
1/2VQ018	M-105-3	2	A	.50	GL	M	C	C	N/A	Lt	RR	VR-1	Passive
1/2VQ019	M-105-3	2	A	.50	GL	M	C	C	N/A	Lt	RR	VR-1	Passive

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	MAX. STROKE TIME (SEC.)	TEST METHOD	TEST FREQ.	RELIEF REQUEST	REMARKS
1/2WM190	M-49-1	2	A	2.0	GL	M	C	C	N/A	1t	RR	VR-1	Passive
1/2WM191	M-49-1	2	AC	2.0	CK	S.A.	C	C	N/A	1t	RR	VR-1	Passive

VALVE NUMBER	P & ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSIT.ON	STROKE DIRECT.	MAX.STROKE TIME (SEC.)	TEST METHOD	TEST MODE	RELIEF REQ'D ST	REMARKS
1/2W0006A	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	50.0	St Lt It	OP RR RR	VR-1	
1/2W0006B	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	50.0	St Lt It	OP RR RR	VR-1	
1/2W0007A	M-118-5 M-118-7	2	AC	10.0	CK	S.A.	C	C	N/A	Lt	RR	VR-1	Passive
1/2W0007B	M-118-5 M-118-7	2	AC	10.0	CK	S.A.	C	C	N/A	Lt	RR	VR-1	Passive
1/2W0070A	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	50.0	St Lt It	OP RR RR	VR-1	
1/2W0070B	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	50.0	St Lt It	OP RR RR	VR-1	
1/2W0056A	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	50.0	St Lt It	OP RR RR	VR-1	
1/2W0056B	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	50.0	St Lt It	OP RR RR	VR-1	