Commonwealth Edison
1400 Opus Place
Downers Grove, Illinois 60515

July 15, 1991

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

(e) May 23, 1991 T.K. Schuster letter to T.E. Murley

Dear Dr. Murley:

The Braidwood Station (IST) Programs for Pumps (Revision 5) and Valves (Revision 5) are enclosed with this letter and include changes based on the comments presented in the teleconference held on May 7, 1991. These revisions include changes presented in reference (e) for Byron Station as they apply to Braidwood Station.

Attachment A to this letter presents the differences or changes made between Revision 4 which had been submitted previously in reference (d) for Braidwood Station and Revision 5 as provided here. For ease of your review Revision 5 has been reformated to match the current Byron revisions. Attachments B and C are the actual pump and valve programs, respectively.

ZNLD/968/3

A047
1/1

Pump Program

As noted in previous submittals, the IST Pump Program for Braidwood consists of a tabular listing of those pumps which are identified in the Byron/Braidwood UFSAR 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 functions 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.

Valve Program

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

Please address any questions you may have regarding this matter to this office.

Very truly yours,

Allen R Checca

Allen R. Checca
Nuclear Licensing Administrator

cc: R.M. Pulsifer
Resident Inspector-Braidwood
W. Shafer- Region III

ZNLD/968/4

ATTACHMENT A

SUMMARY OF CHANGES

Summary of Changes to Revision 5
of the Inservice Testing Program
Plan for Pumps and Valves

Section 3.0 - Table of Contents

The format of the Braidwood Inservice Testing (IST) program for pumps has been changed to coincide with the Byron Station program.

1. Added a program reference section.
2. Changed note numbers to match Byron's.
3. Added a technical approach and position section.
4. Changed relief request numbers to match Byron's.
5. PR-02a is being submitted to exempt bearing temperature measurements from all pumps in the program.

Section 3.1 - Program Description

1. Expanded this section to incorporate Byron's additional information.

Section 3.2 - Program References

1. Added this section to list various references used to develop the IST program, including NRC SERs.

Section 3.3 - Pump Tables

A. Pump Table Description

1. Added a "T" character identifier to the "Code" field (for tracking purposes only).
2. Added a statement to the "Test Interval" description concerning testing when a pump is not required to be operable.
3. Added a "Remarks" field description.

B. Pump Tables

1. Added the AB pumps to the program for tracking purposes only. Pump Technical Approach and Position, PA-01 provides the explanation why these pumps will be tracked by the IST program.
2. Deleted the DO pumps from PR-03 because the permanently installed flow instruments will be used.
3. Changed PR-03 (rev. 4) to PR-05 (rev. 5) to match Byron's program.
4. Changed Note 2 to Note 3.
5. Changed Note 1 to Note 2.
6. Added type of driver to "pump name" column for the AF pumps.
7. Changed PR-04 to PR-06 to match Byron's program.
8. Changed PR-03 to PR-05 to match Byron's program.
9. Added "Pump" to the WO pump description.

217(070891)
ZD79G

Summary of Changes to Revision 5
of the Inservice Testing Program
Plan for Pumps and Valves

Section 3.4 - Pump Notes

1. This section was changed to reflect Byron's program numbering. Those notes which are not applicable to Braidwood's program are specifically identified.

   Note 5 - these pumps do not exist at Braidwood.
   Note 6 - pertains to Byron's modified unit two SX booster pump only.
   Note 7 - Braidwood elected to track the AB pumps per the IST program versus a separate program.

Section 3.5 - Pump Technical Approaches and Positions

1. Added this section to implement standard IST program format and practices as outlined in the CECo. "Conduct of ISI/IST Manual."
2. Added to describe how the AB pumps will be tested and tracked.

Section 3.6 - Pump Relief Requests

1. An approval status section/step (9) was added to all relief requests to track both revision and approval for ease of review.
2. PR-1 - the total number of pumps was changed.
3. PR-3 - changed to PR-5 to match Byron's program.
4. PR-4 - changed to PR-6 to match Byron's program.
5. PR-7 - does not apply; these pumps do not exist at Braidwood.
6. PR-02a - submitting this relief request to incorporate all pumps in the program. This is an industry wide change (from measuring temperature yearly to measuring vibration in velocity) and is acceptable to the NRC and ASME interested parties. Needs NRC approval.

Summary of Changes to Revision 5
of the Inservice Testing Program
Plan for Pumps and Valves

Section 4.0 - Table of Contents

The format of the Braidwood Inservice Testing (IST) program for valves has been changed to coincide with the Byron Station program.

1. Added a program reference section.
2. Changed note numbers to match Byron's.
3. Added a technical approach and position section.
4. Changed relief request numbers to match Byron's.

Section 4.1 - Program Description

1. Expanded this section to incorporate Byron's additional information. Specifically:

   a. Added status and requirements of the NRC approval on relief requests.
   b. Added paragraph describing scope of valve program.
   c. Added description of positions on stroke timing and check valve testing per Generic Letter 89-04.
   d. Added required action range response when data falls outside acceptable limits.
   e. Added description of when new stroke time reference values are required.

Section 4.2 - Program References

1. Added this section to list various references used in program development or that are pertinent to the program, including NRC SERs.

Section 4.3 - Valve Tables

A. Valve Table Description

1. Added a "T" character identifier to the "Code" field (for tracking purposes only).
2. Added field descriptions and columns for "Notes" and "Technical Approaches and Positions."
3. Added a "Remarks" field description.
4. Changed Ct description to CT/Bt to indicate the direction a check valve will be tested. Ct - for open direction and Bt - for closed direction.
5. Deleted the "maximum stroke time" and "system" fields.

B. Valve Tables

1. Added the AB pump discharge check valves to the program for tracking purposes only. Valve Technical Approach and Position, VA-5 provides the explanation why these valves will be tracked by the IST program.
2. Added new "Technical Approaches and Positions" and "Notes" columns.
3. Added VA-2 to all fail safe tested (Ft) valves.
4. Added VA-3 to all check valves and VA-1 to all power operated valves.

B. Valve Tables (continued)

5. 1/2AF001A/B - added Bt at RR per VR-19.
6. 1/2AF014A-H - added Bt at CS and Notes 12 and 30.
7. 1/2CC9437A - deleted passive from remarks and added an FT test.
8. 1/2CC9463A/B - added Ct/Bt at CS, Xt at OP and Note 32.
9. 0CC9464 - added Ct/Bt at CS, Xt at OP and Note 32.
10. 1/2CC9486 - added Bt at RR per VR-8.
11. 1/2CC9518 - added Bt at RR per VR-8 and Note 24, deleted passive from remarks.
12. 1/2CS008A/B - added Bt at RR per VR-4.
13. 1/2CV112B/C - added Note 28.
14. 1/2CV8113 - added Ct/Bt at RR per VR-9 and Note 29, deleted passive from remarks. 1/2CV8100 and 1/2CV8112 frequency changed to RR.
15. 1/2CV8442 - added Note 29.
16. 1/2CV8480A/B - added Bt at OP and Note 31.
17. 1/2CV8481A/B - added Bt at RR per VR-15.
18. 1/2CV8546 - changed Ct at CS to Ct at RR per VR-15 and added Note 26.
19. 1/2DO003A-D - added Bt at OP.
20. 1/2FP010 - corrected valve type to globe (GL).
21. 1/2FW034A-D - renumbered Note 18 to 21.
22. 1/2IA091 - added Bt at RR per VR-10, deleted passive from remarks.
23. 1/2PR002G/H - added Ft at RR per VR-23, deleted passive from remarks.
24. 1/2PR032 - added Bt at RR per VR-24, deleted passive from remarks.
25. 1/2PS228A/B - changed from globe to gate type valves.
26. 1/2PS229A/B - changed from globe to gate type valves.
27. 1/2PS230A/B - charged from 1" globe to 0.5" gate type valves per Mod M20-1-88-060.
28. 1/2PS231A/B - added Bt at RR per VR-25 and changed Note 21 to Note 22.
29. 1/2RE1003 - deleted VR-12.
30. 1/2RE9157 - deleted VR-12.
31. 1/2RE9159A/B - deleted VR-12.
32. 1/2RE9160A/B - deleted VR-12.
33. 1/2RH8705A/B - added Ct/Bt at RR per RV-15 and Notes 24 and 35.
34. 1/2RH8730A/B - added Bt at CS per Note 8.
35. 1/2RY455A - changed St at OP to St at RR per Note 36.
36. 1/2RY456 - changed St at OP to St at RR per Note 36.
37. 1/2RY8025 - deleted passive from remarks.
38. 1/2RY8046 - added Bt at RR per VR-26, deleted passive from remarks.
39. 1/2RY8047 - added Bt at RR per VR-26, deleted passive from remarks.
40. 1/2SD002A-H - deleted VR-1 and added Note 34.
41. 1/2SD005A-D - deleted VR-1 and added Note 34.
42. 1/2SI8815 - added Bt at RR per VR-15; changed Ct at CS to Ct at RR per VR-15.
43. 1/2SI8818A-D - added Bt at RR per VR-15 and Note 23.
44. 1/2SI8819A-D - added Bt at RR per VR-15 and Note 23.
45. 1/2SI8841A/B - added Bt at RR per VR-15; changed Ct at CS to Ct at RR per VR-15.

B. Valve Tables (continued)

46. 1/2SI8900A-B - added Bt at RR per VR-15; changed Ct at CS to Ct at RR per VR-15.
47. 1/2SI8905A-D - added Bt at RR per VR-15.
48. 1/2SI8919A/B - added Bt at OP.
49. 1/2SI8922A/B - added Bt at RR per VR-3.
50. 1/2SI8926 - added Note 25.
51. 1/2SI8948A/B - added Bt at RR per VR-5, deleted Ct at CS per VR-5; added Note 23 to the 1/2SI8948A/B valves.
52. 1/2SI8949A-D - added Bt at RR per VR-15.
53. 1/2SI8956A/B - added Bt at RR per VR-5, deleted Ct at CS per VR-5.
54. 1/2SI8958A/B - added Note 27.
55. 1/2SI8964 - deleted passive from remarks.
56. 1/2SI8968 - added Bt at RR per VR-18, deleted passive from remarks.
57. 1/2SX002A/B - added Bt at OP.
58. 1/2SX016A/B - deleted passive from remarks.
59. 1/2SX016A/B - deleted passive from remarks.
60. 1/2SX147A/B - added control valves to program per Byron's latest submittal.
61. 1/2VQ001A/B - deleted passive from remarks.
62. 1/2VQ002A/B - deleted passive from remarks.
63. 1/2VQ004A/B - deleted passive from remarks.
64. 1/2VQ005A/B/C - deleted passive from remarks.
65. 1/2WO007A/B - added Bt at RR per VR-27, deleted passive from remarks.

Section 4.4 - Valve Notes

1. This section was changed to reflect Byron's program numbering. Those notes which are not applicable to Braidwood's program are specifically identified.

2. Changed Note 18 to 21.
3. Changed Note 21 to 22.
4. Added Notes 23 through 36.

Section 4.5 - Valve Technical Approaches and Positions

1. Added this section to implement standard IST program format and practices as outlined in the CECo. "Conduct of ISI/IST Manual."
2. Added VA-1 through 4 to coincide with Byron's program.
3. Added VA-5 to describe how the AB pump discharge check valves will be tested and tracked.

Summary of Changes to Revision 5
of the Inservice Testing Program
Plan for Pumps and Valves

Section 4.6 - Valve Relief Requests

1. An approval status section/step (9) was added to all relief requests to track both revision and approval for ease of review.
2. VR-1 - Revised to document GL 89-04, Attachment 1, Item 10 concerning trending of CIVs sized six inches or greater. ASME Section XI IWV-3427(a) will not be utilized. Also, valves 1/2SD002A-H and 1/2SD005A-D were removed per Technical Specification Amendment #26. This relief request is in accordance with GL 89-04 requirements, and is pre-approved.
3. VR-2 - Provided additional information for the disassembly and inspection sample plan per GL 89-04. This revision incorporates the latest Byron discussions with NRR. This relief request is in accordance with GL 89-04 requirements, and is pre-approved.
   VR-3 - Added back flow test code (Bt) to section 4.
4. VR-4 - Provided additional information for the disassembly and inspection sample plan per GL 89-04. This revision incorporates the latest Byron discussions with NRR. This relief request is in accordance with GL 89-04 requirements, and is pre-approved.
5. VR-5 - Added additional information regarding acoustic testing of these valves and provided justification for performing the Ct test during refueling only. The refueling frequency needs NRC review and approval.
6. VR-8 Added valves 1/2CC9518 and 1/2CC9534 with supporting information. These additions need NRC review and approval.
7. VR-9 - Added valves 1/2CV8113 with supporting information. These additions need NRC review and approval.
8. VR-10 - Added valves 1/2IA091 with supporting information. These additions need NRC review and approval.
9. VR-12 - Removed the RE system valves from this relief per system engineers request. NRC approval is not required.
10. VR-15 - Added valves 1/2RH8705A, B and 1/2SI8818A-D with supporting justification. In addition, the Ct testing of all these valves is requested to be done on a refueling basis only; additional justification has been provided. These additions need NRC review and approval.
11. VR-17 - Additional information and justification was added to incorporate Byron's SER items.
12. VR-18 - This relief differs from Byron's program in that each valve has been separated into various other requests for relief. VR-18, VR-23 through VR-27 resulted from this break up. Each of these relief requests need NRC review and approval. VR-18 was never submitted for Braidwood's program due to delays in receiving the program SER from the NRC.
13. VR-19 - This is a new relief request for the 1/2AF001A, B valves. This relief incorporates the latest Byron/NRR comments. This relief request is in accordance with GL 89-04 requirements, and is pre-approved.
14. VR-20 through VR-22 - not used at Braidwood Station.

ATTACHMENT B

INSERVICE TESTING PROGRAM

PLAN FOR PUMPS

SECTION 3.0

INSERVICE TESTING

PROGRAM PLAN FOR PUMPS

BRAIDWOOD STATION UNITS 1 AND 2

TABLE OF CONTENTS

SECTION 3.1

PROGRAM DESCRIPTION

PROGRAM DESCRIPTION

The Pump Inservice Testing (IST) Program Plan for Braidwood Nuclear Power Station Units 1 and 2, is implemented in accordance with the requirements of Subsection IWP of Section XI of the ASME Boiler and Pressure Vessel Code, 1983 Edition, through the Summer of 1983 Addenda. 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 IST testing are those pumps which are identified in accordance with the scope of ASME Section XI, subsection IWP-1100: "IWP-1100 SCOPE... This Subsection provides the rules and requirements for inservice testing of Class 1, 2, and 3 centrifugal and displacement type pumps that are installed in light-water cooled nuclear power plants, that are required to bring and maintain the plant in cold shutdown condition or mitigates the consequences of an accident, and that are provided with an emergency power source. The results of these tests are to be used in assessing operational readiness of the pumps during their service life."

The only exceptions are the diesel driven auxiliary feedwater pumps (1AF01PB and 2AF01PB), which are not supplied by an emergency power source. The diesel oil transfer pumps (1/2 DO01PA, 1/2DO01PB, 1/2DO01PC and 1/2DO01PD) are classified non-ASME Class G.

Pump reference values shall be determined from the results of a pre-service test, which may be run during pre-operational 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:

1. After a pump has been replaced,

2. When a reference value or set of values may have been affected by repair or routine servicing of a pump, or

3. If it is necessary or desirable for some other reason than 1 or 2 above.

Per NRC Generic Letter 89-04, Attachment 1, Position #8, whenever pump data is determined to be within the Required Action Range, the pump is inoperable, and the Technical Specification LCO Action statement time starts.

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.

SECTION 3.2

PROGRAM REFERENCES

PROGRAM REFERENCES

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

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

3. ASME/ANSI OM-1987, Operation and Maintenance of Nuclear Power Plants, including 1989 Addenda, Part 6, Inservice Testing of Pumps in Light Water Reactor Power Plants.

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

5. Braidwood Station UFSAR, Section 3.9.6.1, Inservice Testing of Pumps.

6. Braidwood Station Technical Specification, 4.0.5, ASME XI Program Requirements.

7. Braidwood Station Technical Staff Procedure, BwVP 200-1, ISI Requirements for Pumps.

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

SECTION 3.3

PUMP TABLES

PUMP 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 (1, 2, 3, N for non-Code, and T for tracking purposes only), and the system P & ID for the pump listed.

Speed: Speed will be measured by a tachometer 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. Also, refer to relief request PR-05.

Vibration: Vibration measurement shall be made using portable or hand held instruments at locations marked on the pumps, relief request PR-01.

Bearing Temperature: Bearing temperature is not measured per PR-02.

Test Interval: An inservice test shall be run on each pump nominally every 3 months during normal plant operation, in accordance with IWP-3400, except during periods when the pump is not required to be operable.

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

Remarks: Any applicable note(s) are referenced here.

Revision Number: The current revision of the program is listed.

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

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			
0AB03P	Boric Acid Transfer Pump	T	M-65	No	No	PA-1	PA-1	PA-1	PA-1	Quarterly	Yes	
1AB03P	Boric Acid Transfer Pump	T	M-65	No	No	PA-1	PA-1	PA-1	PA-1	Quarterly	Yes	
2AB03P	Boric Acid Transfer Pump	T	M-65	No	No	PA-1	PA-1	PA-1	PA-1	Quarterly	Yes	
1AF01PA	Auxiliary Feedwater Pump (Motor)	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 (Motor)	3	M-122	No	Yes	Yes	Yes	PR-1	Yes	Quarterly	Yes	
2AF01PB	Auxiliary Feedwater Pump (Diesel)	3	M-122	Yes	Yes	Yes	Yes	PR-1	Yes	Quarterly	Yes	
0CC01P	Component Cooling Pump	3	M-66	No	Yes	Yes	PR-5	PR-1	PR-2	Quarterly	Yes	Note 3
1CC01PA	Component Cooling Pump	3	M-66	No	Yes	Yes	PR-5	PR-1	PR-2	Quarterly	Yes	Note 3
1CC01PB	Component Cooling Pump	3	M-66	No	Yes	Yes	PR-5	PR-1	PR-2	Quarterly	Yes	Note 3
2CC01PA	Component Cooling Pump	3	M-66	No	Yes	Yes	PR-5	PR-1	PR-2	Quarterly	Yes	Note 3

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			
2CC01PB	Component Cooling Pump	3	M-66	No	Yes	Yes	PR-5	PR-1	PR-2	Quarterly	Yes	Note 3
1CS01PA	Containment Spray Pump	2	M-46	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 2
1CS01PB	Containment Spray Pump	2	M-46	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 2
2CS01PA	Containment Spray Pump	2	M-129	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 2
2CS01PB	Containment Spray Pump	2	M-129	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 2
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-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2

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			
1DO01PB	Diesel Oil Transfer Pump	3	M-50	No	Yes	PR-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2
1DO01PC	Diesel Oil Transfer Pump	3	M-50	No	Yes	PR-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2
1DO01PD	Diesel Oil Transfer Pump	3	M-50	No	Yes	PR-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2
2DO01PA	Diesel Oil Transfer Pump	3	M-130	No	Yes	PR-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2
2DO01PB	Diesel Oil Transfer Pump	3	M-130	No	Yes	PR-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2
2DO01PC	Diesel Oil Transfer Pump	3	M-130	No	Yes	PR-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2
2DO01PD	Diesel Oil Transfer Pump	3	M-130	No	Yes	PR-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2
1RH01PA	Residual Heat Removal Pump	2	M-62	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 2
1RH01PB	Residual Heat Removal Pump	2	M-62	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 2
2RH01PA	Residual Heat Removal Pump	2	M-137	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 2
2RH01PB	Residual Heat Removal Pump	2	M-137	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 2

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			
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	
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-5	PR-1	Yes	Quarterly	Yes	Note 3
1SX01PB	Essential Service Water Pump	3	M-42	No	Yes	Yes	PR-5	PR-1	Yes	Quarterly	Yes	Note 3
2SX01PA	Essential Service Water Pump	3	M-42	No	Yes	Yes	PR-5	PR-1	Yes	Quarterly	Yes	Note 3
2SX01PB	Essential Service Water Pump	3	M-42	No	Yes	Yes	PR-5	PR-1	Yes	Quarterly	Yes	Note 3
0WO01PA	Control Room Chilled Water Pump	3	M-118	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	Yes	Note 3
0WO01PB	Control Room Chilled Water Pump	3	M-118	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	Yes	Note 3

SECTION 3.4

PUMP NOTES

PUMP NOTES

NOTE 1

-Deleted-

NOTE 2

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 3

The Component Cooling Water pumps (0CC01P, 1CC01PA/B and 2CC01PA/B), Essential Service Water Pumps (1SX01PA/B and 2SX01PA/B), and the Control Room Chilled Water Pumps (0WO01PA/B) are in systems which are in continuous operation. The idle irlet 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 4

-Deleted-

NOTE 5

Not Used at Braidwood - Byron ONLY

NOTE 6

Not Used at Braidwood - Byron ONLY

NOTE 7

Not Used at Braidwood - Byron NLY

SECTION 3.5

PUMP TECHNICAL APPROACHES AND POSITIONS

IST Technical Approach and Position
No. PA-01

A. Component Identification:

1. Description: Performance Testing of the Boric Acid (AB) Transfer Pumps

2. Component Numbers: 0AB03P, 1/2AB03P

3. References: (a) Engineering Correspondence (CHRON #161733) dated January 17, 1991

4. Code Class: 3/T (Tracking purposes ONLY))

B. Requirements:

The ASME Section XI Code requires safety related pumps performing a specific function in shutting down the reactor or in mitigating the consequences of an accident, and that are provided with an emergency power supply be included in the inservice testing program (IST). However, the AB pumps do not have an "emergency" power supply, so consequently, they are not required to be included in the program. Braidwood was licensed as a "hot shutdown" plant. This means it was only required to be capable of hot shutdown using non-safety related systems or repair to postulated damaged equipment. For this reason the electrical support for the emergency boration function is Safety Category II. Also, the RWST (Refueling Water Storage Tank) is a seismic Category I structure as described in the UFSAR Table 3.2-1 and is designed to withstand design basis accidents, including tornados. The RWST is required for ECCS (Emergency Core Cooling Systems) operation.

The AB pumps are tested per the Technical Specification requirement that requires an 18 month flow verification of 30 gpm to the RCS. Also, the AB pumps are monitored per the station's vibration monitoring program requirements.

C. Position:

The AB pumps fall outside the scope of the ASME Section XI and the IST program. However, because of the operating significance of these pumps, and based on correspondence and discussions with NRR and CECo Engineering, Braidwood Station has decided to list the AB pumps in the program for tracking purposes only. They will be tested in a like fashion to the ASME Section XI program. The hydraulic limits used will be similar to those specified in ASME/ANSI OMa-1988, Part 6. Meaning that the differential pressure limits will be plus or minus 10 percent of its reference value (flow rate will be a set value). There will be no alert limits placed on differential pressure. The AB pumps will be trended to monitor for degradation or abnormal/erratic operation. Also, the vibration readings and limits will be similar to those in ASME/ANSI OMa-1988, Part 6.

SECTION 3.6

PUMP RELIEF REQUESTS

RELIEF REQUEST NO. PR-01

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

2. NUMBER OF ITEMS: 42 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 goes undetected by simple displacement measurements.

The allowable ranges of vibration and their associated action levels will be patterned after the requirements established in ANSI/ASME OMa-1988, Part 6. These ranges will be used in whole to assess equipment operational readiness for all components.

The acceptable performance range for all components will be $\leq$ 2.5 times the reference value, not to exceed .325 inches per secord. 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.

RELIEF REQUEST NO. PR-01

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:

Measurements of vibration in mils displacement are not sensitive to small changes that are indicative of developing mechanical problems. Therefore, the proposed alternate method of measuring vibration amplitude in inches/second provides added assurance of the continued operability of the pumps. Also, there are no positive displacement pumps or centrifugal pumps which rotate at less than 600 RPM in Braidwood's IST program.

8. APPLICABLE TIME PERIOD:

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

9. APPROVAL STATUS:

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

RELIEF REQUEST NO. PR-02

1. PUMP NUMBER: 0CC01P, 1CC01PA, 1CC01PB, 2CC01PA, 2CC01PB, 1CS01PA, 1CS01PB, 2CS01PA, 2CS01PB, 1DO01PA, 1DO01PB, 1DO01PC, 1DO01PD, 2DO01PA, 2DO01PB, 2DO01PC, 2DO01PD, 1RH01PA, 1RH01PB, 2RH01PA, 2RH01PB, 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 pump 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 positive information on bearing condition or degradation. For example, the bearings on the Diesel Oil Transfer Pumps (1DO01PA-D and 2DO01PA-D) are cooled by the pumped fluid. 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-01), 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.

9. APPROVAL STATUS:

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

RELIEF REQUEST NO. PR-02a

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

2. NUMBER OF ITEMS: 42 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. The CC, CS, DO, RH, SX and WO pump bearings are not provided with permanent temperature detectors or thermal wells. Therefore, gathering data on bearing temperature is impractical. The only temperature measurements possible are from the bearing housing. Measurement of housing temperature on these pumps does not provide positive information on bearing condition or degradation.

b. Even those cases where bearing temperature monitoring equipment is available, bearing temperature measurements will not provide significant additional information regarding bearing condition other than that already obtained by measuring vibration. Measurement of vibration provides more concise and consistent information with respect to pump and bearing condition. The usage of vibration measurements can provide information as to a change in the balance of rotating parts, misalignment of bearings, worn bearings, changes in internal hydraulic forces and general pump integrity prior to the condition degrading to the point where the component is jeopardized. Bearing temperature does not always predict such problems.

c. An increase in bearing temperature most often does not occur until the bearing has deteriorated to a point where additional pump damage may occur. Bearing temperatures are also affected by the temperature of the medium being pumped, thus the hydraulic and vibration readings are more consistent. Also, the Code specifically exempts temperature measurement for pump bearings in the main flow path (i.e., the diesel oil transfer pumps).

RELIEF REQUEST NO. PR-02a

6. ALTERNATE TESTING:

Quarterly measurement of hydraulic parameters and vibration readings 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-01), 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.

9. APPROVAL STATUS:

This relief is a proposed change to the approved PR-02 and is NOT approved for use. Formal written approval from the NRC is required prior to use. Expedited review and approval is requested.

RELIEF REQUEST NO. PR-Q.

-Deleted-

RELIEF REQUEST NO. PR-04

-Deleted-

RELIEF REQUEST NO. PR-05

1. PUMP NUMBER: 0CC01P, 1CC01PA, 1CC01PB, 2CC01PA, 2CC01PB, 1SX01PA, 1SX01PB, 2SX01PA, 2SX01PB

2. NUMBER OF ITEMS: 9 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 three times the reference value or less. The following examples will illustrate this point. The component cooling pumps (0CC01P, 1/2CC01PA, and 1/2CC01PB) 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 ± 4% of the indicated reading, provides an instrument accuracy of ± 180 gpm.(.04 x 4500 gpm).

   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.

9. APPROVAL STATUS:

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

RELIEF REQUEST NO. PR-06

1. PUMP NUMBER: 1DO01PA, 1DO01PB, 1DO01PC, 1DO01PD,
   2DO01PA, 2DO01PB, 2DO01PC, 2DO01PD,

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.

9. APPROVAL STATUS:

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

RELIEF REQUEST NO. PR-07

Not Used at Braidwood - Byron ONLY

ATTACHMENT C

INSERVICE TESTING PROGRAM PLAN

FOR VALVES

SECTION 4.0

INSERVICE TESTING

PROGRAM PLAN FOR VALVES

BRAIDWOOD STATION UNITS 1 AND 2

TABLE OF CONTENTS

TABLE OF CONTENTS

SECTION 4.1

PROGRAM DESCRIPTION

PROGRAM DESCRIPTION

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

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

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

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

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

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

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

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

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

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

SECTION 4.2

PROGRAM REFERENCES

PROGRAM REFERENCES

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

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

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

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

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

6. Braidwood Station Technical Specification 4.0.5, ASME XI Program Requirements.

7. Braidwood Station Technical Staff Procedures, BVP 200-2, 200-3, & 200-4, IST Requirements for Valves.

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

SECTION 4.3

VALVE TABLES

TABLE DESCRIPTION

The following information is included in the valve summary tables:

A. REVISION:

The revision corresponds to the current revision of the program.

B. PAGE:

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

C. VALVE NUMBER:

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

D. P&ID:

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

E. CLASS:

This column refers to the ASME Code Class assigned to the specific valve (1, 2, 3, N for non-Code, and T for tracking purposes only).

F. VALVE CATEGORY:

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

G. VALVE SIZE:

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

TABLE DESCRIPTION

H. VALVE TYPE:

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

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

I. ACT. TYPE:

The actuator type identifies the valve actuator. The 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.

J. NORMAL POSITION:

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

K. STROKE DIRECTION:

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

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

TABLE DESCRIPTION

L. TEST METHOD:

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

1. (Bt) Check Valve Back Flow Test

   The check valve disc will be exercised to the closed position required to fulfill its safety function by verifying that the disc travels to the seat promptly on cessation or reversal of flow, except for those valves that can only be back flow tested by means of a seat leakage test.

2. (Ct) Check Valve Full Stroke Test

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

3. (Ft) Fail Safe Test

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

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

4. (It) Position Indication Check

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

5. (Lt) Seat Leakage Test

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

TABLE DESCRIPTION

6. (Rt) Safety Valve Setpoint Check

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

7. (St) Full Stroke Test

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

8. (Xt) Partial-Stroke Test

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

M. TEST MODE:

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

Normal Operation (OP)

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

Semiannual (S)

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

Cold Shutdown (CS)

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

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

Reactor Refueling (RR)

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

TABLE DESCRIPTION

N. RELIEF REQUEST:

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

O. NOTES:

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

P. TECHNICAL APPROACHES AND POSITIONS:

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

Q. REMARKS:

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

INSERVICE TESTING PROGRAM PLAN
CLASS 1, 2, 3, and AUGMENTED VALVES
BRAIDWOOD NUCLEAR POWER STATION
UNITS 0, 1, & 2
Revision 5

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
0AB8473	M-65-5A	T	C	2.0	CK	S.A.	C	O	Ct	OP			5	
1/2AB8487	M-65-5A	T	C	2.0	CK	S.A.	C	O	Ct	OP			5	

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

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

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

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

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

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

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

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
1/2DG5182A	M-54-4	NONE	B	3.0	GA	S.O.	C	O	St	OP	VR-13			
1/2DG5182B	M-152-20	NONE	B	3.0	GA	S.O.	C	O	St	OP	VR-13			
1/2DG5183A	M-54-4	NONE	B	3.0	GA	S.O.	C	O	St	OP	VR-13			
1/2DG5183B	M-54-4	NONE	B	3.0	GA	S.O.	C	O	St	OP	VR-13			
1/2DG5184A	M-152-20	NONE	C	3.0	CK	S.A.	C	O	Ct	OP	VR-13		3	
1/2DG5184B	M-152-20	NONE	C	3.0	CK	S.A.	C	O	Ct	OP	VR-13		3	
1/2DG5185A	M-152-20	NONE	C	3.0	CK	S.A.	C	O	Ct	OP	VR-13		3	
1/2DG5185B	M-152-20	NONE	C	3.0	CK	S.A.	C	O	Ct	OP	VR-13		3	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
1/2D0003A	M-50-1B M-130-1A	3	C	1.5	CK	S.A.	C	O C	Ct Bt	OP OP			3 3	
1/2D0003B	M-50-1A M-130-1B	3	C	1 5	CK	S.A.	C	O C	Ct Bt	OP OP			3 3	
1/2D0003C	M-50-1B M-130-1A	3	C	1.5	CK	S.A.	C	O C	Ct Bt	OP OP			3 3	
1/2D0003D	M-50-1A M-130-1B	3	C	1.5	CK	S.A.	C	O C	Ct Bt	OP OP			3 3	

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

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
1/2FP010	M-52-1	2	C	4.0	GL	A.O.	O	C	St It FT	OP RR OP			1 2	

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

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

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

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
1/2IA065	M-55-10	2	A	3.0	GL	A.O	O	C	Lt	RR	VR-1			
	M-55-15								St	RR	VR-10		1	
									Ft	RR	VR-10		2	
									It	RR				
1/2IA066	M-55-10	2	A	3.0	GL	A.O.	O	C	Lt	RR	VR-1			
	M-55-15								St	RR	VR-10		1	
									Ft	RR	VR-10		2	
									It	RR				
1/2IA091	M-55-10	2	AC	0.75	CK	S.A.	C	C	Lt/Bt	RR	VR-1, 10		3	
	M-55-15													

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

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

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
1/2MS101B	M-35-1 M-120-1	2	B	4.0	GA	A.O.	C	C	St It Ft	OP RR OP			1 2	
1/2MS101C	M-35-2 M-120-2B	2	B	4.0	GA	A.O.	C	C	St It Ft	OP RR OP			1 2	
1/2MS101D	M-35-1 M-120-1	2	B	4.0	GA	A.O.	C	C	St It Ft	OP RR OP			1 2	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
1/2OG057A	M-47-2	2	A	3.0	BTF	M.O.	C	C	Lt	RR	VR-1			
	M-150-2								St	OP			1	
									It	RR				
1/2OG079	M-47-2	2	A	3.0	BTF	M.O.	C	C	Lt	RR	VR-1			
	M-150-2								St	OP			1	
									It	RR				
1/2OG080	M-47-2	2	A	3.0	BTF	M.O.	C	C	Lt	RR	VR-1			
	M-150-2								St	OP			1	
									It	RR				
1/2OG081	M-47-2	2	A	3.0	BTF	M.O.	C	C	Lt	RR	VR-1			
	M-150-2								St	OP			1	
									It	RR				
1/2OG082	M-47-2	2	A	3.0	BTF	M.O.	C	C	Lt	RR	VR-1			
	M-150-2								St	OP			1	
									It	RR				
1/2OG083	M-47-2	2	A	3.0	BTF	M.O.	C	C	Lt	RR	VR-1			
	M-150-2								St	OP			1	
									It	RR				
1/2OG084	M-47-2	2	A	3.0	BTF	M.O.	C	C	Lt	RR	VR-1			
	M-150-2								St	OP			1	
									It	RR				
1/2OG085	M-47-2	2	A	3.0	BTF	M.O.	C	C	Lt	RR	VR-1			
	M-150-2								St	OP			1	
									It	RR				

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
1/2PR001A	M-78-10 M-151-1	2	A	1.0	GL	A.O.	O	C	Lt Ft St It	RR OP OP RR	VR-1		 2 1	
1/2PR001B	M-78-10 M-151-1	2	A	1.0	GL	A.O.	O	C	Lt Ft St It	RR OP OP RR	VR-1		 2 1	
1/2PR002E	M-78-6	2	A	2.0	GL	M	C	C	Lt	RR	VR-1			Passive
1/2PR002F	M-78-6	2	A	2.0	GL	M	C	C	Lt	RR	VR-1			Passive
1/2PR002G	M-78-6	2	AC	2.0	CK	S.A.	C	C	Lt/Bt	RR	VR-1, 23		3	
1/2PR002H	M-78-6	2	AC	2.0	CK	S.A.	C	C	Lt/Bt	RR	VR-1, 23		3	
1/2PR032	M-78-10 M-151-1	2	AC	1.0	CK	S.A	C	C	Lt/Bt	RR	VR-1, 24		3	
1/2PR033A	M-78-6	2	A	2.0	GL	M	C	C	Lt	RR	VR-1			Passive
1/2PR033B	M-78-6	2	A	2.0	GL	M	C	C	Lt	RR	VR-1			Passive
1/2PR033C	M-78-6	2	A	2.0	GL	M	C	C	Lt	RR	VR-1			Passive
1/2PR033D	M-78-6	2	A	2.0	GL	M	C	C	Lt	RR	VR-1			Passive
1/2PR066	M-78-10 M-151-1	2	A	1.0	GL	A.O	O	C	Lt Ft It St	RR OP RR OP	VR-1		 2 1	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
1/2PS228A	M-68-7 M-140-6	2	A	0.50	GA	S.O.	O	C	Lt St Ft It	RR OP OP RR	VR-1 VR-12	 20	 1 2 	
1/2PS228B	M-68-7 M-140-6	2	A	0.50	GA	S.O.	O	C	Lt St Ft It	RR OP OP RR	VR-1 VR-12	 20	 1 2 	
1/2PS229A	M-68-7 M-140-	2	A	0.50	GA	S.O.	O	C	Lt St Ft It	RR OP OP RR	VR-1 VR-12	 20	 1 2 	
1/2PS229B	M-68-7 M-140-6	2	A	0.50	GA	S.O.	O	C	Lt St Ft It	RR OP OP RP	VR-1 VR-12	 20	 1 2 	
1/2PS230A	M-68-7 M-140-6	2	A	0.50	GA	S.O.	C	C	Lt St Ft It	RR OP OP RP	VR-1 VR-12	 20	 1 2 	
1/2PS230B	M-68-7 M-140-6	2	A	0.50	GA	S.O.	C	C	Lt St Ft It	RR OP OP RR	VR-1 VR-12	 20	 1 2 	
1/2PS231A	M-68-7 M-140-6	2	A	0.75	CK	S.A.	C	C O	Lt/Bt Ct	RR OP	VR-1, 25	 22	3 3	
1/2PS231B	M-68-7 M-140-6	2	A	0.75	CK	S.A.	C	C O	Lt/Bt Ct	RR OP	VR-1, 25	 22	3 3	
1/2PS9354A	M-68-1B M-140-1	2	A	0.375	GL	A.O.	C	C	St Lt It Ft	OP RR RR OP	VR-1	 	1 2	

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

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

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

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

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
1/2RH8701A	M-62 M-137	1	A	12.0	GA	M.O.	C	O	St It Lt	CS RR RR		5 6	1	
1/2RH8701B	M-62 M-137	1	A	12.0	GA	M.O.	C	O	St It Lt	CS RR RR		5 6	1	
1/2RH8702A	M-62 M-137	1	A	12.0	GA	M.O.	C	O	St It Lt	CS RR RR		5 6	1	
1/2RH8702B	M-62 M-137	1	A	12.0	GA	M.O.	C	O	St It Lt	CS RR RR		5 6	1	
1/2RH8705A	M-62 M-137	2	AC	0.75	CK	S.A.	C O	C O	Lt/Bt Ct	RR RR	VR-15 VR-15	6 24,35	3 3	
1/2RH8705B	M-62 M-137	2	AC	0.75	CK	S.A.	C O	C O	Lt/Bt Ct	RR RR	VR-15 VR-15	6 24,35	3 3	
1/2RH8708A	M-62 M-137	2	C	3.0 x 4.0	RV	S.A	C	O	Rt	RR				
1/2RH8708B	M-62 M-137	2	C	3.0 x 4.0	RV	S.A.	C	O	Rt	RR				
1/2RH8730A	M-62 M-137	2	C	8.0	CK	S.A.	C	O C	Ct/Xt Bt	CS/OP CS		8	3 3	
1/2RH8730B	M-62 M-137	2	C	8.0	CK	S.A.	C	O C	Ct/Xt Bt	CS/OP CS		8	3 3	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
1/2RY455A	M-60-5 M-135-5	1	B	3.0	PORV	A.O.	C	O	St It Ft	CS RR CS		36	1 2	
1/2RY456	M-60-5 M-135-5	1	B	3.0	PORV	A.O.	C	O	St It Ft	CS RR CS		36	1 2	
1/2RY8000A	M-60-5 M-135-5	1	B	3.0	GA	M.O.	O	C	St It	OP RR			1	
1/2RY8000B	M-60-5 M-135-5	1	B	3.0	GA	M.O.	O	C	St It	OP RR			1	
1/2RY8010A	M-60-5 M-135-5	1	C	6.0	SV	S.A	C	O	Rt It	RR RR				
1/2RY8010B	M-60-5 M-135-5	1	C	6.0	SV	S.A.	C	O	Rt It	RR RR				
1/2RY8010C	M-60-5 M-135-5	1	C	6.0	SV	S.A.	C	O	Rt It	RR RR				
1/2RY8025	M-60-6 M-135-6	2	A	0.375	GL	A.O.	C	C	St Lt It Ft	OP RR RR OP	VR-1		1 2	
1/2RY8026	M-60-6 M-135-6	2	A	0.375	GL	A.O.	O	C	Lt St It Ft	RR OP RR OP	VR-1		 1 2	
1/2RY8028	M-60-6 M-135-6	2	A	3.0	D	A.O.	O	C	Lt St It Ft	RR OP RR OP	VR-1		 1 2	
1/2RY8033	M-60-6 M-135-6	2	A	0.75	D	A.O.	O	C	Lt St It Ft	RR OP RR OP	VR-1 VR-12		 1 2	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
1/2RY8046	M-60-6 M-135-6	2	AC	3.0	CK	S.A	C	C	Lt/Bt	RR	VR-1, 26		3 3	
1/2RY8047	M-60-6 M-135-6	2	AC	0.75	CK	S.A.	C	C	Lt/Bt	RR	VR-1, 26		3 3	

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

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

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

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
1/2SI8801A	M-61-2 M-136-2	2	B	4.0	GA	M.O.	C	0	St It	CS RR		13	1	
1/2SI8801B	M-61-2 M-136-2	2	B	4.0	GA	M.O.	C	0	St It	CS RR		13	1	
1/2SI8802A	M-61-3 M-136-3	2	B	4.0	GA	M.O.	C	0	St It	CS RR		14	1	
1/2SI8802B	M-61-3 M-136-3	2	B	4.0	GA	M.O.	C	0	St It	CS RR		14	1	
1/2SI8804B	M-61-1A M-136-1	2	B	8.0	GA	M.O.	C	0	St It	OP RR			1	
1/2SI8806	M-61-1A M-136-1	2	B	8.0	GA	M.O	0	0	St It	CS RR		14	1	
1/2SI8807A	M-61-1A M-136-1	2	B	6.0	GA	M.O.	C	0	St It	OP RR			1	
1/2SI8807B	M-61-1A M-136-1	2	B	6.0	GA	M.O.	C	0	St It	OP RR			1	
1/2SI8809A	M-61-4 M-136-4	2	B	8.0	GA	M.O.	0	C	St It	CS RR		14	1	
1/2SI8809B	M-61-4 M-136-4	2	B	8.0	GA	M.O.	0	C	St It	CS RR		14	1	
1/2SI8811A	M-61-4 M-136-4	2	B	24.0	GA	M.O.	C	0	St It	RR RR	VR-16		1	
1/2SI8811B	M-61-4 M-136-4	2	B	24.0	GA	M.O.	C	0	St It	RR RR	VR-16		1	
1/2SI8812A	M-61-4 M-136-4	2	B	12.0	GA	M.O.	0	C	St It	OP RR			1	
1/2SI8812B	M-61-4 M-136-4	2	B	12.0	GA	M.O.	0	C	St It	OP RR			1	
1/2SI8813	M-61-1B M-136-1	2	B	2.0	GL	M.O.	0	C	St It	CS RR		14	1	
1/2SI8814	M-61-1A M-136-1	2	B	1.5	GL	M.O.	0	C	St It	OP RR			1	

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

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (vA)	REMARKS
1/2SI8871	M-61-6 M-135-6	2	A	0.75	GL	A.O	C	C C	St Lt It Ft	OP RR RR OP	VR-1		1 2	
1/2SI8880	M-61-6 M-136-6	2	A	1.0	GL	A.O.	C	C C	St Lt It Ft	OP RR RR OP	VR-1		1 2	
1/2SI8888	M-61-3 M-136-3	2	A	0.75	GL	A.O	C	C C	St Lt It Ft	OP RR RR OP	VR-1		1 2	
1/2SI8900A	M-61-2 M-136-2	1	AC	1.5	CK	S.A.	C	0 C	Ct Lt/Bt	RR RR	VR-15 VR-15	6	3 3	
1/2SI8900B	M-61-2 M-136-2	1	AC	1.5	CK	S.A.	C	0 C	Ct Lt/Bt	RR RR	VR-15 VR-15	6	3 3	
1/2SI8900C	M-61-2 M-136-2	1	AC	1.5	CK	S.A.	C	0 C	Ct Lt/Bt	RR RR	VR-15 VR-15	6	3 3	
1/2SI8900D	M-61-2 M-136-2	1	AC	1.5	CK	S.A.	C	0 C	Ct Lt/Bt	RR RR	VR-15 VR-15	6	3 3	
1/2SI8905A	M-61-3 M-136-3	1	AC	2.0	CK	S.A.	C	0 C	Ct Lt/Bt	RR RR	VR-15 VR-15	6	3 3	
1/2SI8905B	M-61-3 M-136-3	1	AC	2.0	CK	S.A.	C	0 C	Ct Lt/Bt	RR RR	VR-15 VR-15	6	3 3	
1/2SI8905C	M-61-3 M-136-3	1	AC	2.0	CK	S.A.	C	0 C	Ct Lt/Bt	RR RR	VR-15 VR-15	6	3 3	
1/2SI8905D	M-61-3 M-136-3	1	AC	2.0	CK	S.A.	C	0 C	Ct Lt/Bt	RR RR	VR-15 VR-15	6	3 3	
1/2SI8919A	M-61-1A M-136-1	2	C	1.5	CK	S.A.	C	0 C	Ct Bt	OP OP		31	3 3	
1/2SI8919B	M-61-1A M-136-1	2	C	1.5	CK	S.A.	O	0 C	Ct Bt	OP OP		31	3 3	

INSERVICE TESTING PROGRAM PLAN
CLASS 1, 2, 3, and AUGMENTED VALVES
BRAIDWOOD NUCLEAR POWER STATION
UNITS 0, 1, & 2
Revision 5

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

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

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

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
1/2SX147A	M-42-3 M-126-1	3	B	16.0	BTF	A.O.	N/A	O	Ft	OP			2	
1/2SX147B	M-42-3 M-126-1	3	B	16.0	BTF	A.O.	N/A	O	Ft	OP			2	
1/2SX169A	M-42-3 M-126-1	3	B	10.0	BTF	A.O.	—	O	St It Ft	OP RR OP			1 2	
1/2SX169B	M-42-3 M-126-1	3	B	10.0	BTF	A.O.	C	O	St It Ft	OP RR OP			1 2	
1/2SX173	M-42-3 M-126-1	3	B	6.0	GA	A.O.	C	O	St Ft	OP OP			1 2	
1/2SX178	M-42-3 M-126-1	3	B	6.0	GA	A.O.	C	O	St Ft	OP OP			1 2	

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

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
1/2VQ016	M-105-3	2	A	.50	GL	M	C	C	Lt	RR	VR-1			Passive
1/2VQ017	M-105-3	2	A	.50	GL	M	C	C	Lt	RR	VR-1			Passive
1/2VQ018	M-105-3	2	A	.50	GL	M	C	C	Lt	RR	VR-1			Passive
1/2VQ019	M-105-3	2	A	.50	GL	M	C	C	Lt	RR	VR-1			Passive

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

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST (VR)	NOTES	TECH. POS. (VA)	REMARKS
1/2W0006A	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	St Lt It	OP RR RR	VR-1		1	
1/2W0006B	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	St Lt It	OP RR RR	VR-1		1	
1/2W0007A	M-118-5 M-118-7	2	AC	10.0	CK	S.A.	C	C	Lt/Bt	RR	VR-1, 27		3	
1/2W0007B	M-118-5 M-118-7	2	AC	10.0	CK	S.A.	C	C	Lt/Bt	RR	VR-1, 27		3	
1/2W0020A	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	St Lt It	OP RR RR	VR-1		1	
1/2W0020B	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	St Lt It	OP RR RR	VR-1		1	
1/2W0056A	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	St Lt It	OP RR RR	VR-1		1	
1/2W0056B	M-118-5 M-118-7	2	A	10.0	GA	M.O.	O	C	St Lt It	OP RR RR	VR-1		1	

SECTION 4.4

VALVE NOTES

VALVE NOTES

NOTE 1

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

NOTE 2

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

NOTE 3

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

NOTE 4

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

NOTE 5

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

NOTE 6

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

Intersystem LOCA Valves

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 full stroke/fail safe exercised when the RCS pressure is at a minimum during cold shutdown, per IWV-3412.

NOTE 8

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

NOTE 9

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

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

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

NOTE 10

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

NOTE 11

The Primary Containment Purge Supply and Exhaust Valves 1VQ001A/B, 1VQ002A/B, 2VQ001A/B, and 2VQ002A/B cannot be stroke timed during unit operation. These 48-inch valves are the only isolation points between the containment atmosphere and the environment. Stroking these valves at any time other 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 semiannually, in accordance with Braidwood Station Technical Specifications.

The Primary Containment Mini-Purge and Exhaust Valves 1VQ004A/B, 1VQ005A/B/C, 2VQ004A/B, and 2VQ005A//B/C, and the Post LOCA Purge Exhaust Valves 1VQ003/ 2VQ003 will be leak tested every 3 months, in accordance with 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, and 2AF029A/B cannot be full stroke tested during unit operation, as this would induce potentially damaging thermal stresses in the upper feedwater nozzle piping. The 1AF001A/B, 1AF003A/B, 2AF001A/B, and 2AF003A/B valves will be partially stroke tested during operation, and all valves full stroke tested during cold shutdown. This will be performed per Tech Spec 4.7.1.2.2 and is in accordance with IWV-3522.

NOTE 13

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

NOTE 14

The safety injection system SVAG (Spurious Valve Actuation Group) valves 1SI8802A/B, 1SI8806, 1SI8809A/B, 1SI8813, 1SI8835, 1SI8840, 2SI8802A/B, 2SI8806, 2SI8809A/B, 2SI8813, 2SI5835, and 2SI8840 cannot be stroke tested during unit operation. These valves are required by the Technical Specifications to be de-energized in their proper positions during unit operation. Stroking them would be a violation of the Technical Specifications as well as defeating the de-energized SVAG valve principle. These valves will be stroke tested during cold shutdown when they are not required to be de-energized. This is in accordance with IWV-3412.

NOTE 15

-DELETED-

NOTE 16

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

NOTE 17

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

NOTE 18

-DELETED-
(Incorporated into NOTE 21)

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

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

NOTE 22

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

NOTE 23

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

NOTE 24

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

NOTE 25

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

NOTE 26

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

NOTE 27

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

NOTE 28

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

NOTE 29

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

NOTE 30

Check valves 1/2AF014A-H are verified to be closed each shift by the Operating Department, by verifying that the temperature at 1/2AF005A-H is ≤ 130° F. If the temperature is > 130° F at any 1/2AF005 valve, then an abnormal operating procedure is entered to isolate and cool down the affected lines. This shiftly monitoring of 1/2AF014A-H in the closed position adequately monitors the status of these valves. No additional monitoring/ trending by the IST Group is required.

NOTE 31

Check valves 1/2CV8480A/B and 1/2SI8919A/B are the Centrifugal Charging Pump and Safety Injection Pump mini-flow recirculation line valves which open to allow recirculation flow during IST Surveillances. Acceptable full-stroke will be verified whenever the recorded mini-recirculation flowrate is within the "acceptable" or "alert" ranges given in the IST Pump Surveillance.

NOTE 32

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

NOTE 33

Used at Byron Station ONLY

NOTE 34

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

NOTE 35

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

NOTE 36

In response to GL 90-06, "PORV and Block Valve Reliability and Additional LTOP for LWRs," the 1(2)RY455A and 1(2)RY456 valves will be restricted from stroke testing in Mode 1. Technical Specifications will provide direction for any further operability testing required.
(Reference NTS Item - 456-130-90-4.4-0100)

SECTION 4.5

VALVE TECHNICAL APPROACHES AND POSITIONS

IST Technical Approach and Position
No. VA-01

A. Component Identification:

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

2. Component Numbers: See IST Valve Tables.

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

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

B. Requirement:

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

C. Position:

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

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

IST Technical Approach and Position
No. VA-02

A. Component Identification:

1. Description: Method of Fail Safe Testing Valves.

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

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

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

B. Requirement:

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

C. Position:

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

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

IST Technical Approach and Position
No. VA-03

A. Component Identification:

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

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

3. References: (a) NRC Generic Letter 89-04, Guidance on Developing Acceptable Inservice Testing Programs, Attachment 1, Positions 1, 2, and 3; (b) ASME Code, Section XI, Subsection IWV, paragraph IWV-3522; (c) SMAD Report M-1078-91, "SI Accumulator Check Valve Acoustic Test."

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

B. Requirement:

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

C. Position:

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

C. Position, continued

One exception to the "maximum required accident flow" requirement is the methodology used to verify full-stroke exercising of the Safety Injection (SI) Accumulator Back-up Check Valves, 1/2SI8956A-D. Because of the high maximum design flow rate of these valves, a maximum design accident flow rate test is physically impossible to perform. For these valves, an Engineering calculation has been performed to determine the minimum flow rate for full disc lift. An acceptable full-stroke exercise of these valves will be performed each refueling outage by measuring the pressurizer level increase over time, converting these parameters to a flow rate through the valve, and verifying this value is greater than or equal to the engineering calculated minimum flow rate for full disc lift. Per reference c above, these valves were also verified to full-stroke open by using a "time of arrival" acoustic emission technique on the unit one valves that was performed in conjunction with the injection test described in VR-05. This method is superior to sample disassembly and inspection of one valve per outage which would require unusual system line-ups, freeze seals, radiation exposure, and possible plant transients.

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

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

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

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

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

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

IST Technical Approach and Position
No. VA-03

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

> The sample disassembly and inspection program involves grouping similar valves and testing one valve in each group during each refueling outage. The sampling technique requires that each valve in the group be the same design (manufacturer, size, model number, and materials of construction) and have the same service conditions including valve orientation. Additionally, at each disassembly the licensee must verify that the disassembled valve is capable of full-stroking and that the internals of the valve are structurally sound (no loose or corroded parts). Also, if the disassembly is to verify the full-stroke capability of the valve, the disk should be manually exercised.
>
> A different valve of each group is required to be disassembled, inspected, and manually full-stroke exercised at each successive refueling outage, until the entire group has been tested. If the disassembled valve is not capable of being full-stroke exercised or there is binding or failure of valve internals, the remaining valves in that group must also be disassembled, inspected, and manually full-stroke exercised during the same outage. Once this is completed, the sequence of disassembly must be repeated unless extension of the interval can be justified.

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

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

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

IST Technical Approach and Position
No. VA-04

A. Component Identification:

1. Description: Determining Limiting Values of Full-Stroke Times for Power Operated Valves.

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

3. References:

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

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

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

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

B. Requirement:

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

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

The 1983 Edition through Summer 1983 Addenda of ASME Section XI does not provide guidance for determining values of full-stroke.

IST Technical Approach and Position
No. VA-04

C. Position:

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

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

REQUIRED ACTION VALUE: Greater than $(2.0)(T_{ref})$, if (2)(Tref) is less than 5 seconds, 5 seconds may be used as the limiting value of full-stroke.

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

REQUIRED ACTION VALUE: Greater than (1.75)(Tref), but not to exceed Tech Spec. or UFSAR limiting value.

AOV's - Greater than 10 seconds:

REQUIRED ACTION VALUE: Greater than (2.0)(Tref), but not to exceed Tech Spec, or UFSAR limiting value.

Additional Notes:

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

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

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

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

IST Technical Approach and Position
No. VA-04

Additional Notes: (continued)

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

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

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

IST Technical Approach and Position
No. VA-05

A. Component Identification:

1. Description: Testing of the Boric Acid Transfer Pumps Discharge Check Valves

2. Component Numbers: 0AB8473, 1/2AB8487

3. References: (a) Engineering Correspondence (CHRON # 161733) dated January 17, 1991

4. Code Class: 3/T (Tracking purposes ONLY)

B. Requirement:

These check valves are tested per the Technical Specification requirement that requires an 18 month flow verification of 30 gpm to the RCS. Because the AB pumps were added to the program, the discharge check valves will also be added for tracking purposes only.

C. Position:

The boric acid transfer pumps were added to the IST program per pump technical position PA-01. Since this was done, it was decided to put the discharge check valves in the program as well for tracking purposes only. These valves are required to pass a minimum of 30 gpm in order to meet the Technical Specification requirement. The quarterly pump test will verify greater than 30 gpm, which is significantly more frequent than the current Technical Specification frequency. Back flow is prevented from the chemical and volume control system (CV) by check valve 1(2)CV8442 and motor operated valve 1(2)CV8104 in the emergency boration flow path. Also, the system uses only a single pump in series which precludes short circuiting of flow through the parallel pump's discharge check valve, so no back flow test will be performed.

SECTION 4.6

VALVE RELIEF REQUESTS

RELIEF REQUEST VR-1

1. Valve Number:

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

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

RELIEF REQUEST VR-1

Valve Number: (continued)

	VALVE #		VALVE #		VALVE #
107)	2CC685	147)	2PR033B	187)	2SI8964
108)	2CC9413A	148)	2PR033C	188)	2SI8968
109)	2CC9414	149)	2PR033D	189)	2VQ001A
110)	2CC9416	150)	2PR066	190)	2VQ001B
111)	2CC9438	151)	2PS228A	191)	2VQ002A
112)	2CC9486	152)	2PS228B	192)	2VQ002B
113)	2CC9518	153)	2PS229A	193)	2VQ003
114)	2CC9534	154)	2PS229B	194)	2VQ004A
115)	2CS007A	155)	2PS230A	195)	2VQ004B
116)	2CS007B	156)	2PS230B	196)	2VQ005A
117)	2CS008A	157)	2PS231A	197)	2VQ005B
118)	2CS008B	158)	2PS231B	198)	2VQ005C
119)	2CV8100	159)	2PS9354A	199)	2VQ016
120)	2CV8112	160)	2PS9354B	200)	2VQ017
121)	2CV8113	161)	2PS9355A	201)	2VQ018
122)	2CV8152	162)	2PS9355B	202)	2VQ019
123)	2CV8160	163)	2PS9356A	203)	2WM190
124)	2FC009	164)	2PS9356B	204)	2WM191
125)	2FC010	165)	2PS9357A	205)	2WO006A
126)	2FC011	166)	2PS9357B	206)	2WO006B
127)	2FC012	167)	2RE1003	207)	2WO007A
128)	2IA065	168)	2RE9157	208)	2WO007B
129)	2IA066	169)	2RE9159A	209)	2WO020A
130)	2IA091	170)	2RE9159B	210)	2WO020B
131)	2OG057A	171)	2RE9160A	211)	2WO056A
132)	2OG079	172)	2RE9160B	212)	2WO056B
133)	2OG080	173)	2RE9170		
134)	2OG081	174)	2RF026		
135)	2OG082	175)	2RF027		
136)	2OG083	176)	2RY8025		
137)	2OG084	177)	2RY8026		
138)	2OG085	178)	2RY8028		
139)	2PR001A	179)	2RY8033		
140)	2PR001B	180)	2RY8046		
141)	2PR002E	181)	2RY8047		
142)	2PR002F	182)	2SA032		
143)	2PR002G	183)	2SA033		
144)	2PR002H	184)	2SI8871		
145)	2PR032	185)	2SI8880		
146)	2PR033A	186)	2SI8886		

RELIEF REQUEST VR-1

2. Number of Items: 212

3. ASME Code Category: A

4. ASME Code, Section XI Requirements:

Seat Leakage Measurement per IWV-3420 and Corrective Action per IWV-3427(b).

5. Basis for Relief:

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

6. Alternate Testing:

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

7. Justification:

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

8. Applicable Time Period:

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

9. Approval Status:

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

b. Deleted SD valves per Technical Specification Amendment #26.

RELIEF REQUEST VR-2

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

2. Number of Items: 4

3. ASME Code Category: C

4. ASME Code, Section XI Requirements:

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

5. Basis for Relief:

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

6. Alternate Testing:

   The A and B train valves are of the same design (manufacturer, size, model number, and materials of construction) and have the same service conditions, including orientation, therefore they form a sample disassembly group.

Group 1	Group 2
1CS020A	2CS020A
1CS020B	2CS020B

   One valve from each group, on a per unit basis, will be examined each refueling outage. If the disassembled valve is not capable of being full stroked exercised or there is binding or failure of internals, the remaining valve on the affected unit will be inspected.

7. Justification:

   Full flow testing of these valves cannot be accomplished without posing a serious threat to the safety of equipment and personnel. It is impractical to either full or partial stroke exercise these valves since flow through them would result in the introduction of NaOH into the CS system. Full flow testing would require a special test hook-up and necessitate flushing the system.

RELIEF REQUEST VR-2

7. Justification: (continued)

The alternate test frequency is justifiable in that maintenance history and previous inspections of these valves at both Byron and Braidwood stations has shown no evidence of degradation or physical impairments. This is to be expected since these valves see very limited operation. Industry experience, as documented in NPRDS, showed no history of problems with these valves. A company wide check valve evaluation addressing the "EPRI Application Guidelines for Check Valves in Nuclear Power Plants" revealed that the location, orientation and application of these valves are not conducive to the type of wear or degradation correlated with SOER 86-03 type problems. However, they still require some level of monitoring to detect hidden problems.

The alternate test method is sufficient to ensure operability of these valves and is consistent with Generic letter 89-04.

8. Applicable Time Period:

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

9. Approval Status:

a. Relief granted per Generic Letter 89-04.

RELIEF REQUEST VR-3

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

2. Number of Items: 4

3. ASME Code Category: C

4. ASME Code, Section XI Requirements:

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

5. Basis for Relief:

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

6. Alternative Testing:

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

7. Justification:

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

8. Applicable Time Period:

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

9. Approval Status:

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

RELIEF REQUEST VR-4

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

2. Number of Items: 8

3. ASME Code Category: AC and C

4. ASME Code, Section XI Requirements:

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

5. Basis for Relief:

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

   Additionally, the full flow testing of these check valves during periods of cold shutdown, using the CS pumps, would fill the reactor refueling cavity with contaminated water from the refueling water storage tank. The filling of the cavity, via temporarily installed large bore piping, would require the removal of the reactor vessel head so as to preclude equipment damage from borated water. The erection of temporary piping from the CS line to the reactor cavity would take an estimated nine to twelve shifts, or longer compared to one to two shifts for valve inspection. This estimate does not take into account the time required to drain and remove the piping from containment.

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

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

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

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

RELIEF REQUEST VR-4

6. Alternate Testing:

The A and B train valves are of the same design (manufacturer, size, model number, and materials of construction) and have the same service conditions, including orientation, therefore they form a sample disassembly group.

Group 1	Group 2
1CS003A 1CS003B	2CS003A 2CS003B

Group 1	Group 2
1CS008A 1CS008B	2CS008A 2CS008B

One valve from each group, on a per unit basis, will be examined each refueling outage. If the disassembled valve is not capable of being full stroked exercised or there is binding or failure of internals, the remaining valve on the affected unit will be inspected.

In addition to the above, the 1/2CS003A, B valves will be partial stroke tested during the quarterly pump surveillance.

7. Justification:

The 1/2CS003A, B and 1/2CS008A, B valves are removed from the system and visually examined per the strict detailed inspection requirements of the Station Check Valve Program. This inspection adequately verifies that the valves are maintained in a state of operational readiness. The valves are verified to be functional by performing a thorough visual inspection of the internals and by performing a manual full-stroke exercise of each disc. Previous inspections of these particular valves at both Byron and Braidwood Stations has repeatedly shown them to be in good condition.

The wafer type design of the valve body for these valves makes their removal a simple process, with little chance of damage to their internals. Also, there is no disassembly of internal parts required; all wear surfaces are accessible by visual examination. After inspection and stroke testing, the valve is reinstalled into the line and post maintenance testing is performed. The 1/2CS008A, B valves receive a containment leakage test, and the 1/2CS003A, B valves are partial flow tested. These tests verify proper installation of the check valves, and the valve inspection procedure requires post-inspection visual examination of the check valve to ensure that the pin is oriented properly and that the flow direction is correct.

RELIEF REQUEST VR-4

7. Justification: (continued)

The alternate test frequency is justifiable in that maintenance history and previous inspections of these valves at both Byron and Braidwood stations has shown no evidence of degradation or physical impairments. Industry experience, as documented in NPRDS, showed no history of problems with these valves. A company wide check valve evaluation addressing the "EPRI Application Guidelines for Check Valves in Nuclear Power Plants" revealed that the location, orientation and application of these valves are not conducive to the type of wear or degradation correlated with SOER 86-03 type problems. However, they still require some level of monitoring to detect hidden problems.

The alternate test method is sufficient to ensure operability of these valves and is consistent with Generic Letter 89-04.

8. Applicable Time Period:

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

9. Approval Status:

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

RELIEF REQUEST VR-5

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

2. Number of Items: 16

3. ASME Code Category: AC

4. ASME Code, Section XI Requirements:

   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-3521 and IWV-3522.

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 for greater than 72 hours and if such leak rate testing has not been performed within the past nine months. Therefore, Braidwood Station will back flow (Bt) test these check valves on the same schedule. Successful completion of the seat leakage test will provide positive verification of closure (Bt).

   The accumulators will be discharged into the reactor vessel during refueling outages to perform a full stroke exercise (Ct) of these valves. An Engineering calculation has been performed to determine the minimum flow rate for full disc lift. An acceptable full-stroke exercise of these valves will be performed each refueling outage by measuring the pressurizer level increase over time, converting these parameters to a flow rate through the valve, and verifying this value is greater than or equal to the engineering calculated minimum flow rate for full disc lift. Positive verification of valve full stroke will be adequately demonstrated using this method.

7. Justification:

   Back flow testing these 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.

RELIEF REQUEST VR-5

7. Justification: (continued)

It is impractical to full stroke these valves during cold shutdowns, routine or forced, due to time and system constraints, increased radiation exposure, and costs involved. The reactor coolant system (RCS) must be at approximately 40 psi with all 4 reactor coolant pumps (RCPs) off and accumulator pressure at 100 psi over RCS pressure. Installing special test equipment to record pressurizer level increase could interfere with the required Technical Specification leakage test, required prior to entering Mode 2. The amount of nitrogen required to test these valves alone is approximately $2500. Also, at this point in core life, boron concentration in the RCS is relatively low compared to the 2000 ppm concentration in the accumulators. This injection test uses an estimated 8 to 10 thousand gallons of water, which will increase the RCS boron concentration, resulting in substantial delays with startup of the reactor. To dilute the RCS boron concentration, the feed and bleed process will greatly increase the amount of high grade water rejected from the site and may even increase the amount of radioactive effluents discharged to the environment.

Additionally, the unit one valves were acoustically tested during the above described injection test on 2/1/91. Using a "time of arrival" technique, the 1SI8956A-D valves were positively proved to full stroke to the open position as flow developed through each valve. This test is documented in System Material Analysis Department (SMAD) Report M-1078-91. The SI8948 valves have also been shown to full-stroke at a much lower flow rate during the RH system injection test. This alternate test method is superior to sample disassembly and inspection of one valve per outage which would require unusual system line-ups, freeze seals, radiation exposure, and possible plant transients.

8. Applicable Time Period:

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

9. Approval Status:

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

b. Requested refueling frequency for the CT exercise test of these valves and incorporated the necessary information and justification. Information regarding acoustic test results was also included per revision 5 submittal.

RELIEF REQUEST VR-6

1. Valve Number: 1SI8926 2SI8926

2. Number of Items: 2

3. ASME Code Category: C

4. ASME Code, Section XI Requirements:

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

5. Basis for Relief:

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

6. Alternate Testing:

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

7. Justification:

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

8. Applicable Time Period:

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

9. Approval Status:

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

RELIEF REQUEST VR-7

-DELETED-

Deleted relief request VR-7. Incorporated valves formerly covered by VR-7 into VR-12 and VR-17.

RELIEF REQUEST VR-8

1. Valve Number:

1CC685	2CC685
1CC9413A	2CC9413A
1CC9414	2CC9414
1CC9416	2CC9416
1CC9438	2CC9438
1CC9486	2CC9486
1CC9518	2CC9518
1CC9534	2CC9534

2. Number of Items: 16

3. ASME Code Category: A, B, and C

4. ASME Code, Section XI Requirements:

Exercise for operability: full stroke testing (St) of Category A & B valves; full stroke and back flow testing (Ct/Bt) of Category C valves every 3 months per IWV-3411 and IWV-3421, respectively.

5. Basis for Relief:

Component cooling (CC) 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 RCPs and eventual pump damage and/or trip.

The RCPs also provide the necessary driving head to the pressurizer spray valves for pressure control in the RCS, while a steam bubble exists in the pressurizer, during both power operation and reactor shutdown.

The closure test for the 1/2CC9518 (flow to RCP thermal barrier) and 1/2CC9534 (flow to RCP motor barrier oil cooler) valves can only be verified by performing a local leakage rate test (LLRT). The opening test is performed in conjunction with the fill and vent of the piping following the leak test. Performing this LLRT requires placing the system in an inoperable status, isolating that portion of piping, and connecting an external pressure supply.

6. Alternate Testing:

These valves will be exercised on a refueling frequency when all four RCPs are no longer required to support plant conditions and can be removed from service.

Check valves 1/2CC9486 (total CC flow to the RCPs) will be back flow tested (Bt) closed on the same frequency as their seat leakage test. The 1/2CC9518 and 1/2CC9534 check valves will be exercised (Ct/Bt) each refueling outage in conjunction with the associated seat leakage test. This frequency is at least once per two years, to be performed during reactor refueling outages.

RELIEF REQUEST VR-8

7. Justification:

This alternate testing will adequately maintain these portions of the CC system in a state of operational readiness, while not impacting the safety of the plant or causing unnecessary personnel radiation exposure or possible damage to the RCPs.

The 1/2CC9518 and 1/2CC9534 check valves function only when both of the associated containment isolation valves (CIVs) are closed during an accident condition involving adverse containment conditions. Each valve opens in a manner that will bypass the upstream isolation valve to relieve excess pressure. Back flow testing these check valves and the 1/2CC9486 check valves on the same schedule as their leak rate test will adequately maintain this portion of the CC system in a state of operational readiness without causing unnecessary personnel radiation exposure or possible damage to the RCPs.

During forced outages, limited manpower and resources are available to perform the necessary prerequisites involved with an LLRT. Performing an LLRT to prove valve closure would only draw manpower away from the task at hand, and could hamper attempts to restart the unit. An LLRT requires personnel involvement from operations (valve manipulations and out of services), radiation protection (radiation surveys and monitoring), instrument maintenance (installation of test equipment), and technical staff (LLRT rig operation and test supervision) that results in increased man-rem, which conflicts with station ALARA goals and practices. For these reasons, performing an LLRT to verify valve closure is considered to be impractical during cold shutdown.

In addition, performance of leakage testing on a two year (refueling) frequency is adequate to demonstrate structural integrity of valve seating capability per both Appendix J and ASME Section XI requirements.

8. Applicable Time Period:

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

9. Approval Status:

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

b. Requesting additional relief for valves 1/2CC9518 and 1/2CC9534 per revision 5 submittal.

RELIEF REQUEST VR-9

1. Valve Number:

1CV8100	2CV8100
1CV8112	2CV8112
1CV8113	2CV8113

2. Number of Items: 6

3. ASME Code Category: A and AC

4. ASME Code, Section XI Requirements:

Exercise for operability: full stroke testing (St) of Category A & B valves; full stroke and back flow testing (Ct/Bt) of Category C valves every 3 months per IWV-3411 and IWV-3421, respectively.

5. Basis for Relief:

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

The RCPs also provide the driving head to the pressurizer spray valves for pressure control in the RCS, while a steam bubble exists in the pressurizer, during both power operation and reactor shutdown.

The closure test for the 1/2CV8113 (seal return pressure relief check valves) can only be verified by performing a local leakage rate test (LLRT). Performing this test requires placing the system in an inoperable status, isolating that portion of piping, and connecting an external pressure supply. The opening test requires isolating both the inboard motor and manual isolation valves and running a centrifugal charging pump on mini-flow recirculation to supply pressure for opening the valve. The inboard manual vent is opened to verify that the check valve is capable of relieving pressure.

6. Alternate Testing:

The 1/2CV8100 and 1/2CV8112 valves will be exercised on a refueling frequency when all four RCPs are no longer required to support plant operations and can be taken out of service.

The 1/2CV8113 check valves will be exercised (Ct/Bt) each refueling outage in conjunction with their associated leakage rate test. This frequency is at least once per two years, to be performed during a reactor refueling outage.

RELIEF REQUEST VR-9

7. Justification:

This alternate testing will adequately maintain this portion of the CV system in a state of operational readiness, while not impacting the safety of the plant or causing unnecessary personnel radiation exposure or possible damage to the RCPs.

The 1/2CV8113 check valves function only when both of the associated containment isolation valves (CIVs) are closed during an accident condition involving adverse containment conditions. Each valve opens in a manner that will bypass the upstream isolation valve to relieve excess pressure. Back flow testing these check valves on the same schedule as their leak rate test will adequately maintain this portion of the CV system in a state of operational readiness without causing unnecessary personnel radiation exposure or possible damage to the RCPs.

During forced outages, limited manpower and resources are available to perform the necessary prerequisites involved with an LLRT. Performing an LLRT to prove valve closure would only draw manpower away from the task at hand, and could hamper attempts to restart the unit. An LLRT requires personnel involvement from operations (valve manipulations and out of services), radiation protection (radiation surveys and monitoring), instrument maintenance (installation of test equipment), and technical staff (LLRT rig operation and test supervision) that results in increased man-rem, which conflicts with station ALARA goals and practices. For these reasons, performing an LLRT to verify valve closure is considered to be impractical during cold shutdown.

In addition, performance of leakage testing on a two year (refueling) frequency is adequate to demonstrate structural integrity of valve seating capability per both Appendix J and ASME Section XI requirements.

8. Applicable Time Period:

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

9. Approval Status:

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

b. Requesting additional relief for the 1/2CV8113 check valves per revision 5 submittal.

RELIEF REQUEST VR-10

1. Valve Number:

1IA066	2IA066
1IA065	2IA065
1IA091	2IA091

2. Number of Items: 6

3. ASME Code Category: A and AC

4. ASME Code, Section XI Requirements:

Exercise for operability (St and Ft) of Category A and B valves and (Bt) of Category C valves every 3 months per IWV-3411 and IWV-3521.

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. The back flow (Bt) test for the 1/2IA091 check valves will be done in conjunction with their seat leakage test.

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

RELIEF REQUEST VR-10

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

The loss of instrument air would cause a disruption in the unit letdown flow paths resulting in pressurizer level increases. Such valves as the letdown orifice containment outlet header isolation valve 1/2CV8160, the letdown line isolation valves 1/2CV459 and 1/2CV460, the letdown orifice outlet isolation valves 1/2CV8149 A, B & C, the excess letdown heat exchanger inlet isolation valves 1/2CV8153A & B, and the regen heat exchanger letdown inlet isolation valves 1/2CV8389A & 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 1/2CV8324A & 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 1/2CC053 to go to its fail closed position. The loss of penetration cooling would result in elevated temperatures being imposed on the penetrations being supported by the component cooling system.

D. Loss of Personnel Breathing Air -

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

8. Applicable Time Period:

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

9. Approval Status:

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

b. Requesting additional relief for check valves 1/2IA091 regarding back flow testing.

RELIEF REQUEST VR-11

-DELETED-

Deleted relief request VR-1 per EG&G Idaho (Technical Reviewers) recommendation to Byron. This was a request for extension of position indication tests from every two years to every three years.

RELIEF REQUEST VR-12

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

VALVE #	VALVE #
1MS018A-D	2MS018A-D
1PS228A, B	2PS228A, B
1PS229A, B	2PS229A, B
1PS230A, B	2PS230A, B
1RC014A-D	2RC014A-D
1RY8033	2RY8033

2. Number of Items: 30

3. ASME Code Category: A & B

4. ASME Code, Section XI Requirements:

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

5. Basis for Relief:

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

6. Alternate Testing:

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

RELIEF REQUEST 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 hardships or sacrificing the safety of the plant.

8. Applicable Time Period:

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

9. Approval Status:

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

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

RELIEF REQUEST VR-13

1. Valve Numbers:

1DG5182A,B	2DG5182A,B
1DG5183A,B	2DG5183A,B
1DG5184A,B	2DG5184A,B
1DG5185A,B	2DG5185A,B

2. Number of Items: 16

3. ASME Code Category: B & C

4. ASME Code Section XI Requirements:

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

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

5. Basis for Relief:

The monthly Diesel Generator testing program, outlined in 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 valves between trains, the satisfactory operation of the power operated and self-actuated check valves associated with the Diesel Air Start System can be adequately demonstrated.

RELIEF REQUEST VR-13

7. Justification:

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

8. Applicable Time Period:

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

9. Approval Status:

a. Relief granted NRC Generic Letter 89-04.

RELIEF REQUEST VR-14

-DELETED-

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

RELIEF REQUEST VR-15

1. Valve Numbers:

1CV8481A, B	2CV8481A, B
1CV8546	2CV8546
1RH8705A, B	2RH8705A, B
1SI8815	2SI8815
1SI8818A-D	2SI8818A-D
1SI8819A-D	2SI8819A-D
1SI8841A,B	2SI8841A,B
1SI8900A-D	2SI8900A-D
1SI8905A-D	2SI8905A-D
1SI8949A-D	2SI8949A-D

2. Number of Valves: 56

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 exercised to the position(s) required to fulfill their function (Ct=open; Bt=closed) during cold shutdowns per IWV-3522.

5. Basis for Relief:

The closure test for the 1/2RH8705A, B (RHR suction isolation pressure relief) check valves can only be verified by performing a local leakage rate test (LLRT). The opening test is performed in conjunction with the fill and vent of the piping following the leak test. Performing this LLRT requires placing the system in an inoperable condition, isolating that portion of piping, and connecting an external pressure supply. Technical Specifications specifically exempt the RHR suction isolations from LLRT following flow through the valves.

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

Additionally, 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 (the reactor head is removed only during refueling). This requirement minimizes the possibility of low temperature over pressurization (LTOP) of the Reactor Coolant System. Therefore, check valves 1(2)SI8819A-D, 1(2)SI8905A-D, and 1(2)SI8949A-D, cannot be full stroke exercised during both routine and forced Mode 5 cold shutdowns, as required by IWV-3522.

RELIEF REQUEST VR-15

5. Basis for Relief: (continued)

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:

The 1/2RH8705A, B check valves will be exercised (Ct/Bt) tested each refueling outage in conjunction with their associated leakage rate test. This frequency is at least once per 18 months, to be performed during a reactor refueling outage.

The back flow test of these check valves can only be individually verified by performing a local leak rate test. Braidwood Station's Technical Specification 3/4.4.6.2 requires routine leak rate testing to be performed on these Reactor Coolant System Pressure Boundary Isolation (PIV) check valves:

1. At least once per 18 months;
2. Prior to entering Mode 2 whenever the plant has been in cold shutdown for greater than 72 hours or more if leakage testing has not been performed within the previous nine months;
3. Prior to returning the valve to service following maintenance repair, or replacement work on the valve;
4. Within 24 hours following valve actuation due to automatic or manual operation or flow through the valve, except for the 1/2RH8701A, B and 1/2RH8702A, B.

Based on this Technical Specification that ensures the structural integrity of these valves, Braidwood will back flow (Bt) test these check valves on the same frequency.

The full stroke (Ct) of these check valves will be performed at each refueling outage.

7. Justification:

The 1/2RH8705A, B check valves function only when both of the associated containment isolation valves (CIVs) are closed during an accident condition involving adverse containment conditions. Each valve opens in a manner that will bypass the upstream isolation valve to relieve excess pressure. Exercising (Ct/Bt) testing these check valves on a refueling frequency will adequately maintain this portion of the RH system in a state of operational readiness without causing unnecessary personnel radiation exposure or delays in startup of the reactor.

RELIEF REQUEST VR-15

7. Justification: (continued)

Stroke exercising (Ct) of check valves 1(2)SI8819A-D, 1(2)SI8949A-D, and 1(2)SI8905A-D can only be safely performed in Mode 6 with the Reactor Vessel head removed. Also, these valves cannot be full stroked without exceeding Technical Specification 3/4.5.3 requirements, which requires that all safety injection pumps be demonstrated inoperable when RCS temperature is less than 350° F. Stroke exercising check valves 1(2)SI8819A-D, 1(2)SI8905A-D and 1(2)SI8949A-D at least once per Reactor Refueling mode of operation, will insure compliance with Braidwood Station Technical Specifications and minimize the possibility of low temperature over-pressurization of the Reactor Coolant System.

It is impractical to full stroke test the 1(2)CV8481A, B, 1(2)CV8546, and 1(2)SI8815, 1(2)SI8900A-D, and 1(2)SI8841A, B check valves as it will: 1) Induce unnecessary thermal stresses to the reactor vessel nozzles, 2) Cause the necessity to perform the Technical Specification required LLRT, and 3) Inject large quantities of 2000 ppm borated water into the RCS. Injecting high concentrations of borated water into the RCS would significantly impact the time required to restart the reactor at this time in core life, (greater than 9 months per Technical Specification 3/4.4.6.2) when boron concentration is maintained at a much lower value. To dilute the RCS boron concentration, the feed and bleed process will greatly increase the amount of high grade water rejected from the site and could even increase the amount of radioactive effluents discharged to the environment.

During forced outages, limited manpower and resources are available to perform the necessary prerequisites involved with an LLRT. Performing an LLRT to prove valve closure would only draw manpower away from the task at hand, and could hamper attempts to restart the unit. An LLRT requires personnel involvement from operations (valve manipulations and out of services), radiation protection (radiation surveys and monitoring), instrument maintenance (installation of test equipment), and technical staff (LLRT rig operation and test supervision) that results in increased man-rem, which conflicts with station ALARA goals and practices. For these reasons, performing an LLRT to verify valve closure is considered to be impractical during cold shutdown.

In addition, performance of leakage testing on a two year (refueling) frequency is adequate to demonstrate structural integrity of valve seating capability per both Appendix J and ASME Section XI requirements.

8. Applicable Time Period:

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

RELIEF REQUEST VR-15

9. Approval Status:

a. Revised (to address NRC concerns) in Byron's response to SER 12/16/90 (Byron Station Letter 88-1321).

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

c. Requested additional relief for valves 1/2RH8705A, B and refueling frequency for full stroke testing these check valves per revision 5 submittal.

RELIEF REQUEST VR-16

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

2. Number of Valves: 4

3. ASME Code Category: B

4. ASME Code, Section XI Requirements:

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

5. Basis for Relief:

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

For Cold Shutdown operations with the Reactor Coolant Loops filled and one train of Residual Heat Removal declared inoperable, 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% (Unit2). However, if the cold shutdown was necessitated by a problem requiring draining of the secondary side of the Steam Generators (i.e. tube leaks), 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 support 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 stroke exercise the Containment Sump Outlet Isolation Valves, 1/2SI8811A, B during refueling outages vice cold shutdown.

RELIEF REQUEST VR-16

7. Justification:

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

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

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

8. Applicable Time Period:

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

9. Approval Status:

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

RELIEF REQUEST VR-17

1. Valve Numbers: 1SX101A 2SX101A

2. Number of Valves: 2

3. ASME Code Category: A

4. ASME Code, Section XI Requirements:

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

5. Basis for Relief:

   Valves 1/2SX101A are the essential service water outlet isolation valves for the motor driven auxiliary feedwater (AF) pump lube oil coolers. These valves are completely encapsulated per design (valve stem not visible) and do not have any limit switches that can be used to trigger a change in valve stem position. These valves are energized by a "b" contact in the motor breaker closing causing the valve to close. On pump start, the "b"contact opens de-energizing the coil causing the valve to open. These valves change position instantaneously (i.e. rapid acting) and are basically a go-no-go type, in regards to stroking. There is no practical way to accurately stroke these valves without a system modification.

6. Alternate Testing:

   Valves 1/2SX101A can be verified to open during each quarterly ASME surveillance of the motor driven auxiliary feedwater pumps by observing that temperature downstream the valve changes when the pump starts. This is a positive verification of flow through the valve, which is indicative of the valve opening. Observing that proper lube oil temperatures are maintained will also prove that the valve opens. In addition, these valves are stroked monthly during the AF pump surveillances required by Braidwood Technical Specifications.

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. Also, these valves are tested monthly for proper valve operation per Technical Specification requirements. This testing will adequately maintain the system 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.

9. Approval Status:

   a. Relief is being resubmitted per SER Appendix C response.

RELIEF REQUEST VR-18

1. Valve Numbers: 1/2SI8968

2. Number of Valves: 2

3. ASME Code Category: AC

4. ASME Code, Section XI Requirement:

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

5. Basis for Relief:

   These valves can only be verified closed by performing a local seat leakage test (LLRT). Performing this LLRT requires placing the system in an inoperable status (removed from service) for an extended period of time due to the need to isolate portions of the system, and connecting leak rate test equipment. The 1/2SI8968 valves are located inside containment in the nitrogen supply line to the RCS (SI) accumulators. This LLRT could lead to eventual problems with maintaining accumulator pressure, should any system leakage exist.

6. Alternate Testing:

   These valves will be back flow tested each refueling outage in conjunction with their associated leakage rate test.

7. Justification:

   To perform an LLRT on a quarterly basis would require that the nitrogen supply system be removed from service and placed in an inoperable condition, which could impact accumulator operability. A one hour Technical Specification time clock is associated with low accumulator pressure that would require reactor shutdown. Also, quarterly testing would require a containment entry during power operation that would conflict with station ALARA goals and practices in reducing man-rem and is not prudent from a personnel safety standpoint. Two individuals must always enter containment together, whenever containment integrity is required for personnel safety considerations.

   During forced outages, limited manpower and resources are available to perform the necessary prerequisites involved with an LLRT. Performance of an LLRT to prove valve closure would only draw manpower away from the task at hand, and could hamper attempts to restart the unit. Also, if the nitrogen system is depressurized to perform the LLRT, this could cause the accumulators to depressurize (if valve leakage were to occur) creating another activity to be performed (accumulator nitrogen fill) prior to unit startup. For these reasons, performing an LLRT is considered to be impractical during cold shutdown.

RELIEF REQUEST VR-18

7. Justification: (continued)

In addition, performance of leakage testing on a two year (refueling) frequency is adequate to demonstrate structural integrity of valve seating capability per both Appendix J and ASME Section XI requirements.

However, when a valve fails to meet its leakage criteria and repairs are required which make the internals accessible for inspection, a detailed visual inspection will be performed. The disassembled valve disc is verified to be capable of being full stroked and is checked for binding or failure of valve internals. Only trained check valve inspectors are utilized for this examination. The results of this inspection are reviewed and evaluated by the station's Check Valve Coordinator for any further action required.

This alternate test method is sufficient to insure the operability of these valves.

8. Applicable Time Period:

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

9. Approval Status:

a. Relief is requested per revision 5 submittal.

RELIEF REQUEST VR-19

1. Valve Numbers: 1AF001A, 1AF001B, 2AF001A, 2AF001B

2. Number of Valves: 4

3. ASME Code Category: C

4. ASME Code, Section XI Requirement:

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

5. Basis for Relief:

   Per program note 12, these valves are full-stroke tested during cold shutdown in accordance with Technical Specification 4.7.1.2.2 which ensures the operability of the Auxiliary Feedwater flow path to each steam generator by verifying flow to each steam generator following each cold shutdown of 30 days prior to entering Mode 2. Testing at this frequency is sufficient to ensure operability of this system and forms the basis of this Technical Specification.

   However, the closure capability of these valves cannot be verified adequately by performing a back pressure test due to the multiple boundary isolation points. This configuration makes it impossible to assign any observed leakage to any individual valve or component using standard mass make-up or pressure decay techniques.

6. Alternate Testing:

   The A and B train valves are of the same design (manufacturer, size, model number, and materials of construction) and have the same service conditions, including orientation, therefore they form a sample disassembly group.

Group 1	Group 2
1AF001A	2AF001A
1AF001B	2AF001B

   One valve from each group, on a per unit basis, will be examined each refueling outage. If the disassembled valve is not capable of being full-stroked exercised or there is binding or failure of internals, the remaining valve on the affected unit will be inspected.

RELIEF REQUEST VR-19

7. Justification:

Performing a pressure test to verify closure is impractical due to the system configuration. To perform this test it would be necessary to attach a pump or some other type of pressure source to a test connection and pressurize the line containing the valve. However, this line also contains many potential leakage paths (valves, pump seals, and instruments). It is impossible to assign a leakage value to any specific path using available methods of seat leakage testing.

The alternate test frequency is justifiable in that removal of these valves requires that the system be taken out of service for an extended period of time. Due to Safety System Performance, Probable Risk Assessment (PRA), and availability concerns involving the Auxiliary Feedwater system these valves cannot be removed on a quarterly frequency without impacting plant safety. Maintenance history and previous inspections of these valves at both Byron and Braidwood stations has shown no evidence of degradation or physical impairments. Industry experience, as documented in NPRDS, showed no history of problems with these valves. A company wide check valve evaluation addressing the "EPRI Application Guidelines for Check Valves in Nuclear Power Plants" revealed that the location, orientation and application of these valves are not conducive to the type of wear or degradation correlated with SOER 86-03 type problems. However, they still require some level of monitoring to detect hidden problems.

The alternate test method is sufficient to ensure operability of these valves and is consistent with Generic letter 89-04.

8. Applicable Time Period:

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

9. Approval Status:

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

RELIEF REQUEST VR-20

Not used at Braidwood - Byron ONLY

RELIEF REQUEST VR-21

Withdrawn from Byron's program per SER dated 09/14/90

Not used at Braidwood - Byron ONLY

RELIEF REQUEST VR-22

Not used at Braidwood - Byron ONLY

RELIEF REQUEST VR-23

1. Valve Numbers: 1/2PR002G, 1/2PR002H

2. Number of Valves: 4

3. ASME Code Category: AC

4. ASME Code, Section XI Requirement:

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

5. Basis for Relief:

   These valves can only be verified closed by performing a local seat leakage test (LLRT). Performing this LLRT requires placing the system in an inoperable status (removed from service) for an extended period of time due to the need to isolate portions of the system, and connecting leak rate test equipment. The 1/2PR002G, H valves are located inside containment in the return line of the air particulate and Iodine samplers (1/2PR51J or 1/2PR52J).

6. Alternate Testing:

   These valves will be back flow tested each refueling outage in conjunction with their associated leakage rate test.

7. Justification:

   To perform an LLRT on a quarterly basis would require that the associated sample panel(s) be removed from service and placed in an inoperable condition. Also, quarterly testing would require a containment entry during power operation that would conflict with station ALARA goals and practices in accruing man-rem and is not prudent from a personnel safety standpoint. There is a large neutron stream at these particular valves and hatch locations and two individuals must always enter containment together, whenever containment integrity is required for personnel safety considerations.

   During forced outages, limited manpower and resources are available to perform the necessary prerequisites involved with an LLRT. Performance of an LLRT to prove valve closure would only draw manpower away from the task at hand, and could hamper attempts to restart the unit. For these reasons, performing an LLRT is considered to be impractical during cold shutdown.

   In addition, performance of leakage testing on a two year (refueling) frequency is adequate to demonstrate structural integrity of valve seating capability per both Appendix J and ASME Section XI requirements.

RELIEF REQUEST VR-23

7. Justification: (continued)

However, when a valve fails to meet its leakage criteria and repairs are required which make the internals accessible for inspection, a detailed visual inspection will be performed. The disassembled valve disc is verified to be capable of being full stroked and is checked for binding or failure of valve internals. Only trained check valve inspectors are utilized for this examination. The results of this inspection are reviewed and evaluated by the station's Check Valve Coordinator for any further action required.

This alternate test method is sufficient to insure the operability of these valves.

8. Applicable Time Period:

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

9. Approval Status:

a. Relief is requested per revision 5 submittal.

RELIEF REQUEST VR-24

1. Valve Numbers: 1/2PR032

2. Number of Valves: 2

3. ASME Code Category: AC

4. ASME Code, Section XI Requirement:

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

5. Basis for Relief:

   These valves can only be verified closed by performing a local seat leakage test (LLRT). Performing this LLRT requires placing the system in an inoperable status (removed from service) for an extended period of time due to the need to isolate portions of the system, and connecting leak rate test equipment. This would make the process radiation monitor (PRM) (1/2PR11J panel) inoperable requiring entry into a 72 hour Technical Specification time clock. The 1/2PR032 valves are located inside containment in the return line of the process radiation monitor.

6. Alternate Testing:

   These valves will be back flow tested each refueling outage in conjunction with their associated leakage rate test.

7. Justification:

   To perform an LLRT on a quarterly basis would require that the associated PRM be removed from service and placed in an inoperable condition. Also, quarterly testing would require a containment entry during power operation that would conflict with station ALARA goals and practices in reducing man-rem and is not prudent from a personnel safety standpoint. Two individuals must always enter containment together, whenever containment integrity is required for personnel safety considerations.

   During forced outages, limited manpower and resources are available to perform the necessary prerequisites involved with an LLRT. Performance of an LLRT to prove valve closure would only draw manpower away from the task at hand, and could hamper attempts to restart the unit. For these reasons, performing an LLRT is considered to be impractical during cold shutdown.

   In addition, performance of leakage testing on a two year (refueling) frequency is adequate to demonstrate structural integrity of valve seating capability per both Appendix J and ASME Section XI requirements.

RELIEF REQUEST VR-24

7. Justification: (continued)

However, when a valve fails to meet its leakage criteria and repairs are required which make the internals accessible for inspection, a detailed visual inspection will be performed. The disassembled valve disc is verified to be capable of being full stroked and is checked for binding or failure of valve internals. Only trained check valve inspectors are utilized for this examination. The results of this inspection are reviewed and evaluated by the station's Check Valve Coordinator for any further action required.

This alternate test method is sufficient to insure the operability of these valves.

8. Applicable Time Period:

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

9. Approval Status:

a. Relief is requested per revision 5 submittal.

RELIEF REQUEST VR-25

1. Valve Numbers: 1/2PS231A, 1/2PS231B

2. Number of Valves: 4

3. ASME Code Category: AC

4. ASME Code, Section XI Requirement:

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

5. Basis for Relief:

   These valves can only be verified closed by performing a local seat leakage test (LLRT). Performing this LLRT requires placing the system in an inoperable status (removed from service) for an extended period of time due to the need to isolate portions of the system, and connecting leak rate test equipment. This would make the hydrogen monitor inoperable. The 1/2PR231A, B valves are located inside containment in the return line of the hydrogen monitors.

6. Alternate Testing:

   These valves will be back flow tested each refueling outage in conjunction with their associated leakage rate test.

7. Justification:

   To perform an LLRT on a quarterly basis would require that the associated hydrogen monitor be removed from service and placed in an inoperable condition. This is in conflict with Technical Specification 3/4.6.3.2, which requires the hydrogen monitors to be in the standby mode to meet the requirements set forth in NUREG 0737, Item II.F.1.6 in Modes 1 and 2. Also, quarterly testing would require a containment entry and climbing in the penetration areas during power operation and would conflict with station ALARA goals and practices in reducing man-rem and is not prudent from a personnel safety standpoint. Two individuals must always enter containment together, whenever containment integrity is required for personnel safety considerations.

   During forced outages, limited manpower and resources are available to perform the necessary prerequisites involved with an LLRT. Performance of an LLRT to prove valve closure would only draw manpower away from the task at hand, and could hamper attempts to restart the unit. For these reasons, performing an LLRT is considered to be impractical during cold shutdown.

RELIEF REQUEST VR-25

7. Justification: (continued)

In addition, performance of leakage testing on a two year (refueling) frequency is adequate to demonstrate structural integrity of valve seating capability per both Appendix J and ASME Section XI requirements.

However, when a valve fails to meet its leakage criteria and repairs are required which make the internals accessible for inspection, a detailed visual inspection will be performed. The disassembled valve disc is verified to be capable of being full stroked and is checked for binding or failure of valve internals. Only trained check valve inspectors are utilized for this examination. The results of this inspection are reviewed and evaluated by the station's Check Valve Coordinator for any further action required.

This alternate test method is sufficient to insure the operability of these valves.

8. Applicable Time Period:

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

9. Approval Status:

a. Relief is requested per revision 5 submittal.

RELIEF REQUEST VR-26

1. Valve Numbers: 1/2RY8046, 1/2RY8047

2. Number of Valves: 4

3. ASME Code Category: AC

4. ASME Code, Section XI Requirement:

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

5. Basis for Relief:

   These valves can only be verified closed by performing a local seat leakage test (LLRT). Performing this LLRT requires placing the system in an inoperable status (removed from service) for an extended period of time due to the need to isolate portions of the system, and connecting leak rate test equipment. The 1/2RY8046 valve is located inside containment in the primary water (PW) line to the Pressure Relief Tank (PRT) and the Reactor Coolant Pump (RCP) number three seal standpipes. The 1/2RY8047 valve is also inside containment in the nitrogen supply line to the PRT. This will directly impact the PRTs ability to condense any steam discharged from the pressurizer (PZR) safety valves in order to maintain acceptable pressure inside the tank.

6. Alternate Testing:

   These valves will be back flow tested each refueling outage in conjunction with their associated leakage rate test.

7. Justification:

   To perform an LLRT on a quarterly basis would require that both the nitrogen and PW systems be removed from service and placed in an inoperable condition and would directly impact the operability of the PRT. The nitrogen is used for purging and venting of hydrogen which comes from the reactor coolant, while the primary water is used to control pressure in the PRT in case of an over-pressure condition in the RCS (safety valve or PORV lifting). Also, quarterly testing would require a containment entry during power operation that would conflict with station ALARA goals and practices in reducing man-rem and is not prudent from a personnel safety standpoint. Two individuals must always enter containment together, whenever containment integrity is required for personnel safety considerations.

   During forced outages, limited manpower and resources are available to perform the necessary prerequisites involved with an LLRT. Performance of an LLRT to prove valve closure would only draw manpower away from the task at hand, and could hamper attempts to restart the unit. For these reasons, performing an LLRT is considered to be impractical during cold shutdown.

RELIEF REQUEST VR-26

7. Justification: (continued)

In addition, performance of leakage testing on a two year (refueling) frequency is adequate to demonstrate structural integrity of valve seating capability per both Appendix J and ASME Section XI requirements.

However, when a valve fails to meet its leakage criteria and repairs are required which make the internals accessible for inspection, a detailed visual inspection will be performed. The disassembled valve disc is verified to be capable of being full stroked and is checked for binding or failure of valve internals. Only trained check valve inspectors are utilized for this examination. The results of this inspection are reviewed and evaluated by the station's Check Valve Coordinator for any further action required.

This alternate test method is sufficient to insure the operability of these valves.

8. Applicable Time Period:

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

9. Approval Status:

a. Relief is requested per revision 5 submittal.

RELIEF REQUEST VR-27

1. Valve Numbers: 1/2WO007A, 1/2WO007B

2. Number of Valves: 4

3. ASME Code Category: AC

4. ASME Code, Section XI Requirement:

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

5. Basis for Relief:

   These valves can only be verified closed by performing a local seat leakage test (LLRT). Performing this LLRT requires placing the system in an inoperable status (removed from service) for an extended period of time due to the need to isolate portions of the system, and connecting leak rate test equipment. This particular LLRT test procedure requires approximately 3 days per valve to complete. It usually takes two days to drain the system and another day to fill and vent the isolated portions of piping. The 1/2WO007A, B valves are located inside containment in the supply lines to the RCFC chilled water coils.

6. Alternate Testing:

   These valves will be back flow tested each refueling outage in conjunction with their associated leakage rate test.

7. Justification:

   To perform an LLRT on a quarterly basis would require that the containmen chilled water (WO) system be removed from service and placed in an inoperable condition for an extended period of time. It is impractical to perform this test during power operation because the WO system is needed during the summer months to keep containment temperatures below 120 °F. This is based on the environmental qualification of components inside containment. Also, quarterly testing would involve containment entries during power operation that would conflict with station ALARA goals and practices in reducing man-rem and is not prudent from a personnel safety standpoint. Two individuals must always enter containment together, whenever containment integrity is required for personnel safety considerations.

   During forced outages, limited manpower and resources are available to perform the necessary prerequisites involved with an LLRT. Performance of an LLRT to prove valve closure would only draw manpower away from the task at hand, and could hamper attempts to restart the unit. For these reasons, performing an LLRT is considered to be impractical during cold shutdown.

RELIEF REQUEST VR-27

7. Justification: (continued)

In addition, performance of leakage testing on a two year (refueling) frequency is adequate to demonstrate structural integrity of valve seating capability per both Appendix J and ASME Section XI requirements.

However, when a valve fails to meet its leakage criteria and repairs are required which make the internals accessible for inspection, a detailed visual inspection will be performed. The disassembled valve disc is verified to be capable of being full stroked and is checked for binding or failure of valve internals. Only trained check valve inspectors are utilized for this examination. The results of this inspection are reviewed and evaluated by the station's Check Valve Coordinator for any further action required.

This alternate test method is sufficient to insure the operability of these valves.

8. Applicable Time Period:

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

9. Approval Status:

a. Relief is requested per revision 5 submittal.