Braidwood Nuclear Power Station
Units 1 & 2

Inservice Testing Program
Second Ten Year Interval

Commercial Service Dates:

Unit 1 – 7/29/88
Unit 2 – 10/17/88

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REVISION LOG

Effective Date	Revision Description	Prepared; IST Program Engineer	Date	Approved; Engr. Programs Supervisor	Date
6/15//00	IST Scope Bases Document Update, and reply to NRC SER of 8/4/99				
9/01/01	Revised for update to ASME Oma-1996 Code including Appendix II for check valve testing	Don Zebrauskas	8/20/01	Robert J. Flores	8/20/01

REVISION LOG

Effective Date	Revision Description	Prepared; IST Program Engineer	Date	Approved; Engr. Programs Supervisor	Date
6/15//00	IST Scope Bases Document Update, and reply to NRC SER of 8/4/99	Don Zehnstaz	6/15/00	[signature]	6/15/00

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1.0 INTRODUCTION

1.1 Purpose

To provide requirements for the performance and administration of assessing the operational readiness of those pumps and valves whose specific functions that are required to:

- Shutdown the reactor to the cold shutdown condition,
- Maintaining the cold shutdown condition, or
- To mitigate the consequences of an accident.

1.2 Scope

The program plan was prepared to meet the requirements of the following subsections of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI (1989 Edition with no Addenda.), with the NRC approved Code update for check valves as indicated.

- Subsection IWP, "*Inservice Testing of Pumps in Nuclear Power Plants*"

  ASME Section XI Sub-article IWP-1100 requires pump testing be performed in accordance with the requirements stated in the ASME/ANSI Operations and Maintenance of Nuclear Power Plant Standard, Part 6, 1987 Edition through the 1988 Addenda (OMa –1988).

- Subsection IWV, "*Inservice Testing of Valves in Nuclear Power Plants*"

  ASME Section XI Article IWV-1100 requires valve testing be performed in accordance with the requirements stated in the ASME/ANSI Operations and Maintenance of Nuclear Power Plant Standard, Part 10, 1987 Edition through the 1988 Addenda (OMa – 1988).

- ASME OM Code – 1995 Edition, 1996 Addenda (including Appendix II) for check valves

The Braidwood Nuclear Power Station Pump and Valve Inservice Testing Plan will be in effect through the second 120-month interval.

- Unit One and Unit Two: July 29, 1998 through July 28, 2008

This plan will be updated as required in accordance with 10 CFR50.55a(f).

This program plan provides a complete listing of those pumps and valves included in the program per the requirements of:

- OM-1987, Part 1 (OM-1), *"Requirements for Inservice Performance Testing of Nuclear Power Plant Pressure Relief Devices,"*
- OMa-1988, Part 6 (OM-6), *"Inservice Testing of Pumps in Light-Water Reactor Power Plants"*, and
- OMa-1988, Part 10 (OM-10), *"Inservice Testing of Valves in Light-Water Reactor Power Plants"*
- OM-1995, 1996 Addenda, Check valve sections of "Inservice Testing of Valves in Light – Water Reactor Power Plants"

2.0 INSERVICE TESTING PLAN FOR PUMPS

2.1 Pump Inservice Testing Plan Description

This program plan meets the requirements of ASME/ANSI Oma-1988, Part 6 (OM-6) with the exception of specific relief requests contained in Attachment 2.

2.2 Pump Plan Table Description

The pumps included in the Braidwood Nuclear Power Station IST Plan are listed in Attachment 14. The information contained in these tables identifies those pumps required to be tested to the requirements of ASME Section XI, the testing parameters and frequency of testing, and associated relief requests and remarks. The headings for the pump tables are delineated below.

System — The system containing the pump.

Pump Name — The descriptive name for the pump.

Pump EPN — The unique Equipment Part Number (EPN) for the pump. Each EPN is preceded with a Unit designator for the pump:

0	Unit 0
1	Unit 1
2	Unit 2

Safety Class — The ASME Code classification of the pump

1	Class 1
2	Class 2
3	Class 3
NC	Non-Code, Safety Related
NS	Non-Safety Related

2.2 Pump Plan Table Description (Cont'd)

P&ID	The Piping and Instrumentation Drawing on which the pump is represented.	
P&ID Coor.	The P&ID Coordinate location of the pump.	
Pump Type	The type of pump.	
	C	Centrifugal
	PD	Positive Displacement
Pump Driver	The type of pump driver.	
	MOTOR	Motor driven
	TURBINE	Steam turbine driven
Test Type	Measured test parameters.	
	PUMP SPEED	Measured only for variable speed pumps.
	DIFFERENTIAL PRESSURE	Calculated from suction and discharge pressures or obtained by direct measurement.
	DISCHARGE PRESSURE	Measured for positive displacement pumps.
	FLOW RATE	Measured using a rate or quantity meter installed in the pump test circuit.
	VIBRATION	Pump bearing vibration.

2.2 Pump Plan Table Description (Cont'd)

Test Freq. — The frequency for performing the specified inservice test.

M3 — Quarterly (92 Days)

Relief Request — A relief request number is listed when a specific code requirement is determined to be impracticable.

Tech. Pos. — A technical position number is listed when the requirements of the code are not easily interpreted and clarifying information is needed. The technical position is used to document how Code requirements are being implemented at the station.

Notes — Miscellaneous pump information

3.0 INSERVICE TESTING PLAN FOR VALVES

3.1 Valve Inservice Testing Plan Description

This plan establishes the test intervals, parameters to be measured and meets the requirements of OM-1, OM-10, and OM-1995/1996 Addenda for check valves, with the exception of the specific relief requests contained in Attachment 4.

Where the frequency requirements for valve testing have been determined to be impracticable, Cold Shutdown or Refuel Outage Justifications have been identified and written. These justifications are provided in Attachments 6 and 8 respectively.

3.2 Valve Plan Table Description

The valves included in the Braidwood Nuclear Station IST Plan are listed in Attachment 16. The information contained in these tables identify those valves that are required to be tested to the requirements of OM-1 and OM-10, the test parameters, frequency of testing, and the associated relief requests. The headings for the valve tables are delineated below.

System — The unique system identifier.

Valve Name — The description of the valve.

Valve EPN — A unique identifier for the valve. Each EPN is preceded with a Unit designator for the valve:

0	Unit 0
1	Unit 1
2	Unit 2

Safety Class — The ASME Class abbreviation.

1	Class 1
2	Class 2
3	Class 3
NC	Non-Code, Safety Related
NS	Non-Safety Related

3.2 Valve Plan Table Description (Cont'd)

P&ID — The Piping and Instrumentation Drawing (P&ID) number on which the valve appears. If the valve appears on multiple P&IDs, the primary P&ID will be listed.

P&ID Coor. — The coordinate location on the P&ID where the valve appears.

Category — The code category (or categories) as defined in paragraph 1.4 of OM-10.

A	Seat Leakage Limited.
B	Seat Leakage Not Required.
C	Self-Actuating Valves.
D	Single Use Valves.

Size — The nominal pipe size of the valve, in inches.

Valve Type — The valve body style abbreviation.

BAL	Ball Valve
BTF	Butterfly Valve
CK	Check Valve
DAM	Damper
DIA	Diaphragm Valve
GA	Gate Valve
GL	Globe Valve
PLG	Plug Valve
PLT	Pilot Valve
PPT	Poppet Valve
RPD	Rupture Disk
RV	Relief Valve
SCK	Stop Check Valve
SHR	Shear Valve/SQUIB Valve
3W	3-Way Valve
4W	4-Way Valve
XFC	Excess Flow Check Valve

3.2 Valve Plan Table Description (Cont'd)

Act. Type — The actuator type abbreviation.

AO	Air Operator
DF	Dual Function (Self Actuated and Power Operated)
EXP	Explosive Actuator
HO	Hydraulic Operator
M	Manual
MO	Motor Operator
SA	Self-Actuating
SAP	Self-Actuated Pilot
SO	Solenoid Operator

Normal Position — The normal position abbreviation. The valve's position during normal power operation. If the system does not operate during power operation, then the normal position is the position of the valve when the system is not operating.

C	Closed
CKL	Closed / Hand Switch Key Locked in Positio
LC	Locked Closed
D	De-energized (3-way and 4-way valves)
E	Energized (3-way and 4-way valves)
O	Open
OKL	Open / Hand Switch Key Locked in Position
LO	Locked Open
SYS	System Condition Dependent

3.2 Valve Plan Table Description (Cont'd)

Safety Position — The safety function position(s). For valves that perform safety functions in the open and closed positions more than one safety function position may be specified.

C	Closed
D	De-energized (3-way and 4-way valves)
E	Energized (3-way and 4-way valves)
D/E	De-energized or Energized
O	Open
O/C	Open or Closed

Test Type — The test type abbreviation.

LT	Leakage Rate Test
SC	Exercise Closed
SD	De-energize
SE	Energize
SO	Exercise Open
RT	Relief Valve Test
CC	Exercised Closed – Check Valve[1]
CO	Exercise Open – Check Valve[2]
CP	Partial Exercise Open[3]
DT	Rupture Disk / Explosive Valves
FC	Fail Safe Test Closed
FO	Fail Safe Test Open
PI	Position Indication Test

[1] An "A" following the "CC" means acoustics is used to verify closure, "D" is disassembly and inspection, "R" radiography, "U" ultrasonics
[2] An "A" following the "CO" means acoustics is used to verify open, "D" is disassembly and inspection
[3] An "F" following the "CP" means flow is used

3.2 Valve Plan Table Description (Cont'd)

Test Freq. — The test frequency abbreviation.

AJ	Appendix J
CM	Condition Monitoring[4]
CS	Cold Shutdown
M3	Quarterly
RR	Refuel Outage
S2	Explosive Charge Sample
SA	Check Valve Disassembly Sample[5]
Y2	Biennial
Y5	Five Year
Y10	Ten Year

Relief Request — A relief request number is listed when a specific code requirement is determined to be impracticable.

Deferred Just. — Deferred Test Justification. This section refers to Cold Shutdown Justifications and Refuel Outage Justifications.

A Cold Shutdown Justification number is listed when the testing frequency coincides with Cold Shutdowns instead of being performed quarterly. Cold Shutdown Justification numbers for valves are prefixed with "CS".

A Refuel Outage Justification number is listed when the testing frequency coincides with Refuel Outages instead of being performed quarterly or during Cold Shutdowns. Refuel Outage Justification numbers for valves are prefixed with "RJ".

[4] Frequency is as indicated in respective Condition Monitoring Plan for that valve group.
[5] Used for check valve disassembly/inspection per ISTC requirements or to indicate Condition Monitoring frequency as indicated in respective Condition Monitoring Plan for that valve group.

3.2 Valve Plan Table Description (Cont'd)

Tech. Pos. — A technical position number is listed when the requirements of the code are not easily interpreted and clarifying information is needed. The technical position is used to document how Code requirements are being implemented at the station.

4.0 ATTACHMENTS

ATTACHMENT 1

PUMP RELIEF INDEX

(Page 1 of 1)

Designator	Description	Approval Date
None used	None used	

ATTACHMENT 2

NONE USED

ATTACHMENT 3

VALVE RELIEF REQUEST INDEX

(Page 1 of 1)

Designator	Description	Approval Date
RV-1 *VR-1	(1/2FW079A-D) Disassembly per GL 89-04, Position 2, to satisfy the Backflow Test (CC); Approved per GL 89-04	8/04//99
RV-2 *VR-2	(1/2CS003A/B, 1/2CS008A/B, 1/2CS011A/B, 1/2CS020A/B) Sample Disassembly of the 3s, 11s, and 20s on an 18 month frequency and the 8s per GL 89-04, Position 2, to satisfy Full Stroke Testing (CO); proposes using Tech Spec Flow Test in lieu of Disassembly for 11s, and 20s when performed (approx. every 5 years)	8/04/99
RV-3 *VR-3	1/2CC9495A-D Sample Dissembly of one valve per refueling outage to satisfy the Backflow test (CC); approved per GL 89-04, position 2	8/04/99
RV-4 *VR-4	(1/2DG5182A/B, 1/2DG5183A/B, 1/2DG5184A/B, 1/2DG5185A/B) Non-IST Alternative Testing for Diesel Air Start Valves; NRC Prior Approval Not Required as the valves are outside the IST Program scope and are tested in accordance with augmented requirements.	8/04/99

* These were the designators used for these relief requests in the 2nd interval Rev 0 Plan submitted to the NRC. Consequently they are of the previous format.

ATTACHMENT 4

RELIEF REQUEST RV-1

TITLE: Disassembly of the Main Feedwater Header Check Valves

VALVE NUMBER	CATEGORY	CODE CLASS	DRAWING NUMBER	DRAWING COORDINATE
1/2FW079A	C	2	M-36-1C(M-121-1B)	C4 (C4)
1/2FW079B	C	2	M-36-1A(M-121-1D)	C4 (C4)
1/2FW079C	C	2	M-36-1D(M-121-1A)	C4 (C4)
1/2FW079D	C	2	M-36-1B(M-121-1C)	C4 (C4)

FUNCTION(S):

1/2FW079A-D: Closed: Isolate Steam Generators from an upstream pipe break

CODE REQUIREMENT(S):

Per OMa-1988, Part 10, paragraph 4.3.2.1, check valves shall be exercised nominally every 3 months, except as provided by paras. 4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5.

BASIS FOR RELIEF:

The main feedwater header flow check valves are 16-inch tilting disk check valves built with a vertical piston and rod assembly that serves as a controlled closure mechanism; the valves do not have external position indicators. The valves are designed to have a delayed closure time of 2 to 3 seconds to isolate flow during a feedwater line break accident without inducing significant water hammer transients. Their closed safety functions are to 1) mitigate a loss of secondary inventory and/or make-up, and 2) provide pressure integrity between the safety and non-safety related portions of piping.

These valves cannot be exercised to their closed position during power operations because feed flow to a steam generator would be isolated, causing loss of Steam Generator water inventory and a subsequent low S/G level Reactor Trip.

Non-intrusive testing during cold shutdowns has been attempted at Braidwood Station with unreliable results. Specifically, ultrasonic examination of the piston rod position has not conclusively demonstrated valve closure: The anti-slam mechanism prevents the disk from travelling completely to its seat after cessation of forward flow. In fact, during normal feedwater system shutdown evolutions, the valves routinely come to rest at a partial open position -- substantial reverse flow or reverse differential pressure (.5 psid) would be required to bring the disk into contact with the seat. This is in accordance with the valve's design.

RELIEF REQUEST RV-1 (continued)

The alternate test method is sufficient to ensure operability of these valves and is consistent with Generic Letter 89-04 sample disassembly and inspection program. The alternate test method in conjunction with other existing in-service testing of feedwater valves is more than sufficient to ensure the system's ability to safely respond to a feedwater line break accident.

A partial stroke following disassembly (full or partial) is not required for these check valves since an "as left" stroke is performed after the valve is re-assembled except for the installation of the upper bonnet. The installation of the upper bonnet does not affect the stroke of the valve, hence this "as left" stroke would verify that the valve is capable of stroking. In addition, the plant operates with these valves in the open position and open stroke problems would be readily identified during plant startup.

PROPOSED ALTERNATIVE TESTING:

The four valves on each unit 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.

One valve from each group, on a per unit basis, will be fully disassembled and examined each refueling outage. If the initial "fully" disassembled valve is not capable of being full stroke exercised or if there is binding or failure of internals, subsequent disassembly and inspection of the remaining three group members will be commensurate with the initial valve's failure mode.

Commensurate means that the remaining three valves may be "partially" disassembled, which refers to the removal of the accessible components (e.g. seal ring, mating surfaces), and also for manual full stroke closing. A "fully" disassembled valve (minimum of one per outage) would additionally include removal of the valve cylinder, giving access to the disk and seating surfaces. The subsequent disassembly requirements would be satisfied through either "partial" or "full" disassemblies depending on what is found with the initial disassembled valve. This will both satisfy the testing requirements to demonstrate all four valves' ability to perform their safety function and minimize the potential concerns regarding minimum wall thickness discussed earlier. This approach is consistent with Generic Letter 89-04, position 2.

APPROVAL STATUS:

1. Submitted with Revision 0 of Braidwood's 2nd Interval Program (Jan., 1998).
2. Relief granted per Generic Letter 89-04
3. Approved per NRC SER dated August 04, 1998 [In response to Revision 0 of Braidwood's 2nd Interval Program]

4. The valves included in this relief request are in a condition monitoring plan in accordance with ASME Oma-1996 Code Appendix II, as of 9/1/01. The condition monitoring plans describe the inspections for these valves, this relief request is still referenced for these valves as it contains pertinent information pertaining to these valves.

RELIEF REQUEST RV-2

TITLE: Disassembly of Containment Spray Check Valves

VALVE NUMBER	CATEGORY	CODE CLASS	DRAWING NUMBER	DRAWING COORDINATE
1/2CS003A	C	2	M-46-1A(M-129-1A)	E6 (E3)
1/2CS003B	C	2	M-46-1A(M-129-1A)	C6 (C3)
1/2CS008A	AC	2	M-46-1C(M-129-1C)	D6 (D3)
1/2CS008B	AC	2	M-46-1C(M-129-1C)	B6 (B3)
1/2CS011A	C	2	M-46-1A(M-129-1A)	D2 (D8)
1/2CS011B	C	2	M-46-1A(M-129-1A)	B2 (B8)
1/2CS020A	C	2	M-46-1B(M-129-1A)	B2 (D5)
1/2CS020B	C	2	M-46-1B(M-129-1B)	B5 (A5)

FUNCTION(S):

1/2CS003A/B:	Open:	Supply water to the Spray Nozzles
1/2CS008A/B:	Open:	Provides flowpath to Spray Nozzles
	Closed:	Containment Isolation
1/2CS011A/B:	Open:	Supplies NaOH to suction of the CS pump (Eductor Outlet)
1/2CS020A/B:	Open:	Supplies NaOH to suction of the CS pump (Eductor Inlet/Discharge of Spray Add Tank
	Closed:	Prevents backflow to the spray additive tank (quarterly test)

CODE REQUIREMENT(S):

Per OMa-1988, Part 10, paragraph 4.3.2.1, check valves shall be exercised nominally every 3 months, except as provided by paras. 4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5.

BASIS FOR RELIEF:

General: Currently, full flow recirculation flow paths do not exist for the Containment Spray pumps. Extensive modifications to the existing plant design would be required to accommodate full flow testing of the 1/2CS003A,B and 1/2CS008A/B check valves, including the penetration of containment integrity. Additionally, NaOH in the spray additive tank limits the stroking of the 1/2CS011A,B and 1/2CS020A/B valves. Finally, the use of nonintrusive techniques, such as acoustic monitoring and magnetics, have not been successful in proving full stroking on this type of valve (dual disk).

RELIEF REQUEST RV-2 (continued)

Generic Letter 89-04, position 2, "Alternative to Full Flow Testing of Check Valves" allows for disassembly and inspection of check valves on a sampling basis during refueling outages. The purpose of this relief request is two fold. One is to establish a basis for performing disassemblies on these valves during refueling outages as established in Generic Letter 89-04, position 2. The second purpose is to establish a basis for performing disassembly and inspection using a sampling plan at the same approximate frequency as refueling outages, every 18 months, but not necessarily during the refueling outage mode (such as performing the disassembly and inspection during an operating mode). This second purpose would apply to the 1/2CS003A/B, 1/2CS011A/B, and 1/2CS020A/B. The 1/2CS008A/B valves disassemblies will remain during outages, due to their physical location in containment.

Per NUREG 1482, Appendix A, "Positions, Questions, Responses, and Current Considerations Regarding Generic Letter 89-04," Question Group 14 considers the question of disassembling valves during a non-refueling outage schedule. Under "Current Considerations" for this question group, it states that "If it is practical to disassemble and inspect the selected valves at a frequency not determined by refueling outages, the licensee may establish a schedule for these valves that does not conform to a refueling outage schedule. However, ...entry into an LCO to perform the activity may not be acceptable (See Section 3.1.2)." Braidwood Station feels that the entry into the Containment Spray LCO to perform these check valve inspections would not create a significant safety or equipment problem which would discourage this activity. Per Braidwood Technical Specifications there is a 7 day LCO to restore an inoperable Containment Spray System. If this could not be met, then the shutdown process would begin. However, the work involved with these check valves is easily completed within the 7 day LCO. Additionally, having a Containment Spray Train inoperable is low in risk significance when considering Braidwood's PRA analysis. Braidwood Station feels that it would be practical to disassemble and inspect these valves during nonoutage time periods. The NUREG 1482 Appendix A discussion discussed above, provides that a schedule may be established that does not conform to a refueling outage schedule.

Previous inspections at Braidwood and Byron stations, have shown no evidence of degradation or physical impairment which would inhibit the valves from performing the functions described in this relief request. These valves are not expected to experience degradation or impairment since the valves are infrequently actuated. 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. An 18 month frequency is being requested for the 1/2CS003A/B, 1/2CS011A/B, and 1/2CS020A/B valves to be consistent with Braidwood's current refueling outage frequency of 18 months.

RELIEF REQUEST RV-2 (continued)

Because of the significant work involved with the isolation, draining, maintenance, inspections, and partial stroke testing of the valves, along with the superior results of past inspections, it is clearly impractical and burdensome to perform disassemblies as frequently as quarterly or during cold shutdowns.

Additional technical support in justification for this relief request is provided for each set of valves in parts A-D of this section.

A. 1/2CS008A,B: With the existing plant configuration, these valves cannot be full flow or partial flow tested during unit operation, cold shutdown or refueling, as water from the CS pumps would be discharged through the CS ring headers, causing undesirable effects on system components inside containment. Additionally, it is impractical to erect temporary large bore piping from the CS line to the reactor cavity, during cold shutdowns or refueling outages, in order to perform a full stroke test on these valves. The filling of the cavity would require the removal of the reactor vessel head to preclude equipment damage from borated water and the construction of the temporary piping would take an estimated nine to twelve shifts (or longer) to complete. There would be even more time involved with the draining and removal of the piping from containment following the completion of the test.

   Partial stroking of these valves using air during Unit operation, cold shutdown, or refueling 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 required portion of piping to perform this test may cause deposition of boric acid residue which could in turn promote binding of the check valve internals.

B. 1/2CS003A,B: These valves cannot be full stroke tested due to the existing plant configurations, as previously discussed for the 1/2CS008A,B valves. However, these valves are partially stroked quarterly since they are in the flowpath of their respective Containment Spray pump runs.

C. 1/2CS011A,B: These valves cannot be full stroke tested during Unit operation or cold shutdown as NaOH from the spray additive tank would be discharged throughout the CS system causing undesirable chemical effects on the reactor makeup supply (RWST) and associated systems. Additionally, personnel safety would also be a factor, since NaOH is a hazardous caustic chemical. However, these valves are partially stroked quarterly during respective Containment Spray Pump runs in which the eductor flow passes through the valve, while the spray additive tank is isolated, eliminating the NaOH flow required for the full stroke.

RELIEF REQUEST RV-2 (continued)

Full flow testing of these valves is accomplished a minimum of once every 5 years through the use of a temporary test hook-up in which flushing of the system is necessitated. Performing this testing on a more frequent basis is undesirable due to the accumulation of nearly two 55 gallon drums of potentially radioactive/toxic mixed waste that requires either recycling or disposal. Additionally, the handling of this material poses a significant safety hazard to personnel, resulting in eye damage and/or chemical burns if splashed or spilled. This testing, currently performed every five years per Technical Specification 4.6.2.2, would be impractical and burdensome to perform on a more frequent basis.

Non-intrusive techniques (acoustics and magnetics) have been attempted with unsuccessful results since the amount of flow required to full stroke the disks (critical velocity of 10 ft/sec) cannot be obtained based on current system design.

D. 1/2CS020A,B: These valves cannot be full stroked or partial stroked during unit operation, or cold shutdowns, for the same reasons as stated for the full flow testing of the 1/2CS011A,B valves. The Spray Additive tank is isolated during pump runs, so no flow is passed through the 1/2CS020A/B valves during this testing.

Additionally, the Tech Spec full flow test, performed a minimum of once every five years, would apply to these check valves in addition to the 1/2CS011A/B valves. The hardship involved with the hazardous mixed waste disposal and handling caustic material with regards to personnel safety does not provide a compensated increase in safety of the CS system equipment (in regards to performing the test more than once every five years). The five year frequency on this Technical Specifications test in conjunction with the disassemblies performed, will more than adequately ensure operability of these valves.

RELIEF REQUEST RV-2 (continued)

PROPOSED ALTERNATIVE TESTING:

Per Generic Letter 89-04, position 2, "...valve disassembly and inspection can be used as a positive means of determining that a valve's disk will full stroke exercise open..." Once stroked in the full open position, the valve's discs are then returned to their full closed position. The provisions of this position may be used in the case of the CS check valves for the open direction as follows:

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

Group 1 (U-1)	Group 2 (U-1)	Group 3 (U-1)	Group 4 (U-1)
1CS003A	1CS008A	1CS011A	1CS020A
1CS003B	1CS008B	1CS011B	1CS020B

Group 5 (U-2)	Group 6 (U-2)	Group 7 (U-2)	Group 8 (U-2)
2CS003A	2CS008A	2CS011A	2CS020A
2CS003B	2CS008B	2CS011B	2CS020B

Group numbers 1, 3, and 4, 5,7,and 8: One valve from each group, on a per Unit basis, will be disassembled on an eighteen month frequency without restrictions on plant mode. Additionally, following re-installation, the 1/2CS003A,B and 1/2CS011A,B valves will be partial stroke tested using the CS pumps and the 1/2CS020A,B valves will be partial stroke tested using an alternate water source (Note: the 1/2CS020A,B test for the closed position is currently performed quarterly). When the Technical Specification full stroke testing of the respective CS020 and CS011 valves is completed, it may be used to satisfy the full stroke testing in lieu of the disassembly plan (if within the 18 month frequency guidelines established).

If a valve disassembled during power operation is found failed, Braidwood will evaluate the operability status of the remaining valve in the group. Expanding the sample expansion to the other valve in the group will be determined form the guidance provided by Generic Letter 90-04.

RELIEF REQUEST RV-2 (continued)

Group number 2 and 6: One valve from each group, on a per Unit basis, will be disassembled on a refueling outage frequency. If the disassembled valve is not capable of being full-stroke exercised or if there is binding or failure of valve internals, the remaining valve on the affected unit will be inspected prior to startup. This methodology is consistent with Generic Letter 89-04, position 2; prior NRC approval is not required. Since partial stroking is impractical, the as-left Appendix J leak rate test ensures the correct installation of the valve.

APPROVAL STATUS:

1. Submitted with Revision 0 of Braidwood's 2nd Interval Program (Jan., 1998).

2. Conditionally approved per NRC SER, dated August 4, 1998, in response to Revision 0 of Braidwood's 2nd Interval Program. Approval is granted, provided the considerations in Section 2.1.1 of the August 4, 1998 NRC SER are addressed. Braidwood has considered the items from section 2.1.1 of the NRC SER and has determined that the guidelines paraphrased from NRC Inspection Manual, Part 9900, represent general work practices/consideration at Braidwood.

3. The valves included in this relief request are in a condition monitoring plan in accordance with ASME Oma-1996 Code Appendix II, as of 9/1/01. The condition monitoring plans describe the inspections for these valves, this relief request is still referenced for these valves as it contains pertinent information pertaining to these valves.

RELIEF REQUEST RV-3

TITLE: Disassembly of the Component Cooling Water Supply to the Reactor Coolant Pump Thermal Barrier Check Valves

VALVE NUMBER	CATEGORY	CODE CLASS	DRAWING NUMBER	DRAWING COORDINATE
1/2CC9495A	BC	3	M-66-1B(M-139-1)	E4 (C4)
1/2CC9495B	BC	3	M-66-1B(M-139-1)	D4 (C4)
1/2CC9495C	BC	3	M-66-1B(M-139-1)	C4 (C4)
1/2CC9495D	BC	3	M-66-1B(M-139-1)	B4 (C4)

FUNCTION(S):

The 1/2CC9495A-D check valves are the component cooling water supply check valves to the Reactor Coolant Pump (RCP) Thermal Barriers. These valves are required to close to isolate the component cooling system in the event of a thermal barrier tube failure.

CODE REQUIREMENT(S):

Per Oma-1988, Part 10, Paragraph 4.3.2.1, check valves shall be exercised nominally every 3 months, except as provided by Paragraphs 4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5.

BASIS FOR RELIEF:

These valves cannot be verified for closure during Unit operation. In order to verify these valves are closed, the corresponding RCP must be off and cooling flow isolated. Isolating Component Cooling Water flow to the RCP during Unit operation is undesirable and may result in eventual pump damage and/or trip. Additionally, these valves are located in the containment building, inside the missile barrier, where entry requires a significant power reduction (to approximately 30% reactor total power) to reduce radiation levels (estimated to be 100to 200 mr/hr generally when shut down).

Various methods of testing these valves to the closed direction were considered. The most practical and effective means of testing these valves is by means of disassembly and inspection. This will be performed at refueling outages, as permitted in OM Part 10 4.3.2.4(c). A sample disassembly and inspection plan will be used as provided by Generic Letter 89-04. Generic Letter 89-04 allows valves of similar design, service conditions, size, materials of construction, to be classified in sample disassembly and inspection groups of up to four members with testing of one valve in the group during each refueling outage. Additionally, these valves are designed with seal welded bonnet/cap and requires grinding and re-welding during inspection activity. This takes more than one shift to accomplish.

RELIEF REQUEST RV-3 (continued)

PROPOSED ALTERNATE TESTING:

The four Unit 1 valves will compose one group, the four Unit 2 valves will compose another group. One valve from each group, on a per unit basis, will be disassembled and inspected on a refueling outage frequency. If the initial disassembled valve is not capable of being full stroke exercised, or if there is binding or failure of valve internals, subsequent disassembly and inspection of the remaining three group members will be performed. This method is consistent with Generic Letter 89-04, Position 2.

APPROVAL STATUS:

1. Relief Granted per Generic Letter 89-04.

2. Approved per NRC SER of August 4, 1998.

3. The valves included in this relief request are in a condition monitoring plan in accordance with ASME Oma-1996 Code Appendix II, as of 9/01/01. The condition monitoring plans describe the inspections for these valves, this relief request is still referenced for these valves as it contains pertinent information pertaining to these valves.

RELIEF REQUEST RV-4

TITLE: Non-IST Monthly Test of Diesel Generator Air Start System Valves

VALVE NUMBER	CATEGORY	CODE CLASS	DRAWING NUMBER	DRAWING COORDINATE
1/2DG5182A	B	N/A	M-152-20	B5 (B5)
1/2DG5182B	B	N/A	M-152-20	B5 (B5)
1/2DG5183A	B	N/A	M-152-20	E5 (E5)
1/2DG5183B	B	N/A	M-152-20	E5 (E5)
1/2DG5184A	C	N/A	M-152-20	B6 (B6)
1/2DG5184B	C	N/A	M-152-20	B6 (B6)
1/2DG5185A	C	N/A	M-152-20	F6 (F6)
1/2DG5185B	C	N/A	M-152-20	F6 (F6)

FUNCTION(S):

This relief request covers the open function of these valves only. They are required to open in order to supply starting air to the Diesel Generators.

CODE REQUIREMENT(S):

These valves are not within the scope of the IST Program per 10 CFR50.55 (a). 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 10 CFR50.55 (6)(ii).

Therefore, valves associated with the Diesel Air Start System shall be exercised to the position required to fulfill their function per OM-10, Paragraphs 4.2.1.1 and 4.3.2.2. Additionally, the stroke testing of power operated valves shall be measured to the nearest second and such stroke times compared to the initial reference valves to document continued valve operational readiness per OM-10, paras. 4.2.1.4(b), 4.2.1.8, and 4.2.1.9.

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 OM-10, Paragraph 4.2.1.2. 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.

RELIEF REQUEST RV-4 (continued)

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.

PROPOSED ALTERNATIVE TESTING:

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

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

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

APPROVAL STATUS:

1. Submitted with Revision 0 of Braidwood's 2nd Interval Program (Jan., 1998).
2. This relief was evaluated and approved for the First Interval IST Program. due to involvement of Non-IST Components (Dec., 1995).
3. Approved, due to involvement of Non-IST Components, per NRC SER, dated August 4, 1998 [In response to Revision 0 of Braidwood's 2nd Interval Program].

ATTACHMENT 5

COLD SHUTDOWN JUSTIFICATION INDEX

(Page 1 of 3)

Designator	Description	Approval Date
CS-1	(1/2MS001A-D) Stroke Time Test (SC) during Cold Shutdown	January, 1998
CS-2	(1/2CV8104; 1/2CV8442; 1/2CV8804A; 1/2CV112D; 1/2CV112E) Full Stroke Test of 1/2CV8442 and Stroke Time Test of remaining valves during Cold Shutdown	January, 1998
CS-3	(1/2FW009A-D) Stroke Time Test (SC) during Cold Shutdown	January, 1998
CS-4	(1/2CV112B; 1/2CV112C; 1/2CV8105; 1/2CV8106; 1/2CV8152; 1/2CV8160) Stroke Time Test (SC) during Cold Shutdown and Fail Safe Test Closed (FC) of 1/2CV8152 and 1/2CV8160 during Cold Shutdown	January, 1998
CS-5	(1/2RH8701A/B; 1/2RH8702A/B) Stroke Time Test (SC) during Cold Shutdown	January, 1998
CS-6	(1/2RC014A-D) Stroke Time Test (SC) / Fail Safe Test Closed (FC) during Cold Shutdown	January, 1998
CS-7	(1/2RH8730A/B) Full Stroke Test (CO) / Backflow Test (CC) during Cold Shutdown and Partial Stroke Test (CP) Quarterly	January, 1998
CS-8	(1/2SI8818A-D; 1/2SI8958A/B) Full Stroke Test (CO) during Cold Shutdown	January, 1998
CS-9	(2FW039A-D) Stroke Time Test (SC) and Fail Safe Test Closed (FC) during Cold Shutdown	January, 1998
CS-10	(1/2CV459; 1/2CV460) Stroke Time Test (SC) and Fail Safe Test Closed (FC) during Cold Shutdown	January, 1998
CS-11	DELETED	

COLD SHUTDOWN JUSTIFICATION INDEX

(Page 2 of 3)

Designator	Description	Approval Date
CS-12	(1/2SI8801A/B) Stroke Time Test (SO/SC) during Cold Shutdown	January, 1998
CS-13	(1/2SI8802A/B; 1/2SI8806; 1/2SI8809A/B; 1/2SI8813; 1/2SI8835; 1/2SI8840) Stroke Time Test (SO/SC) during Cold Shutdown	January, 1998
CS-14	(1/2RY455A; 1/2RY456) Stroke Time Test (SO/SC) and Fail Safe Test Closed (FC) during Cold Shutdown	January, 1998
CS-15	Pressure Isolation Valves (PIVs) and 1/2RH8705A/B Leak Test (LT) during Cold Shutdown for all per Technical Specifications and Back Flow Test (CC) for Check Valves at the same frequency	May, 2000
CS-16	Not used	
CS-17	DELETED	
CS-18	(1/2RH8716A/B) Stroke Time Test (SO/SC) during Cold Shutdown	January, 1998
CS-19	(1/2CC685, 1/2CC9413A, 1/2CC9414, 1/2CC9415, 1/2CC9416, 1/2CC9438, 1/2CV8100, 1/2CV8112) Stroke Time Test (SC) during Cold Shutdown with no RCPs running	May 2000 Revised
CS-20	DELETED	
CS-21	(1/2SI8808A-D) Stroke Time Test (SC) during Cold Shutdown	January, 1998
CS-22	(1/2CV8355A-D) Stroke Time Test (SO) during Cold Shutdown with no RCPs running	January, 1998
CS-23	(1SD054A-H; 2SD054B,D,F,H) Stroke Time Test (SC) and Fail Safe Test Closed (FC) during Cold Shutdown	January, 1998

COLD SHUTDOWN JUSTIFICATION INDEX

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Designator	Description	Approval Date
CS-24	(1/2VQ001A,B; 1/2VQ002A,B) Stroke Time Test (SC) and Fail Safe Test Closed (FC) During Cold Shutdown or as Required to Declare Operability	January, 1998
CS-25	DELETED	

ATTACHMENT 6

COLD SHUTDOWN JUSTIFICATION: CS-1

(Page 1 of 1)

Component Number	System	Code Class	Category
1/2MS001A	Main Steam	2	B
1/2MS001B	Main Steam	2	B
1/2MS001C	Main Steam	2	B
1/2MS001D	Main Steam	2	B

Component Function(s)

These are the Main Steam Isolation Valves (MSIVs). In the normally open position, steam is supplied to the turbine. The valves are required to close to isolate the main steam line to prevent: reverse flow into containment during a main steam line break, Steam Generator Blowdown during a major steamline break outside of containment, and secondary system contamination from a Steam Generator tube rupture.

Justification

Closure of the main steam isolation valves 1MS001A-D or 2MS001A-D during Unit operation would result in a significant steam generator transient and a manual reactor trip. Failure of these valves during partial stroke testing can result in valve closure and subsequent reactor trip. NUREG-1482 section 4.2.4 states, "MSIVs should not be tested at power, since even a part-stroke exercise increases the risk of a valve closure when the Unit is generating power."

Because stroke testing of these valves at power would result in a reactor trip, and because partial stroke testing at power presents the unwarranted risk of a potential reactor trip, testing of these valves during operation is not practical. Stroke time testing of the Main Steam Isolation Valves will be completed during cold shutdown, as conditions allow, in accordance with OM-10, paragraph 4.2.1.2. The actual test modes are Modes 3-6, but normally testing is performed in Modes 3 or 4 before or after cold shutdowns.

COLD SHUTDOWN JUSTIFICATION: CS-2

(Page 1 of 1)

Component Number	System	Code Class	Category
1/2CV8104	Chemical and Volume Control	2	B
1/2CV8442	Chemical and Volume Control	2	C
1/2CV8804A	Chemical And Volume Control	2	B
1/2CV112D	Chemical And Volume Control	2	B
1/2CV112E	Chemical And Volume Control	2	B

Component Function(s)

These are the emergency boration flowpath valves. The 1/2CV8104 is the emergency boration valve and the 1/2CV8442 is the emergency boration header check valve. The 1/2CV8804A is the RH heat exchanger 1A to charging pumps suction isolation valve required to be open for Post LOCA recovery. The 1/2CV112D and 1/2CV112E are the RWST to charging pumps suction isolation valves which are in the emergency boration flowpath when the RWST is the Boration Source.

Justification

The testing of any emergency boration flowpath valves during Unit operation is not practical. Stroke testing the boric acid injection isolation valve 1/2CV8104 and check valve 1/2CV8442, the RH to CV pump suction isolation valve 1/2CV8804A, or the RWST to CV pump suction isolation valves 1/2CV112D/E could result in boration of the RCS, resulting in a cooldown or reactivity 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 OM-10, paragraphs 4.2.1.2 and 4.3.2.2, and ISTC 4.5.2.

COLD SHUTDOWN JUSTIFICATION: CS-3

(Page 1 of 1)

Component Number	System	Code Class	Category
1/2FW009A	Feed Water	2	B
1/2FW009B	Feed Water	2	B
1/2FW009C	Feed Water	2	B
1/2FW009D	Feed Water	2	B

Component Function(s)

These are the main feedwater isolation valves (FWIVs). They are open during normal operation to allow flow to the Steam Generator (non-IST function). They are required to close for Feedwater Isolation and Containment Isolation.

Justification

The main feedwater isolation valves cannot be fully stroked during operation as feedwater would be terminated causing a reactor trip. Failure of these valves during partial stroke testing can result in valve closure and subsequent reactor trip.

Because stroke testing of these valves at power would result in a reactor trip, and because partial stroke testing at power presents the unwarranted risk of a potential reactor trip, testing of these valves during operation is not practical. Stroke time testing of the Main Feedwater Isolation Valves will be completed during cold shutdown, as conditions allow, in accordance with OM-10, paragraph 4.2.1.2.

COLD SHUTDOWN JUSTIFICATION: CS-4

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Component Number	System	Code Class	Category
1/2CV112B	Chemical And Volume Control	2	B
1/2CV112C	Chemical And Volume Control	2	B
1/2CV8105	Chemical And Volume Control	2	B
1/2CV8106	Chemical And Volume Control	2	B
1/2CV8152	Chemical And Volume Control	2	A
1/2CV8160	Chemical And Volume Control	2	A

Component Function(s)

The 1/2CV112B & C are the volume control tank outlet isolation/charging pump suction valves. The 1/2CV8105 and 1/2CV8106 are the normal charging path containment isolation valves. The 1/2CV8152 and the 1/2CV8160 are the letdown line containment isolation valves. These valves are part of the chemical and volume control system (CVCS).

Justification

Closure of these letdown and charging makeup valves 1/2CV112B/C, 1/2CV8105, 1/2CV8106, 1/2CV8152, and 1/2CV8160 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. Additionally, isolating letdown during normal Unit operation would result in a thermal transient on the charging nozzle. Valves 1/2CV8152 and 1/2CV8160 will be stroke time tested during cold shutdown in accordance with OM-10, paragraph 4.2.1.2 (also covers fail-safe tests for 1/2CV8152 and 1/2CV8160). As valves 1/2CV112B/C are the volume control tank outlet isolation/charging pump suction valves, they should not be closed while the charging pumps are running. As valves 1/2CV8105 and 1/2CV8106 are in the normal charging flow path, they should not be closed while the charging pumps are running. Valves 1/2CV112B/C, 1/2CV8105, and 1/2CV8106 will be exercised during Cold Shutdown when the charging pumps are not running, as a result they may not be tested during cold shutdowns in which the charging pumps are not secured for sufficient duration to perform the tests. It is not the intent of this justification to require charging pump shutdown only to perform the exercise test for these valves. Valves 1/2CV112B/C, 1/2CV8105, and 1/2CV8106 will be tested during Cold Shutdown in which the charging pumps are secured for sufficient duration to perform the tests, which is in accordance with OM-10, paragraph 4.2.1.2.

COLD SHUTDOWN JUSTIFICATION: CS-5

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Component Number	System	Code Class	Category
1/2RH8701A	Residual Heat Removal	1	A
1/2RH8701B	Residual Heat Removal	1	A
1/2RH8702A	Residual Heat Removal	1	A
1/2RH8702B	Residual Heat Removal	1	A

Component Function(s)

The 1RH8701A/B, 2RH8701A/B, 1RH8702A/B and 2RH8702A/B valves are the isolation boundary between the Residual Heat Removal Pumps and the Reactor Coolant System. The RH8701 valves isolate the "A" loop of the RCS from the "A" RHR pump suction. The RH8702 valves isolate the "C" loop of the RCS from the "B" RHR pump suction.

Justification

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 and potentially unsafe condition. Therefore, these valves will be full stroke tested during cold shutdown, in accordance with OM-10, paragraph 4.2.1.2.

COLD SHUTDOWN JUSTIFICATION: CS-6

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Component Number	System	Code Class	Category
1/2RC014A	Reactor Coolant	1	B
1/2RC014B	Reactor Coolant	1	B
1/2RC014C	Reactor Coolant	1	B
1/2RC014D	Reactor Coolant	1	B

Component Function(s)

These are the reactor head vent valves and are used to vent the reactor of hydrogen or other post-accident gases.

Justification

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 exercised and fail safe tested when the RCS pressure is at a minimum during cold shutdown, in accordance with OM-10, paragraph 4.2.1.2.

COLD SHUTDOWN JUSTIFICATION: CS-7

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Component Number	System	Code Class	Category
1/2RH8730A	Residual Heat Removal	2	C
1/2RH8730B	Residual Heat Removal	2	C

Component Function(s)

These are the RHR pump discharge check valves. The open function of these valves is to provide an RHR pump flowpath. The closure function is to prevent back leakage while the opposite train is in operation during post-accident situations.

Justification

The Residual Heat Removal Pump discharge check valves 1RH8730A/B and 2RH8730A/B cannot be full stroke exercised during Unit operation due to the RCS pressure being greater than the RH pumps are capable of putting out. These check valves will be partial stroke tested, however, on a quarterly basis during the mini-flow recirculation RHR pump tests and full stroke exercised during cold shutdown. This is in accordance with OM-10, paragraph 4.3.2.2.

Additionally, it would be impractical to backflow test these valves during Unit operation. The methodology for testing these valves involves closing the mini-flow valve on the train being tested and having the opposite train provide pressure against the check valve being tested. The test is satisfied by verifying that the pump on the same train as the check valve is not rotating backwards. However, this testing would put the plant in an undesirable condition as both trains of RH would be considered inoperable. During cold shutdowns, the train running on shutdown cooling may be used to pressurize against the opposite train's check valve. For this reason, these valves will be backflow tested during cold shutdown in accordance with ISTC 4.5.2.

COLD SHUTDOWN JUSTIFICATION: CS-8

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Component Number	System	Code Class	Category
1/2SI8818A	Safety Injection	1	AC
1/2SI8818B	Safety Injection	1	AC
1/2SI8818C	Safety Injection	1	AC
1/2SI8818D	Safety Injection	1	AC
1/2SI8958A	Safety Injection	2	C
1/2SI8958B	Safety Injection	2	C

Component Function(s)

The SI8818 valves are the safety injection RCS Loop 1 cold leg upstream check valves located in the flowpath from the Residual Heat Removal (RHR) pumps. The SI8958 valves are the safety injection RWST outlet check valves to the RHR pumps.

Justification

Due to the high RCS pressure during Unit operation (2235 psi), these valves cannot be full or partial stroke exercised during quarterly testing. The 1/2SI8958A/B check valves, although located at the suction of the RHR pumps, are not in the recirculation flow path to allow partial stroking each quarter. These valves will be full stroke exercised during cold shutdown, in accordance with ISTC 4.5.2.

COLD SHUTDOWN JUSTIFICATION: CS-9

(Page 1 of 1)

Component Number	System	Code Class	Category
2FW039A	Feed Water	2	B
2FW039B	Feed Water	2	B
2FW039C	Feed Water	2	B
2FW039D	Feed Water	2	B

Component Function(s)

These are the steam generator feedwater preheater bypass downstream isolation valves. They provide for Feedwater/Containment isolation in the closed position. They are normally open air operated valves located on the cross-tie lines connecting the main FW line to the tempering line.

Justification

It is not practical for the 2FW039A-D valves to be stroke tested during normal operation as closure of these valves would require a power reduction from full power to less than 80%. Stroking these valves closed above 80% would result in undesirable preheater tube vibrations within the Steam Generators. These valves will be stroke time/fail safe tested during cold shutdown, in accordance with OM-10, paragraph 4.2.1.2.

COLD SHUTDOWN JUSTIFICATION: CS-10

(Page 1 of 1)

Component Number	System	Code Class	Category
1/2CV459	Chemical And Volume Control	1	B
1/2CV460	Chemical And Volume Control	1	B

Component Function(s)

CV459 & 460 valves are normally OPEN with the Unit at power, allowing letdown flow to occur. The valves auto close on low Pressurizer level and on letdown isolation due to an interlock with the orifice isolation valves.

Justification

It is impractical to exercise and stroke time the above listed valves on a quarterly basis. Due to the interlocks between the 1/2CV459, 1/2CV460, & the 1/2CV8149A-C valves, exercising these valves during normal operation results in (multiple) total letdown flow isolation events. The affect of a letdown isolation with the Unit at power is a thermal transient to the RPV charging nozzle. A letdown isolation also results in some amount of pressurizer level fluctuation until equilibrium letdown and makeup is re-established. While the piping and components are designed for thermal transients, each cycle presents some additional stress to all of the affected equipment. It is prudent to minimize the number of transients the equipment is required to undergo to prevent premature failures.

Due to the above, these valves will be stroke tested and failed safe tested in Cold Shutdowns in accordance with OM-10, paragraph 4.2.1.2.

COLD SHUTDOWN JUSTIFICATION: CS-11

DELETED

COLD SHUTDOWN JUSTIFICATION: CS-12

(Page 1 of 1)

Component Number	System	Code Class	Category
1/2SI8801A	Safety Injection	2	B
1/2SI8801B	Safety Injection	2	B

Component Function(s)

These are the charging pumps to RCS cold leg isolation valves. They are required to open to provide a flow path for the high head safety injection portion of ECCS. They are required to close for containment isolation.

Justification

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 stroke time tested during cold shutdowns provided the charging pumps are shutdown. As a result, they may not be tested during cold shutdowns for which the charging pumps are required to be running. It is not the intent of this justification to require charging pump shutdown to perform the exercise test for these valves. These valves will be tested during cold shutdowns in which the charging pumps are secured for sufficient duration to perform the tests, which is in accordance with OM-10, paragraph 4.2.1.2.

COLD SHUTDOWN JUSTIFICATION: CS-13

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Component Number	System	Code Class	Category
1/2SI8802A	Safety Injection	2	B
1/2SI8802B	Safety Injection	2	B
1/2SI8806	Safety Injection	2	B
1/2SI8809A	Safety Injection	2	B
1/2SI8809B	Safety Injection	2	B
1/2SI8813	Safety Injection	2	B
1/2SI8835	Safety Injection	2	B
1/2SI8840	Safety Injection	2	B

Component Function(s)

The SI8802 valves are the Safety Injection to the Reactor Coolant System (RCS) hot leg (1A/1D, 1B/1C) isolation valves. The SI8806 valves are the A and B train SI pump suction isolation valves from the RWST. The SI8809 valves are the Residual Heat Removal (RHR) pumps to RCS cold leg isolation valves. The SI8813 valves are the SI pumps common mini-flow recirculation isolation valves. The SI8835 valves are the SI pumps cold leg isolation valves. The SI8840 valves are the RHR to RCS hot legs 1A/1D isolation valves.

Justification

The safety injection system SVAG (Spurious Valve Actuation Group) valves 1/2SI8802A/B, 1/2SI8806, 1/2SI8809A/B, 1/2SI8813, 1/2SI8835, and 1/2SI8840 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 OM-10, paragraph 4.2.1.2.

COLD SHUTDOWN JUSTIFICATION: CS-14

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Component Number	System	Code Class	Category
1/2RY455A	Residual Heat Removal	1	B
1/2RY456	Residual Heat Removal	1	B

Component Function(s)

Pressurizer Power Operated Relief Valves are required to open for low temperature overpressure protection. The closed function is for pressure isolation.

Justification

PORV's 1/2RY455A and 1/2RY456 will be stroke/fail safe tested on a cold shutdown frequency per Generic Letter 90-06. This recommendation comes from Enclosure A to Generic Letter 90-06, which addresses the NRC staff positions concerning PORV and Block Valve Reliability. Item number 3.1.2 states that the "Stroke testing of PORVs should only be performed during Mode 3 (HOT STANDBY) or Mode 4 (HOT SHUTDOWN) and in all cases prior to establishing conditions where the PORVs are used for low-temperature overpressure protection. Stroke testing of the PORV's should not be performed during power operation." For this reason, these valves will be stroke time tested/fail-safe tested during cold shutdowns in accordance with OM-10, paragraph 4.2.1.2 and Generic Letter 90-06. The actual test mode will be Mode 3 or 4, as the Technical Specifications require full cycle operation in Mode 3 or 4 once per 18 months. This is accomplished before entering Mode 5 during plant shutdowns per station procedures.

COLD SHUTDOWN JUSTIFICATION: CS-15

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Component Number	System	Code Class	Category
1/2RH8701A	Residual Heat Removal	A	1
1/2RH8701B	Residual Heat Removal	A	1
1/2RH8702A	Residual Heat Removal	A	1
1/2RH8702B	Residual Heat Removal	A	1
1/2RH8705A	Residual Heat Removal	A	2
1/2RH8705B	Residual Heat Removal	A	2
1/2SI8815	Safety Injection	AC	1
1/2SI8818A	Safety Injection	AC	1
1/2SI8818B	Safety Injection	AC	1
1/2SI8818C	Safety Injection	AC	1
1/2SI8818D	Safety Injection	AC	1
1/2SI8819A	Safety Injection	AC	1
1/2SI8819B	Safety Injection	AC	1
1/2SI8819C	Safety Injection	AC	1
1/2SI8819D	Safety Injection	AC	1
1/2SI8841A	Safety Injection	AC	1
1/2SI8841B	Safety Injection	AC	1
1/2SI8900A	Safety Injection	AC	1
1/2SI8900B	Safety Injection	AC	1
1/2SI8900C	Safety Injection	AC	1
1/2SI8900D	Safety Injection	AC	1
1/2SI8905A	Safety Injection	AC	1
1/2SI8905B	Safety Injection	AC	1
1/2SI8905C	Safety Injection	AC	1
1/2SI8905D	Safety Injection	AC	1
1/2SI8948A	Safety Injection	AC	1
1/2SI8948B	Safety Injection	AC	1
1/2SI8948C	Safety Injection	AC	1
1/2SI8948D	Safety Injection	AC	1
1/2SI8949A	Safety Injection	AC	1
1/2SI8949B	Safety Injection	AC	1
1/2SI8949C	Safety Injection	AC	1
1/2SI8949D	Safety Injection	AC	1
1/2SI8956A	Safety Injection	AC	1
1/2SI8956B	Safety Injection	AC	1
1/2SI8956C	Safety Injection	AC	1
1/2SI8956D	Safety Injection	AC	1

Component Function(s)

The listed valves have been identified as intersystem LOCA valves. Only the closed function of these valves will be addressed in this justification. These valves form a pressure boundary between the RCS and the other essential components in order to protect these components from damage.

Justification

All of these valves are considered pressure isolation valves (PIVs) per the Technical Specifications, except for the 1/2RH8705A/B valves, which will be tested on the same frequency since they are tested in conjunction with the 1/2RH8701/2 valves. The performance of the leak test also satisfies the backflow test required for check valves by NRC Generic Letter 89-04. These valves will be backflow/leak tested during cold shutdowns, in accordance with OM-10, paragraph 4.2.1.2 and 4.3.2.2, and ISTC 4.5.2.

Additionally, pressure isolation valves are required to be tested in accordance with Technical Specification SR 3.4.14.1. The Technical Specification requires that if the Unit is in cold shutdown for 7 days or more and the valves have not been tested in the past nine months, they will be leak tested prior to entry into Mode 2.

COLD SHUTDOWN JUSTIFICATION: CS-16

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NOT USED

COLD SHUTDOWN JUSTIFICATION: CS-17

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DELETED

COLD SHUTDOWN JUSTIFICATION: CS-18

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Component Number	System	Code Class	Category
1/2RH8716A	Residual Heat Removal	2	B
1/2RH8716B	Residual Heat Removal	2	B

Component Function(s)

These valves are the Residual Heat Removal system cross connect valves that are required to be open to allow injection into all four RCS loops. Both A and B valves are required to be open for train operability of either train of RHR. The valves are required to be closed during cold leg recirculation and open during hot leg recirculation.

Justification

Technical Specifications require these valves to be open. Stroking either valve closed would make both trains of RH inoperable, which is a violation of the Technical Specification. They can only be exercised during cold shutdown or refuel. These valves will be stroke timed closed and open during cold shutdowns in accordance with OM-10, paragraph 4.2.1.2.

COLD SHUTDOWN JUSTIFICATION: CS-19

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Component Number	System	Code Class	Category
1/2CC685	Component Cooling	2	A
1/2CC9413A	Component Cooling	2	A
1/2CC9414	Component Cooling	2	A
1/2CC9415	Component Cooling	3	B
1/2CC9416	Component Cooling	2	A
1/2CC9438	Component Cooling	2	A
1/2CV8100	Chemical & Volume Control	2	A
1/2CV8112	Chemical & Volume Control	2	A

Component Function(s)

Motor operated valves 1/2CC685 and 1/2CC9438 function in the closed position to provide a limited leakage barrier between the containment atmosphere and the environment during accident conditions. These valves open to provide a return flow path from the RCP Thermal Barrier.

Motor operated valves 1/2CC9413A are the component cooling water supply to RCP isolation valves. These valves must close to provide containment isolation. These valves open to supply component cooling water to the RCPs.

Motor operated valves 1/2CC9414 and 1/2CC9416 are the component cooling water return line from the RCPs isolation valves. These valves close to provide containment isolation. These valves open to provide a component cooling water return path from the RCPs.

Motor operated valves 1/2CC9415 are in the supply line to the RCPs and other non-essential Component Cooling Water loads. They close to isolate non-essential loads from essential loads during accident conditions. Additionally, these valves may need to be reopened to cool the Excess Letdown HX to maintain control of pressurizer level during a post accident scenario.

Motor operated valves 1/2CV8100 and 1/2CV8112 must close to provide containment isolation. These valves open to provide a seal water return path from the RCPs.

Justification

These valves cannot be stroked during normal operations because closure would isolate flow to the Reactor Coolant Pumps. Failure of one of the CC valves in a closed position during an exercise test would result in a loss of cooling flow to the pumps and eventual pump damage and/or trip. Failure of a CV valve in the closed direction would result in seal water return being diverted to the PRT by lifting a relief valve (1/2CV8121) upstream of the isolation valves. Therefore, these valves will be stroke tested during planned cold shutdowns, in accordance with OM-10, paragraph 4.2.1.2 provided all of the RCPs are shutdown. The RCPs will not be shutdown for the sole purpose of performing this test. This test frequency will adequately maintain these valves in a state of operational readiness by testing them as often as safely possible.

COLD SHUTDOWN JUSTIFICATION: CS-20

(Page 1 of 1)

DELETED

COLD SHUTDOWN JUSTIFICATION: CS-21

(Page 1 of 1)

Component Number	System	Code Class	Category
1/2SI8808A	Safety Injection	1	B
1/2SI8808B	Safety Injection	1	B
1/2SI8808C	Safety Injection	1	B
1/2SI8808D	Safety Injection	1	B

Component Function(s)

The 1/2SI8808A-D valves are Motor Operated Safety Injection Accumulator Discharge Isolation Valves. These valves are OPEN with Power Removed for Modes 1, 2, and 3 with Pressurizer Pressure above 1000 psig in accordance with the Technical Specifications. These valves were included in the IST Program for their need to be closed after all of the water in the Accumulator has been injected into the RCS. Closure of these valves would prevent injection of a Nitrogen bubble into the RCS. These valves are included in the IST Program as passive open and active to close.

Justification

Technical Specifications require the (Accumulator) isolation valves be open and power removed while in Modes 1, 2 or 3 (with pressurizer pressure above 1000 psig).

Since the Technical Specifications require these valves to be OPEN with power to their motor operators removed during periods when pressurizer pressure is above 1000 psig, the valves cannot be exercised every three months. In lieu of stroke time testing the valves every three months, these valves will be tested during heatup or cooldown (the pressure transition between 800 and 1000 psig pressurizer pressure) or, they will be tested with the RCS depressurized and the associated accumulator vented and drained. This cold shutdown testing frequency is in accordance with OM-10, paragraph 4.2.1.2.

COLD SHUTDOWN JUSTIFICATION: CS-22

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Component Number	System	Code Class	Category
1/2CV8355A	Chemical And Volume Control	2	B
1/2CV8355B	Chemical And Volume Control	2	B
1/2CV8355C	Chemical And Volume Control	2	B
1/2CV8355D	Chemical And Volume Control	2	B

Component Function(s)

The CV8355 valves are Motor Operated Isolation valves in the seal injection line to the Reactor Coolant Pumps. Additionally, the CV8355s are designated Containment Isolation valves but are exempt from Local Leak Rate Testing of 10 CFR 50, Appendix J. The CV8355s have no automatic closure function as part of Containment Isolation.

Justification

Reactor Coolant Pumps (RCPs) are required to be in operation in Mode 1, Power Operation. Seal injection flow must be maintained when the RCPs are running. Interruption of seal injection flow with the RCPs in operation, even for a short duration, is detrimental to the RCP seals. The above listed valves are Seal Injection Inlet valves and are designated Containment Isolation valves (CIVs).

The 1/2CV8355A-D valves are exempt from Local Leakage Rate testing of 10 CFR 50, Appendix J, but due to their designation as CIVs, they will be tested per ASME Code in the Closed direction. Due to the above, these valves will not be exercised during plant operation, but they will be exercised during Cold Shutdown when the RCPs are not running. Short duration forced outages to Cold Shutdown seldom require shutdown of RCPs as they are part of the normal heat removal loop. It is not the intent of this justification to require RCP shutdown only to perform the exercise tests for these valves. It is anticipated that these valves may not normally be tested more often than once per refueling outage. However, these valves will be tested during Cold Shutdowns in which the RCPs are secured for sufficient time to perform the tests, which is in accordance with OM-10, paragraph 4.2.1.2.

COLD SHUTDOWN JUSTIFICATION: CS-23

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Component Number	System	Code Class	Category
1SD054A	Steam Generator Blowdown	2	B
1/2SD054B	Steam Generator Blowdown	2	B
1SD054C	Steam Generator Blowdown	2	B
1/2SD054D	Steam Generator Blowdown	2	B
1SD054E	Steam Generator Blowdown	2	B
1/2SD054F	Steam Generator Blowdown	2	B
1SD054G	Steam Generator Blowdown	2	B
1/2SD054H	Steam Generator Blowdown	2	B

Component Function(s)

The SD054 valves are normal Steam Generator Blowdown throttle control valves. An additional function of the Unit 1, (A through H valves) and the Unit 2, (B train valves [B, D, F, & H]) is to isolate Blowdown in the event of a High Energy Line Break (HELB) in the SD system.

Justification

It is impractical to exercise and stroke time the above listed valves on a quarterly basis. The valves have no Open / Closed handswitch. They are normally operated by means of a potentiometer which ultimately controls an air signal to a positioner. Attainment of repeatable stroke time results requires the valves to be stroked by causing (or simulating) HELB relay actuation. This method of closure causes multiple valve actuations resulting in complete steam generator blowdown isolation. Furthermore, the remote position indicator, (a 0-100% indicator - not based on limit switch operation) may lag actual valve position. Therefore the only repeatable method of stroke timing these valves involves stationing personnel locally at the valve(s) to witness actual valve movement.

Full stroke exercising the valves is a Unit operation concern in that closure of these valves during normal operation presents a thermal transient to the downstream piping and components including the blowdown condenser. While the valves, piping, and components are designed to withstand this thermal transient, each transient produces stress which may lead to premature failure of the affected components. It is prudent to minimize the number of thermal transients that these high energy lines are required to undergo.

COLD SHUTDOWN JUSTIFICATION: CS-23

(Page 2 of 2)

Personnel safety concerns exist with this stroking exercise during normal operation in that the valves are physically located in the Main Steam Isolation (MSIV) Valve Room, off the Steam Tunnel. This room contains the MSIVs, Feedwater Isolation Valves (FWIVs), Main Steam Safety Valves, Main Steam PORVs, and other miscellaneous piping and valves. The normal ambient temperature in this room with the Unit at power is greater than 110 °F. Almost all of the piping (most of which is insulated) and instrument tubing in the room are normally at temperatures of approximately 500 °F or more. The SD054 valves are located above the floor some 16 to 20 feet and are not visible from the floor being obscured by Main Steam and Feedwater Piping. Since personnel must be stationed locally at the valve to witness actual valve movement, it is necessary to climb around very hot piping in a hot and very noisy ambient atmosphere. In some cases it may be necessary to erect scaffolding to conduct this test with the Unit in normal operation.

Due to the above, these valves will be stroke time/fail safe tested during Cold Shutdowns of sufficient duration to allow safe access to the valves, including the erection of scaffolding, if required. This testing frequency is in accordance with OM-10, paragraph 4.2.1.2.

COLD SHUTDOWN JUSTIFICATION: CS-24

(Page 1 of 1)

Component Number	System	Code Class	Category
1/2VQ001A	Containment Ventilation	2	A
1/2VQ001B	Containment Ventilation	2	A
1/2VQ002A	Containment Ventilation	2	A
1/2VQ002B	Containment Ventilation	2	A

Component Function(s)

The 1/2VQ001A/B valves are the containment purge supply isolation valves. The 1/2VQ002A/B valves are the containment purge exhaust isolation valves. They were designed to purge containment under normal shutdown conditions. The IST function of closure is for containment isolation.

Justification

The Primary Containment Purge Supply and Exhaust Valves, 1/2VQ001A/B and 1/2VQ002A/B, cannot be stroke time tested 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 Modes 5 or 6 would be a violation of Technical Specifications, in which it states that in Modes 1-4, the valves "..shall be closed and power removed." Administratively, these valves are maintained Out of Service Closed.

As a containment isolation valve, the closure function is considered to be operable. The valves are leak tested in accordance with Technical Specifications every 184 days, and a monthly verification is performed to verify that these valves are closed and power is removed. The monthly verification is completed by verifying the closed indication of the Group 6 monitor lights in the control room and that each power supply is off. However, if re-positioning this valve is necessary and the valve needs to be considered operable in association with exercising capabilities of it, then the IST stroke time testing and remote position indication testing will be completed prior to declaring the valve operable per OM-10, paragraph 4.2.1.7. It is anticipated that the necessary stroke time testing of these valves will be very infrequent, if at all, in the future.

Test Frequency

The 1/2VQ001A/B and 1/2VQ002A/B valves will be stroke time and fail safe tested during cold shutdowns, as necessary, to declare the valve exercising capabilities operable, in accordance with OM-10, paras. 4.2.1.2 and 4.2.1.7.

COLD SHUTDOWN JUSTIFICATION: CS-25

DELETED

ATTACHMENT 7

REFUEL OUTAGE JUSTIFICATION INDEX

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Designator	Description	Approval Date
RJ-1	NOT USED	
RJ-2	DELETED	
RJ-3	(1/2CC9458; 1/2CC9459A/B; 1/2CC9467A-C) All Valves Manually Tested in preparation/ during each U-2 Refueling	January, 1998
RJ-4	(1/2SI8811A/B) Stroke Time Tested (SO/SC) during Refueling	January, 1998
RJ-5	(1/2IA065; 1/2IA066) Stroke Time Test (SC) and Fail Safe Test Closed (FC) during Refueling	June, 2000 Revised
RJ-6	(1/2SI8819A-D; 1/2SI8905A-D; 1/2SI8922A/B; 1/2SI8926; 1/2SI8949B,D) All Valves Full Stroke Tested (CO) during Refueling, and the 1/2SI8926Valves are Partial Stroke Tested (CP) Quarterly	June, 2000 Revised
RJ-7	(1/2CV8481A/B; 1/2CV8546; 1/2SI8815; 1/2SI8900A-D) All Valves Full Stroke Tested (CC) during Refueling, and 1/2CV8481A/B Valves are Partial Stroke Tested (CP) Quarterly	June, 2000 Revised
RJ-8	(1/2SI8841A/B; 1/2SI8949A,C) Full Stroke Test (CO) during Refueling	June, 2000 Revised
RJ-9	(1/2RH8705A/B) Full Stroke Test (CO) during Refueling	June, 2000 Revised

REFUEL OUTAGE JUSTIFICATION INDEX

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Designator	Description	Approval Date
RJ-10	DELETED	
RJ-11	DELETED	
RJ-12	DELETED	
RJ-13	NOT USED	
RJ-14	(1/2FW510A; 1/2FW520A; 1/2FW530A; 1/2FW540A; 1/2FW510; 1/2FW520; 1/2FW530; 1/2FW54-0; 1/2FW034A-D) Augmented Fail-Safe Test Closed (FC) during Refueling per Byron Technical Specifications	January, 1998
RJ-15	DELETED	
RJ-16	DELETED	
RJ-17	DELTED	
RJ-18	NOT USED	

REFUEL OUTAGE JUSTIFICATION INDEX

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ATTACHMENT 8

REFUELING OUTAGE JUSTIFICATION
RJ-2

DELETED

REFUELING OUTAGE JUSTIFICATION
RJ-3

VALVE NUMBER	CATEGORY	CODE CLASS	DRAWING NUMBER	DRAWING COORDINATE
1/2CC9458	B	3	M-66-3B	C6 (C3)
1/2CC9459A	B	3	M-66-3A	D6 (D3)
1/2CC9459B	B	3	M-66-3A	D5 (D4)
1/2CC9467A	B	3	M-66-4D	C6 (C3)
1/2CC9467B	B	3	M-66-4D	C5 (C3)
1/2CC9467C	B	3	M-66-3B	D6 (D2)

FUNCTION(S):

1/2CC9458: CC pump Discharge Header Manual Isolation Valves which may provide for train separation in a post accident situation.

1/2CC9459A: CC Pump Suction Header Crosstie Manual Isolation valves which may provide for separation/isolation of the CC system into two redundant trains during recirculation phase of RHR operation during a LOCA and other applicable accident modes.

1/2CC9459B: CC Pump Suction Header Crosstie Manual Isolation valves which may provide for separation/isolation of Unit 1 and Unit 2 CC systems during normal cooldown and recirculation phase of RHR operation.

1/2CC9467A: CC heat exchanger Outlet Header Crosstie Manual Isolation Valves which provide for possible manual isolation of flow to the Unit normal plant loads if the respective CC9415 valve fails open.

1/2CC9467B: CC Heat Exchanger Header Crosstie Manual Isolation Valves which may provide for train separation while the subject Unit undergoes Post LOCA cooldown. Provides separation/isolation of Unit 1 and Unit 2 CC systems during normal cooldown and recirculation phase of RHR operation.

1/2CC9467C: CC Supply Header Crosstie Manual Isolation Valve which may need to be called upon due to a single failure within the CC system configuration.

REFUELING OUTAGE JUSTIFICATION
RJ-3 (continued)

JUSTIFICATION:

General Information:

This refueling outage justification will address the 12CC9459B and 1/2CC9467B in more detail than the other valves in this justification (CC9458, CC9459A, CC9467A and CC9467C); as these other valves are less safety significant within the CC system. None of these remaining valves would function as a primary means of mitigating an accident, and none of them are considered "active" valves per UFSAR table 3.9.16. The reason for their inclusion is the possibility that they may be called upon following a single failure within the CC system. In addition, there are several other "maintenance" type valves that would also be available for isolation purposes. In a post accident situation, there are no specific directions taken within the CC system. If a malfunction were to occur, operators would be dispatched and the problem isolated as required. Braidwood conservatively added these valves to the program due to the uniqueness of the CC system and to address possible concerns about the valves' ability to isolate. In addition, Braidwood will be exercising these valves on the same frequency as the CC9459B and CC9467B valves. There would be no value added and it would be impractical to exercise them on a more frequent basis. The following is specific information concerning the valves in this refueling outage justification.

Specific Information:

a. 1/2CC9459B and 1/2CC9467B.

Manual valves 1/2CC9459B and 1/2CC9467B are used to provide train separation and/or isolation of the Component Cooling Water (CCW) System. More specifically, they are aligned to place the Unit 0 Heat Exchanger and Pump on the Unit 1 or Unit 2 side of CCW to ensure adequate cooling during shutdowns and/or Post-Accident.

Exercising these valves presents a concern for the equipment cooled by the CCW System. The CCW system is a balanced system that has the potential for becoming upset upon swapping the Unit 0 Heat Exchanger and Pump from one Unit to the other. History has shown that stroking these valves will cause oscillation in the lines, disrupt flow balancing due to D/P differences throughout the system, and would place the normal loads at risk for adequate cooling. For instance, the CC685 valve, which is the Reactor Coolant Pump (RCP) thermal barrier Component Cooling Water return valve, autocloses on high flow, which would result in a loss of flow to the RCP thermal barriers. The CC685 valve could potentially close during the exercising of the CC manual valves, due to the upset flow conditions. Exercising the CC manual valves quarterly is impractical for the reasons presented above.

REFUELING OUTAGE JUSTIFICATION
RJ-3 (continued)

These valves require very careful plant monitoring and a considerable amount of time to physically exercise. The normal practice at Braidwood for the CCW System is to align the Unit 0 heat exchanger and Unit 0 pump to the Unit going into a refueling outage. This is normally not done when going into a Cold Shutdown. As a result, the most practical method of exercising these valves is to exercise them during or shortly before a refueling outage, at which time the Unit 0 heat exchanger and Unit 0 pump are aligned to the Unit going in the refueling outage.

REFUELING OUTAGE JUSTIFICATION
RJ-3 (continued)

b. 1/2CC9467A

Exercising these valves quarterly is impractical. One function of these valves is to serve as another means of isolating flow to the normal plant loads in a post-accident situation in the event that the respective CC9415 valve were to fail open. Due to its function, it is an undesirable practice to exercise these manual valves during normal operations. Closing this valve for a particular Unit, with the Unit 0 heat exchanger and pump aligned to that Unit, would divert CC flow through the Unit 0 heat exchanger which may cause disruptions within the CC system. If the valve is closed at a time when the Unit 0 heat exchanger and pump are not aligned to the Unit, it would interrupt flow to the normal plant loads.

It is impractical to induce the disruptions described above during normal operations. Additionally, finding an appropriate window to stroke these valves during a cold shutdown could possibly result in an extension of the cold shutdown and there would be no compensated increase in plant safety. The most practical alternative method is to exercise these valves at the same frequency (within the same procedure) as valves 1/2CC9459B and 1/2CC9467B.

c. 1/2CC9458, 1/2CC9459A, and 1/2CC9467C

Exercising these valves introduces possibilities of disrupting the CC system. There would be instances in which pumps may need to be swapped, or further re-routing of flow may be necessary due to other miscellaneous work being performed throughout the system.

REFUELING OUTAGE JUSTIFICATION
RJ-3 (continued)

For reasons justified in the general section and throughout this refueling outage justification, it is more practical to exercise these manual valves at the same frequency as described for the manual valves in Part a and Part b of this refueling outage justification.

Conclusions:

To conclude, the most practical method of exercising all the CC manual valves included in this justification is to test all of them under the same procedure, under carefully controlled conditions, to ensure that all necessary precautions/actions are taken. To test them in a different manner would be impractical.

TEST FREQUENCY:

The 1(2)CC9459B and 1(2)CC9467B valves will normally be exercised in one direction in preparation for the Unit going into the refueling outage, to align the Unit going into the outage to the Unit 0 heat exchanger and Unit 0 pump. Subsequently, when the opposite unit then goes into a refueling outage the valves will again be exercised in one direction (the opposite direction). An exception to stroking it during a refueling outage would be if for other reasons it was required or desirable to align the Unit 0 heat exchanger and pump to a Unit prior to its refueling outage. The valves would then be exercised at that time, and not necessarily during the refueling outage. The remaining valves in this refueling outage justification will normally be exercised within the same procedure. This test frequency meets the intent of OM-10, paragraph 4.2.1.2(e).

REFUELING OUTAGE JUSTIFICATION
RJ-4

VALVE NUMBER	CATEGORY	CODE CLASS	DRAWING NUMBER	DRAWING COORDINATE
1/2SI8811A	B	2	M-61-4 (M-136-4)	B5(B6)
1/2SI8811B	B	2	M-61-4 (M-136-4)	A5(A6)

FUNCTION(S):

These normally closed motor operated gate valves are located on the Containment Recirculation Sump discharge line. The valves are required to be closed during the injection phase of ECCS along with functioning as a containment isolation valve. These valves are required to open during the recirculation phase of ECCS.

JUSTIFICATION:

The stroke time testing of the 1/2SI8811A/B valves require the suctions of the Residual Heat Removal Pumps to be drained, thus rendering the train that is being tested inoperable. The stroke time testing of these valves during Unit operation would be clearly impractical due to the extensive activities required to perform this testing, along with rendering a subsystem of ECCS (RHR) inoperable for an extended period of time (placing the plant in an undesirable condition).

The routine testing of these valves during cold shutdowns is also impractical for the following reasons:

1. For a cold shutdown in which the Reactor Coolant Loops remain filled and there is one train of Residual Heat Removal declared inoperable, Braidwood Station's Technical Specifications require the secondary side narrow range water level to be sufficient to provide a viable heat sink. However, if the cold shutdown was necessitated by a problem requiring draining of the secondary side of the Steam Generators (i.e. tube leaks), the Technical Specifications would preclude the testing of the containment sump outlet isolation valves until such time as the affected steam generators had been refilled.

2. 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), the Technical Specifications 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."

REFUELING OUTAGE JUSTIFICATION
RJ-4

JUSTIFICATION: (continued)

3. 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 the Technical Specifications. The violations would occur since these action statements require (as noted in their respective foot note sections) the return of the inoperable residual heat removal loop to service within 2 hours, if such loop was removed for surveillance testing provided the other RHR Loop is operable and in operation.

4. 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 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.

TEST FREQUENCY:

The 1/2SI8811A/B valves will be stroke timed during refueling outages in accordance with OM-10, paragraph 4.2.1.2.

REFUELING OUTAGE JUSTIFICATION
RJ-5

VALVE NUMBER	CATEGORY	CODE CLASS	DRAWING NUMBER	DRAWING COORDINATE
1/2IA065	A	2	M-55-4(M-55-5)	D3 (E6)
1/2IA066	A	2	M-55-4(M-55-5)	D6 (E4)

FUNCTION(S):

Air Operated Valves 1/2IA065 and 1/2IA066 are the outboard and inboard (respectively) containment isolation valves for Instrument Air supply lines to containment. The closed safety function of these valves is to provide a leak-tight barrier between the containment atmosphere and the environment during accident conditions.

JUSTIFICATION:

Stroke/fail-safe testing of the 1/2IA065 and 1/2IA066 valves during plant operation or cold shutdowns would, by design, isolate the air to air operated instruments inside the containment building. This would introduce the possibility of major operating perturbations and/or personnel safety concerns should these valves fail to re-open during testing activities. This would result in scenarios such as:

1. 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.

REFUELING OUTAGE JUSTIFICATION
RJ-5 (continued)

2. 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 1/2CV8149A, B & C, the excess letdown heat exchanger inlet isolation valves 1/2CV8153A & B, and the regenerative 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.

3. 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.

4. 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 close 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 environment.

TEST FREQUENCY:

Air Operated Valves 1/2IA065 and 1/2IA066 will be stroke tested and fail safe tested during refueling outages on the respective Unit in accordance with OM-10, paragraphs 4.2.1.2 and 4.3.2.2.

REFUELING OUTAGE JUSTIFICATION
RJ-6

VALVE NUMBER	CATEGORY	CODE CLASS	DRAWING NUMBER	DRAWING COORDINATE
1/2SI8819A	AC	1	M-61-3(M-136-3)	A5 (B4)
1/2SI8819B	AC	1	M-61-3(M-136-3)	A7 (B2)
1/2SI8819C	AC	1	M-61-3(M-136-3)	A6 (B2)
1/2SI8819D	AC	1	M-61-3(M-136-3)	A6 (B3)
1/2SI8905A	AC	1	M-61-3(M-136-3)	E4 (E4)
1/2SO8905B	AC	1	M-61-3(M-136-3)	D7 (D2)
1/2SI8905C	AC	1	M-61-3(M-136-3)	C7 (C2)
1/2SI8905D	AC	1	M-61-3(M-136-3)	E4 (E5)
1/2SI8922A	C	2	M-61-1A(M-136-1)	E7 (D4)
1/2SI8922B	C	2	M-61-1A(M-136-1)	C7 (B4)
1/2SI8926	C	2	M-61-1A(M-136-1)	D2 (C6)
1/2SI8949B	AC	1	M-61-3(M-136-3)	D8 (D1)
1/2SI8949D	AC	1	M-61-3(M-136-3)	E8 (E1)

FUNCTION(S):

All of the "AC" category valves in this refueling outage justification are pressure isolation valves (PIVs) and will be leak tested (and backflow tested) per Braidwood Station Tech Specs (see CS-15). This refueling outage justification will only include the open functions of all the check valves listed above.

Check valves 1/2SI8819A-D are located in the lines going from the Safety Injection pumps to the reactor vessel cold legs. Their safety function in the open direction is to permit flow of coolant to the reactor vessel cold legs during a safety injection.

Check valves 1/2SI8905A-D and 1/2SI8949B/D are located in the lines going from the Safety Injection pumps to the reactor vessel hot legs. Their safety function in the open direction is to permit flow of coolant to the reactor vessel hot legs during the Hot Leg Recirculation portion of a safety injection.

Check valves 1/2SI8922A/B are located on the Safety Injection pumps discharge line. They are required to open for ECCS injection and recirculation phases.

Check valves 1/2SI8926 are located on the SI pumps' suction line from the RWST. They are required to open for the ECCS injection phase.

REFUELING OUTAGE JUSTIFICATION
RJ-6 (continued)

JUSTIFICATION:

These valves cannot be full stroke exercised during operation as the shut-off head of the Safety Injection pumps is lower than the reactor coolant system pressure. These valves cannot be full stroke exercised during routine Mode 5 cold shutdowns due to the Braidwood Station Technical Specification requirement that all Safety Injection pumps and all but one Charging pump be inoperable during Modes 4, (temperature less than 330 F) 5, and 6, except when the reactor vessel head is removed. This requirement minimizes the possibility of low temperature overpressurization (LTOP) of the Reactor Coolant System (RCS). 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. Full stroke exercising of these valves may only be safely performed in Mode 6 with the Reactor vessel head removed.

TEST FREQUENCY:

These valves will be full stroke exercised during refueling outages in accordance with ISTC 4.5.2. Additionally, the 1/2SI8926 check valves will be partial stroke tested quarterly during the Safety Injection mini-flow recirculation pump runs.

REFUELING OUTAGE JUSTIFICATION
RJ-7

VALVE NUMBER	CATEGORY	CODE CLASS	DRAWING NUMBER	DRAWING COORDINATE
1/2CV8481A	C	2	M-64-3A(M-138-3A)	D6 (D6)
1/2CV8481B	C	2	M-64-3A(M-138-3A)	C6 (C7)
1/2CV8546	C	2	M-64-4B(M-138-4)	B5 (A5)
1/2SI8815	AC	1	M-61-2(M-136-2)	D5 (D4)
1/2SI8900A	AC	1	M-61-2(M-136-2)	E7 (E2)
1/2SI8900B	AC	1	M-61-2(M-136-2)	D7 (D2)
1/2SI8900C	AC	1	M-61-2(M-136-2)	C7 (C2)
1/2SI8900D	AC	1	M-61-2(M-136-2)	B7 (B2)

FUNCTION(S):

All of the "AC" category valves in this refueling outage justification are pressure isolation valves (PIVs) and will be leak tested (and backflow tested) per Braidwood Station Tech Specs (see CS-15). This refueling outage justification will only include the open functions of all the check valves listed above.

Check valves 1/2SI8815 are located in the lines from the Chemical and Volume Control (CV) Centrifugal Charging pump. Their safety function in the open direction is to permit flow of coolant from the centrifugal charging pumps to the four lines which branch off and provide flow to the reactor vessel cold legs during the high pressure injection phase of a safety injection.

Check Valves 1/2SI8900A-D are in the four lines which branch off from the lines containing the 1/2SI8815 valves. Their safety function in the open direction is to permit flow of coolant from the chemical and volume Control Centrifugal Charging Pumps to the reactor vessel cold legs during the high pressure injection phase of a safety injection.

Check valves 1/2CV8481A/B are located at the discharge of the Chemical and volume Control charging pumps. They are required to open to permit flow of coolant during a safety injection.

Check valves 1/2CV8546 are located on the CV pumps' suction line from the RWST. They are required to open to permit flow of coolant when the charging pumps take suction from the RWST during a safety injection.

JUSTIFICATION:

The full stroke exercising of check valves 1/2SI8815 and 1/2SI8900A-D associated with the Emergency Core Cooling System during operation would induce thermal stresses on their respective reactor vessel nozzles as the Reactor Coolant System (maintained at greater than 500 F) is injected with water from the Refueling Water Storage Tank (maintained at approximately 65 F).

REFUELING OUTAGE JUSTIFICATION
RJ-7 (continued)

The 1/2CV8481A/B and 1/2CV8546 check valves are in series and cannot be full stroke exercised without causing stroking of 1/2SI8815 and 1/2SI8900A-D check valves.

These valves cannot be full stroke exercised during routine Mode 5 cold shutdowns due to Braidwood Station Technical Specifications LCO 3.4.12 requirements that all Safety Injection pumps and all but one charging pump be inoperable during Modes 4, (temperature less than 330 F) 5, and 6, except when the reactor vessel head is removed. This requirement minimizes the possibility of low temperature overpressurization (LTOP) of the Reactor coolant System (RCS). 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. In addition, injecting large quantities of highly borated water from the RWST would likely delay reactor start up and the cost of processing the reactor coolant to restore the optimum boron concentration is consequential. Full stroke exercising of these valves may only be safely performed in Mode 6 with the Reactor vessel head removed.

TEST FREQUENCY:

These valves will be full stroke exercised during refueling outages in accordance with ISTC 4.5.2. Additionally, the 1/2CV8481A/B check valves will be partial stroke tested quarterly.

REFUELING OUTAGE JUSTIFICATION
RJ-8

VALVE NUMBER	CATEGORY	CODE CLASS	DRAWING NUMBER	DRAWING COORDINATE
1/2SI8841A	AC	1	M-61-3(M-136-3)	E4 (E4)
1/2SI8841B	AC	1	M-61-3(M-136-3)	C7 (C2)
1/2SI8949A	AC	1	M-61-3(M-136-3)	E8 (E1)
1/2SI8949C	AC	1	M-61-3(M-136-3)	C8 (C1)

FUNCTION(S):

All of the "AC" category valves in this refueling outage justification are pressure isolation valves (PIVs) and will be leak tested (and backflow tested) per Braidwood Station Tech Specs (see CS-15). This refueling outage justification will only include the open functions of all the check valves listed above.

Check valves 1/2SI8841A/B are located in the lines from the Residual Heat Removal (RHR) pumps to the "A" and "C" Reactor Coolant System hot legs. Their safety function in the open direction is to permit flow of coolant from the RHR pumps to the reactor vessel hot legs during the Hot Leg Recirculation phase of a safety injection.

Check Valves 1/2SI8949A/C are located in an ECCS line to the RCS "A" and "C" hot legs. They are required to open to permit flow of makeup water upon a safety injection from: (1) the Safety Injection Pumps during the high pressure safety injection phase, or (2) the RHR pumps during the Hot Leg Recirculation phase, to the reactor vessel hot legs.

JUSTIFICATION:

The full stroke exercising of check valves 1/2SI8841A/B and 1/2SI8949A/C, associated with the Emergency Core Cooling System (ECCS) and the Residual Heat Removal (RHR) System cannot be accomplished during normal reactor operation because the low head developed by the RHR pumps (less than 250 psi) is not great enough to inject into the RCS (2235 psi). Similarly, the 1/2SI8949A/C check valves cannot be partial stroke tested during normal reactor operation with the Safety Injection (SI) pumps since the RCS pressure cannot be overcome by the SI pump developed head (1500 psi).

Full or partial stroke testing of these valves during cold shutdowns would induce thermal stresses on their respective reactor vessel nozzles as the Reactor Coolant System (maintained at approximately 180° F) is injected with water from the Refueling Water Storage Tank (maintained at approximately 65° F). Additionally, the margin of safety is reduced for brittle fracture prevention and an unacceptable reactivity excursion could be created (high boron concentration and low temperature water).

REFUELING OUTAGE JUSTIFICATION
RJ-8 (continued)

Finally, during cold shutdowns in which the Technical Specification leak rate testing is not to be performed, the partial or full stroking of these valves would necessitate the requirement to perform the leak test on these check valves, causing a delay in returning the plant to power in addition to causing unnecessary radiation exposure to test personnel.

TEST FREQUENCY:

These valves will be full stroke exercised during refueling outages in accordance with ISTC 4.5.2.

REFUELING OUTAGE JUSTIFICATION
RJ-9

VALVE NUMBER	CATEGORY	CODE CLASS	DRAWING NUMBER	DRAWING COORDINATE
1/2RH8705A	AC	2	M-62(M-137)	D1 (D8)
1/2RH8705B	AC	2	M-62(M-137)	C1 (C8)

FUNCTION(S):

These check valves are leak tested in conjunction with pressure isolation valves (PIVs) 1/2RH8701B and 1/2RH8702B and will be leak tested (and backflow tested) at the same frequency as the 1/2RH8702B valves (see CS-15). This refueling outage justification will only include the open functions of the check valves listed above.

These valves are located on the 3/4" branch line between the 1/2RH8701A/B and 1/2RH8702A/B suction isolation valves. Their safety function in the open direction is to relieve excess pressure due to thermal expansion back to the RCS when both suction isolation valves are closed in order to prevent over pressurization of the piping between the two valves.

JUSTIFICATION:

These valves are simple spring loaded lift check valves and are not equipped with an external operator or disk position indicator. The only way to verify operability in the open direction is by verifying that the piping between the suction isolation valves is able to be depressurized through the applicable valve via a field test. It would be impractical to perform this testing during Unit operation due to the necessity to enter containment, hookup a pressurized water source to the piping via a test/vent valve, and slowly increase the pressure until the check valve opens to relieve the pressure. Additionally, the RCS must be depressurized in order to perform this test.

It would be impractical to perform this test during cold shutdowns as it requires placing the standby train of Residual Heat Removal (RHR) in an inoperable condition and the RCS must be depressurized (requires all reactor coolant pumps to be stopped). Then, due to the extensive field work involved, there is a potential for delaying reactor start up and return to power. Additionally, taking away the backup/redundant train of RHR reduces both the plant decay removal capability and the available safety margin regarding shutdown risk assessment.

Testing these valves each refueling, in Mode 6, is adequate to maintain this portion of RHR in a state of operational readiness, while not sacrificing the safety of the plant.

REFUELING OUTAGE JUSTIFICATION
RJ-9 (continued)

TEST FREQUENCY:

These valves will be full stroke exercised during refueling outages in accordance with ISTC 4.5.2.

REFUELING OUTAGE JUSTIFICATION
RJ-10

DELETED

REFUELING OUTAGE JUSTIFICATION
RJ-11

DELETED

REFUELING OUTAGE JUSTIFICATION
RJ-12

DELETED

REFUELING OUTAGE JUSTIFICATION
RJ-14

VALVE NUMBER	CATEGORY	CODE CLASS	DRAWING NUMBER	DRAWING COORDINATE
1/2FW510A	B	None	M-36-1C(M-121-1B)	C2 (C2)
1/2FW520A	B	None	M-36-1A(M-121-1D)	C2 (C2)
1/2FW530A	B	None	M-36-1D(M-121-1A)	C2 (C2)
1/2FW540A	B	None	M-36-1B(M-121-1C)	C2 (C2)
1/2FW510	B	None	M-36-1C(M-121-1B)	D2 (D2)
1/2FW520	B	None	M-36-1A(M-121-1D)	D2 (D2)
1/2FW530	B	None	M-36-1D(M-121-1A)	D2 (D2)
1/2FW540	B	None	M-36-1B(M-121-1C)	D2 (D2)
1/2FW034A	B	None	M-36-1C(M-121-1B)	E2 (E2)
1/2FW034B	B	None	M-36-1A(M-121-1D)	E2 (E2)
1/2FW034C	B	None	M-36-1D(M-121-1A)	E2 (E2)
1/2FW034D	B	None	M-36-1B(M-121-1C)	E2 (E2)

FUNCTION(S):

The Feedwater Regulating Bypass Valves (1FW510A. 1FW520A, 1FW530A, and 1FW540A), the Feedwater Regulating Valves (1FW510, 1FW520, 1FW530, and 1FW540) and the Feedwater Tempering Flow Control Valves (1FW034A-D) are non-safety related valves which perform a backup function to isolate Feedwater. These valves are not considered to be Containment Isolation Valves per the Braidwood Station Technical Specifications, and are considered only Feedwater Control Valves that, additionally, serve as backup Feedwater Isolation Valves. They are not considered to be in the scope of the IST Program (per OM-10, paragraph 1.1). This has always been Braidwood's position on these valves. However, since they do receive a Feedwater Isolation signal, an augmented test to verify the fail-safe test will be tracked within the IST Program.

JUSTIFICATION:

The augmented Fail-Safe test will be performed. These valves are all part of the surveillance executed to satisfy Technical Specifications, which manually simulates an SI signal, causing these valves to fail closed. These valves will be fail-safe tested to satisfy the requirements of this Technical Specification (Refueling Outage Frequency).

Additionally, the closure of the Main Feedwater Regulating Bypass Valves (1/2FW510A, 1/2FW520A, 1/2FW530A, and 1/2FW540A) 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. The closure of the Main Feedwater Regulating Valves (1/2FW510, 1/2FW520,

REFUELING OUTAGE JUSTIFICATION
RJ-14 (continued)

1/2FW530, 1/2FW540) 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. Finally, it would be impractical to fail-safe test any of these augmented valves on a more frequent basis than required by the Technical Specifications.

TEST FREQUENCY:

These valves will be fail-safe tested closed as an augmented IST test during refueling outages in accordance with Braidwood Station Technical Specifications.

REFUELING OUTAGE JUSTIFICATION
RJ-15

DELETED

REFUELING OUTAGE JUSTIFICATION
RJ-16

DELETED

REFUELING OUTAGE JUSTIFICATION
RJ-20

DELETED

REFUELING OUTAGE JUSTIFICATION
RJ-21

DELETED

REFUELING OUTAGE JUSTIFICATION
RJ-22

DELETED

REFUELING OUTAGE JUSTIFICATION
RJ-23

DELETED

ATTACHMENT 9

STATION TECHNICAL POSITION INDEX

(Page 1 of 1)

Designator	Description	Approval Date
TP-PA-1	NOT USED	
TP-PA-2	(0/1/2AB03P) Gives basis for the exclusion of the Boric Acid Transfer Pumps from the IST Program. However they will continue to be tested outside of the IST Program	January, 1998
TP-PA-3	NOT USED	
TP-PA-4	(1/2CS01PA/B 1/2RH01PA/B) Categorization of Containment Spray and Residual Heat Removal pumps as centrifugal pumps	April 1999
TP-VA-1	(All Power-Operated Valves) Method of Stroke Timing Valves	January, 1998
TP-VA-2	(Valves with Fail-Safe Actuators) Method of Fail-Safe Testing Valves	January, 1998
TP-VA-3	DELETED	
TP-VA-4	(Valves with Remote Position Indicators) Method of Position Indication Testing	January, 1998
TP-VA-5	NOT USED	
TP-VA-6	(Valves with both Active and Passive Safety functions) Position for testing passive/active valves	March, 2000
TP-VA-7	DELETED	
TP-VA-8	DELETED	
TP-VA-9	1/2CC070A/B and 0WO205A/B Augmented IST Tests	June, 2000

ATTACHMENT 10

PUMP TECHNICAL POSITION
TP-PA-2

PUMP NUMBER: 0AB03P, 1AB03P, 2AB03P

ASME CODE CLASS: 3

POSITION:

The Boric Acid Transfer Pumps fall outside the scope of the IST Pump Program statement of OMa-1988, Part 6 because they are not provided with an emergency power source (non-ESF buses supply/feed these pumps). Braidwood Station is analyzed as a "hot shutdown" plant, and these pumps are not required to maintain hot shutdown conditions. Also, the RWST (Refueling Water Storage Tank) is a Seismic Category I Structure as described in the UFSAR, Table 3.2-1. Paragraph 3.2.1.1 states that Seismic Category I Structures are designed to withstand design basis accidents including tornadoes. Therefore, the Boric Acid Transfer Pumps are not required to be included in the IST Program to satisfy any Design Basis Accident. Engineering correspondence CHRON #161733 dated January 17, 1991 supports these conclusions. However, because of the operating significance of these pumps, Braidwood Station has developed a testing program for these pumps outside the IST Program.

PUMP TECHNICAL POSITION
TP-PA- 4

TITLE:
Categorization of RHR and CS pumps as centrifugal pumps

PUMPS AFFECTED:
1RH01PA, 1RH01PB, 2RH01PB, 2RH01PB,
1CS01PA, 1CS01PB, 2CS01PA, 2CS01PB

CODE REQUIREMENTS/DISCUSSION:

Pumps are tested in accordance with ASME/ANSI Oma-1988, Part 6, Inservice Testing of Pumps in Light-Water Reactor Power Plants. Within this document requirements for acceptance criteria and required action ranges are established in accordance with Table 3, Ranges for Test Parameters. As related to Braidwood Station's RH and CS pumps, this table establishes limits based upon whether the pumps are centrifugal or vertical line shaft pumps. Oma-1988, Part 6, does not provide further guidance on defining centrifugal or vertical line shaft pumps.

NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, in Section 5.9, discusses Vertical Line Shaft Pumps. This section proposes defining vertical line shaft pumps, as a vertically suspended pump, where the pump driver and pumping element are connected by a line shaft within an enclosing column which contains the pump bearings, making pump bearing vibration measurements impracticable".

ASME Oma-1988, Part 6 directs vibration measurements for centrifugal pumps be taken in a plane approximately perpendicular to the rotating shaft in two orthogonal directions on each accessible pump bearing housing. Measurements are also to be taken in the axial direction on each accessible pump thrust bearing housing. For vertical line shaft pumps Oma-1988, Part 6, directs that vibration measurements be taken on the upper motor bearing housing in three orthogonal directions, one of which is the axial direction.

For pumps categorized as vertical line shaft pumps, Oma-1988, Part 6 has a tighter hydraulic acceptance ranges. NUREG-1482 cites NUREG/CP-0111 for the basis of this change as being due to inherent deficiencies in vibration testing such that degradation will be identified sooner through changes in hydraulic parameters.

PUMP TECHNICAL POSITION
TP-PA-4 (continued)

Braidwood Station's RH and CS pumps do not meet the definitions of vertical line shaft pumps as provided in NUREG-1482. While the pumps are in a vertical configuration, the entire pump/motor is accessible and vibrations are being taken where needed. These pumps are single-stage centrifugal pumps with no bearings, and the pump impeller is mounted directly to the motor shaft. These pumps do not suffer from the concerns for vertical line shaft pumps as defined in NUREG-1482, and as such are appropriately classified as centrifugal pumps. Braidwood meets the OM-6 requirements for centrifugal pumps by recording vibrations on the lower motor bearing in three directions and upper motor bearing in two directions.

POSITION:

Braidwood Station categorized the RH and CS pumps as centrifugal pumps for testing in accordance with ASME/ANSI Oma-1988, Part 6, Inservice Testing of Pumps in Light-Water Reactor Power Plants.

VALVE TECHNICAL POSITION
TP-VA-1

TITLE:

Method of Stroke Timing Valves

VALVES AFFECTED:

Power Operated Valves Requiring Stroke Time Testing

CODE REQUIREMENT(S)/DISCUSSION:

The use of the control board open and closed lights to determine the stroke time of power-operated valves is the issue discussed in this Technical Position. Paragraph 1.3 of OMa-1988, Part 10, defines "full-stroke time" as "the time interval from initiation of the actuating signal to the indication of the end of the operating stroke." 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).

POSITION:

The way in which the limit switches that operate the remote position indicator lights are 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 may be rounded to the nearest tenth (0.1) of a second. 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). Reference values will be established to the nearest tenth of a second although stroke times may be recorded to the hundredths place (0.01). This technique satisfies OM-10, paragraph 4.2.1.4(b), in that all power operated valves will be measured to at least the nearest second.

For those specific cases in which a valve must be stroke timed locally, the stroke timing will begin with the initiation of the actuating signal and end with the completion of valve movement in the field.

VALVE TECHNICAL POSITION
TP-VA-2

TITLE:

Method of Fail Safe Testing Valves.

VALVES AFFECTED:

See IST Valve Tables (FC = Fail Safe Test closed; FO = Fail Safe Test open)

CODE REQUIREMENT(S)/ DISCUSSION:

Paragraph 4.2.1.6 of OM-10 states that "Valves with fail-safe actuators shall be tested by observing the operation of the actuator upon loss of valve actuator power in accordance with the exercising frequency of paragraph 4.2.1.1 of OM-10.

POSITION:

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.

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.

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 OM-10, paragraph 4.1.

The fail-safe test is generally performed at the same frequency as the stroke time exercise test. Where the exercise test is performed less frequent than every 3 months, a cold shutdown justification, refueling outage justification, or relief request has been written. The same justifications for the stroke timing would also apply to the fail-safe tests.

VALVE TECHNICAL POSITION
TP-VA-3

DELETED

VALVE TECHNICAL POSITION
TP-VA-4

TITLE:

Method of Position Indication Testing

VALVES AFFECTED:

All valves with Remote Position Indicators

CODE REQUIREMENT(S) / DISCUSSION:

OMa-1988, Part 10, paragraph 4.1, states that "valves with remote position indicators shall be observed at least once every 2 years to verify that valve operation is accurately indicated."

POSITION:

In reference to Steven Weinman (Boiler and Pressure Vessel Committee) reply letter to Russell J. Tamminga (ComEd), dated November 14, 1988, concerning Inquiry number IN88-015, the following question was answered:

> Question: Is it the intent of Section XI, IWV-3300 that for valves having remote position indicators at multiple locations (such as in the control room and also on a remote shutdown panel and/or sampling panel) that only the remote position indicator at the location utilized in exercising the valve (IWV-3412) and timing the stroke of the valve (IWV-3413) be verified that the valve operation is accurately indicated?
>
> Reply: Yes

This Inquiry also applies to the applicable sections in OMa-1988, Part 10:
1. Paragraph 4.1, Valve Position Verification
2. Paragraph 4.2.1, Valve Exercising Test
3. Paragraph 4.2.1.4, Power-Operated Valve Stroke Testing

In summary, the remote position indicator utilized during valve exercising (OM-10, paragraph 4.2.1) and stroke timing (OM-10, paragraph 4.2.1.4) is the indicator which is used to verify that valve operation is accurately indicated (OM-10, paragraph 4.1).

VALVE TECHNICAL POSITION
TP-VA-6

TITLE:

Testing of Valves with both active and passive safety functions

VALVES AFFECTED

Power operated valves requiring stroke time testing

CODE REQUIREMENT(S)/DISCUSSION:

The IST Program requires valves to be exercised to the position(s) required to fulfill their safety function(s). In addition, valves with remote position indication shall have their position indication verified. The Code does not restrict position indication to active valves.

POSITION:

Several valves included in the plant are designed to perform passive safety functions during accident conditions and then based on plant accident response are designed to change positions to perform another (active) function. Once in their final position, there exists no conditions in which they would be required to be placed in their original passive position.

These valves are typically emergency core cooling system valves which require changing position during different phases of the accident. After the original source of injection water is depleted (RWST), the valves are positioned to allow injection from another source (containment sump). The valves are never returned to their original position.

Based on ASME Inquiry OMI 98-07, these valves with passive functions in one direction and active in the other, will be exercised to only their active position. If these valves have positioned indication, the position indication verification will include verification of both positions.

VALVE TECHNICAL POSITION
TP-VA-7

DELETED

VALVE TECHNICAL POSITION
TP-VA-8

DELETED

VALVE TECHNICAL POSITION
TP-VA-9

TITLE:

1/2CC070A/B and 0WO205A/B Augmented IST Tests

NUMBER	CATEGORY	CODE CLASS	DRAWING NUMBER	DRAWING VALVE COORDINATE
1/2CC070A	C	3	M-66-4A (66-4B)	C-7 (B-6)
1/2CC070B	C	3	M-66-4A (66-4B)	C-5 (C-4)
0WO205A	C	3	M-118-1	E-6
0WO205B	C	3	M-118-1	C-6

CODE REQUIREMENT(S)/DISCUSSION:

These valves are not within the scope of the Inservice Testing Program.

POSITION:

The valves due not meet the scoping requirements to be in the IST Program. However, as they have some importance, it was decided to to included them in the IST Program as Augmented Tests.

ATTACHMENT 11

CORPORATE TECHNICAL POSITION INDEX

Designator	Description	Approval Date
TP-CWE-IST-00-02 Abbreviated in the Valve tables as CW00-02 or 02	Check Valve Condition Monitoring	August 30, 2000
TP-EXE-IST-01-01	Non-Safety Check Valve Exercise Test By Normal Operations	April 17, 2001
TP-EXE-IST-01-03	Justification for Exception to Exercise Check Valves after Reassembly	April 9, 2001
TP-EXE-IST-00-04 Abbreviated in the Valve tables as Ex00-04 or 04	Classification of Skid Mounted Components	June 8, 2001