# ATTACHMENT 7

## REFUEL OUTAGE JUSTIFICATION INDEX

(Page 1 of 1)

| Designator | Description | Date |
|---|---|---|
| RJ-1 | (1/2SI8811A/B) Stroke Time Tested (SO/SC) during Refueling | July 1, 2006 |
| RJ-2 | (1/2IA065; 1/2IA066) Stroke Time Test (SC) and Fail Safe Test Closed (FC) during Refueling | July 1, 2006 |
| RJ-3 | (1/2SI8819A-D; 1/2SI8905A-D; 1/2SI8922A/B; 1/2SI8926; 1/2SI8949B,D) All Valves Full Stroke Tested (CO) during Refueling | July 1, 2006 |
| RJ-4 | (1/2CV8481A/B; 1/2CV8546; 1/2SI8815; 1/2SI8900A-D) All Valves Full Stroke Tested (CC) during Refueling | July 1, 2006 |
| RJ-5 | (1/2SI8841A/B; 1/2SI8949A,C) Full Stroke Test (CO) during Refueling | July 1, 2006 |
| RJ-6 | (1/2RH8705A/B) Full Stroke Test (CO) during Refueling | July 1, 2006 |
| RJ-7 | (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 | July 1, 2006 |
| RJ-8 | (1/2RY085A/B, 1/2RY086A/B) Backflow Test (CC) during Refueling | July 1, 2006 |
| RJ-9 | (1/2SX168) Fail Open Test during Refueling | July 1, 2006 |

# ATTACHMENT 8

## REFUELING OUTAGE JUSTIFICATION
## RJ-1
**This Justification may be deleted if Relief Request (RV-1) is APPROVED**

| 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, Byron 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-1

## 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 in accordance with ISTC-3521(e).

# REFUELING OUTAGE JUSTIFICATION
# RJ-2

| 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-2 (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.

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**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 ISTC-3521(e).

# REFUELING OUTAGE JUSTIFICATION
# RJ-3

| 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) |
| 1/2SI8905B | 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) |
| 1/2SI8949B | 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 close stroke tested) per Byron Station Tech Specs (see CS-13). 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.

## REFUELING OUTAGE JUSTIFICATION
## RJ-3 (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 Byron Station Technical Specification LCO 3.4.12 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-3522(c).

# REFUELING OUTAGE JUSTIFICATION
# RJ-4

| 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) |
| 1/2SI8815 | 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 close stroke tested) per Byron Station Tech Specs (see CS-13). 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.

## 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-4 (continued)

The 1/2CV8481A/B 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 Byron 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-3522(c).

# REFUELING OUTAGE JUSTIFICATION
# RJ-5

| 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 Byron Station Tech Specs (see VC-13). 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).

## REFUELING OUTAGE JUSTIFICATION
## RJ-5 (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-3522(c).

# REFUELING OUTAGE JUSTIFICATION
# RJ-6

| 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):

Check valves 1/2RH8705A/B 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-13). 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.

## TEST FREQUENCY:

These valves will be full stroke exercised during refueling outages in accordance with ISTC-3522(c).

# REFUELING OUTAGE JUSTIFICATION
# RJ-7

| 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 Byron 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 (ISTA-1100). This has always been Byron'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:

A commitment was made to only perform an augmented Fail-Safe on these valves in Byron's original program. These valves are all part of the surveillance 1/2BOSR 3.2.9-3 executed to satisfy Tech Spec LCO 3.3.2 (Table 3.3.2-1, item #1a), 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.

## REFUELING OUTAGE JUSTIFICATION
## RJ-7 (continued)

The closure of the Main Feedwater Regulating Valves (1/2FW510, 1/2FW520, 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 outside of the IST Program during refueling outages in accordance with Byron Station Technical Specifications.

# REFUELING OUTAGE JUSTIFICATION
# RJ-8

| VALVE NUMBER | CATEGORY | CODE CLASS | DRAWING NUMBER | DRAWING COORDINATE |
|---|---|---|---|---|
| 1/2RY085A | C | 3 | M-60-8(135-8) | C-5 (E-7) |
| 1/2RY085B | C | 3 | M-60-8(135-8) | C-3 (E-6) |
| 1/2RY086A | C | 3 | M-60-8(135-8) | C-6 (E-2) |
| 1/2RY086B | C | 3 | M-60-8(135-8) | C-4 (E-6) |

## FUNCTION(S):

These valves are the instrument air supply check valves to the pressurizer power operated relief valve (PORV) actuators. These valves must close to isolate the pressurizer PORV actuator air supply from the non safety related instrument air system. This function assures that sufficient air is available in the accumulator to open the pressurizer power operated relief valve (PORV) on demand. This valve prevents discharging the accumulator in the event of a failed instrument air supply which is non safety related.

The valve opens to provide air supply from the instrument air system to the pressurizer PORV accumulator. The accumulator provides operating gas to the pressurizer PORV. This is not a safety function since the instrument air system is not considered safety related and not relied upon for safe shutdown or accident mitigation.

## JUSTIFICATION:

Check valves 1/2RY085A/B and 1/2RY086A/B have been investigated for possible closure testing. These valves are arranged in series without intermediate test taps such that individual verification of each valve closure cannot be performed. However, provisions exist for verification that at least one valve in a pair is closed by performance of a pressure decay/leakage test. Testing of these valves as a pair is acceptable since only one valve is required for closure. Evidence of gross leakage will indicate a failure or degradation of both valves.

The closure testing performed on these valves requires isolating the PORV air supply and accumulator to perform a reverse flow test. This testing cannot be performed during normal operation or cold shutdown conditions since the PORV's are required for low temperature over pressurization protection. Additionally, the time and equipment setup inside containment to perform the testing would extend the cold shutdown duration.

## TEST FREQUENCY:

Check valves 1/2RY085A/B and 1/2RY086A/B will be exercised open and closed during refueling outages in accordance with ISTC-3522(c).

# REFUELING OUTAGE JUSTIFICATION
# RJ-9

| VALVE NUMBER | CATEGORY | CODE CLASS | DRAWING NUMBER | DRAWING COORDINATE |
|---|---|---|---|---|
| 1/2SX168 | B | 3 | M-42-3(M-126-1) | B3 (B6) |

## FUNCTION(S):

This temperature control valve opens to provide a flow path for Essential Service Water to the cubicle coolers for the B (diesel driven) AFW pump room. This valve operates off a temperature controller (thermostat) for the room. This valve oscillates open and closed to maintain the correct room temperature. This valve fails in the open direction to ensure a flow path of essential service water to the cubicle coolers upon loss of power.

## JUSTIFICATION:

These valves were investigated to determine what methods were required to conduct a fail test. There is no simple or practical way to test these valves. These valves are in a location with limited accessibility in the overhead of the diesel driven Auxiliary Feedwater pump rooms. To test these valves requires breaking open the air lines to the valves and hooking up hand pumps and gauges to operate and fail the valve. The more frequently these air line connections are broken increases the chance of introducing a failure of those fittings. This would result in additional unnecessary maintenance on those valves.

## TEST FREQUENCY:

Due to the considerations of limited accessibility, and the requirement to break into the air lines and use special equipment to perform the test, it would not be practical to perform these tests routinely at power or during cold shutdowns. Byron Station will fail open test the 1/2SX168 valves during each respective refueling outage in accordance with ISTC-3521(e).

# ATTACHMENT 9

## TECHNICAL POSITION INDEX

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| Designator | Description | Date |
|---|---|---|
| TP-PA-01 | (0SX02PA/B) Byron's position on collecting vibration data. | July 1, 2006 |
| TP-PA-02 | (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. | July 1, 2006 |
| TP-PA-03 | (All) Byron's position on Preconditioning. | July 1, 2006 |
| TP-PA-04 | (1/2CS01PA/B 1/2RH01PA/B) Categorization of Residual Heat Removal and Containment Spray pumps as centrifugal pumps | July 1, 2006 |
| TP-PA-05 | (All) Categorization of IST Pump as Group A or Group B | July 1, 2006 |
| TP-PA-06 | Method for Determining Suction Pressure of the SX Makeup Pumps (0SX02PA/B) | July 1, 2006 |
| TP-PA-07 | Instrument Accuracy Requirements for Pump Testing | July 1, 2006 |
| TP-PA-08 | Classification of Skid Mounted Pumps | July 1, 2006 |
| TP-VA-01 | (All Power-Operated Valves) Method of Stroke Timing Valves | July 1, 2006 |
| TP-VA-02 | (Valves with Fail-Safe Actuators) Method of Fail-Safe Testing Valves | July 1, 2006 |
| TP-VA-03 | Manual Valve Exercise Frequency | July 1, 2006 |
| TP-VA-04 | (Valves with Remote Position Indicators) Method of Position Indication Testing | July 1, 2006 |
| TP-VA-05 | (All) Byron's Position on Preconditioning | July 1, 2006 |
| TP-VA-06 | (Valves with both Active and Passive Safety functions) Position for testing passive/active valves | July 1, 2006 |

# ATTACHMENT 9

## TECHNICAL POSITION INDEX

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| Designator | Description | Approval Date |
|---|---|---|
| TP-VA-07 | (Skid Mounted Valves) Testing of Skid Mounted Valves | July 1, 2006 |
| TP-VA-08 | Non-Safety Function, Check Valve Exercise Testing By Normal Operations | July 1, 2006 |
| TP-VA-09 | Check Valve Disassembly and Examination to Verify Both the Open and Closed Functions | July 1, 2006 |
| TP-VA-10 | (1/2RY085A/B, 1/2RY086A/B) Bases for Testing Series Check Valves 1/2RY085A/B and 1/2RY086A/B as a Unit | July 1, 2006 |
| TP-VA-11 | Use of Code Case OMN-8 for 1/2SX168 | July 1, 2006 |

# ATTACHMENT 10

## PUMP TECHNICAL POSITION
## TP-PA-01

**TITLE:**

Method of Collecting Vibration Data for the Byron Station Essential Service Water Makeup Pumps

**PUMPS AFFECTED:**

Essential Service Water Makeup Pumps - 0SX02PA and 0SX02PB.

**CODE REQUIREMENT(S)/DISCUSSION:**

ASME OM Code 2001 Edition through 2003 Addenda: Table ISTB 5200-1 – Vertical Line Shaft and Centrifugal Pumps Test Acceptance Criteria; Subsection 3540 - Vibration; Subsection 3510(e) - Frequency Response Range.

**POSITION:**

Byron Station's Essential Service Water Makeup Pumps are a unique design. The seven stage pump is driven by a horizontal diesel engine through a right angle gear drive, with the engine and gear drive located approximately 39 feet above the pump. This configuration assures pump operability during the design basis flooding of the Rock River.

The Essential Service Water Makeup Pumps are classified as vertical line shaft pumps. Subsection ISTB 3540(b) requires that for vertical line shaft pumps, vibration measurements shall be taken on the upper motor bearing housing in three orthogonal directions, one of which is the axial direction. Due to the unique design of the Essential Service Water Makeup Pumps vibration measurements are taken on the gear drive upper bearing housing. This location is functionally equivalent to the upper motor bearing housing specified for vertical line shaft pumps in the ASME OM Code.

In accordance with Subsection 3510(e) vibration measurements will include frequencies from nominally zero to 1000 Hz.

# PUMP TECHNICAL POSITION
# TP-PA-02

**PUMP NUMBER:** 0AB03P, 1AB03P, 2AB03P

**ASME CODE CLASS:** 3

**POSITION:**

The Boric Acid Transfer Pumps fall outside the scope of the IST Pump Program applicability statement of ISTB-1100 because they are not provided with an emergency power source. In addition, Byron Station is analyzed as a "hot shutdown" plant. 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, Byron Station has developed a testing program for these pumps outside the IST Program.

# PUMP TECHNICAL POSITION
# TP-PA-03
# PRECONDITIONING

Preconditioning is an issue in the nuclear industry. The NRC has issued Information Notice 97-16, Preconditioning of Plant Structures, Systems, and Components before ASME Code Inservice Testing or Technical Specification Surveillance Testing. This section provides an overview of how Byron Station and the IST Program address this issue.

Preconditioning is a concern to the validity of Inservice Testing. Two of the primary interrelationships between the IST Program and preconditioning are the scheduling of work and the performance of surveillance procedures themselves.

Preconditioning is the unacceptable practice of "grooming" a component prior to surveillance testing in such a way that the results of the surveillance are invalidated. It is an activity performed immediately prior that enhances performance and which prevents from accurately determining if the system, structure, or component would have been capable of meeting the established acceptance criteria in an undisturbed condition.

Work activities are scheduled and controlled at Byron Station by the Work Control Department. For major Technical Specification pump systems, work windows are established in which to perform maintenance. Normally these work windows are at a significantly reduced frequency from the IST test frequency for the pumps. For work activities which can potentially affect pump performance, the ASME Code requires having the appropriate IST tests conducted afterwards to determine if the performance characteristics were affected. As such, these work windows have the surveillance test scheduled after the pump/system maintenance to test pump operability. It is required that the IST tests be successfully passed prior to declaring the pump operable. The review process for these surveillances assesses to determine if new reference values are required. Because of the normally greater frequency of conducting IST pump surveillances, most of these surveillances are in work windows in which maintenance on the associated equipment is not scheduled.

There is no work window program, which schedules valve maintenance in conjunction with periodic valve surveillances. Post maintenance testing is performed after work, which can affect the performance of the valves. This testing is assigned on a case-by-case basis depending on the work conducted.

Byron Station has identified potential preconditioning concerns and has changed surveillances to address this issue. Examples of this are stroke tests for valves requiring testing in both directions. The surveillances are being revised to stroke these valves in the first direction of opportunity to not precondition the valve. Surveillances for check valves are having precautions placed in them to not move the valve disc or affect the parts prior to inspection which may constitute preconditioning.

## PUMP TECHNICAL POSITION
## TP-PA-03
## PRECONDITIONING (continued)

The identification and addressing of preconditioning concerns at Byron Station is an ongoing concern. The first step in addressing potential preconditioning concerns is at the individual's level with supervisory involvement as necessary. Activities that are determined to violate the Byron Station Preconditioning Policy are documented through the Issue Report (IR) or Engineering Request processes. Engineering will review potential violations of the preconditioning policy for appropriate disposition.

Byron Site Policy Memo 600.12, Preconditioning Position, establishes the preconditioning program at Byron Station. Refer to this Memo for guidance regarding preconditioning. (Note: The definition and reference to this policy is required by NTS # 454-556-98-PRECON-03)

# PUMP TECHNICAL POSITION
# TP-PA-04

**TITLE:**
Categorization of RHR and CS pumps as centrifugal pumps

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

**CODE REQUIREMENTS/DISCUSSION:**

Pumps included in the Inservice Testing Program are tested in accordance with ASME OM Code 2001 Edition through 2003 Addenda, ISTB – "Inservice Testing of Pumps in Light-Water Reactor Nuclear Power Plants". Within this document, requirements for acceptance criteria and required action ranges are established in accordance with Table ISTB 5200-1 – Vertical Line Shaft and Centrifugal Pumps Test Acceptance Criteria. Subsection ISTB-2000 defines vertical line shaft pumps as, a vertically suspended pump where the pump driver and pump element are connected by a line shaft within an enclosed column.

The ASME OM Code directs vibration measurements for centrifugal pumps to 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 vibration measurements are required to be taken on the upper motor bearing housing in three orthogonal directions, one of which is the axial direction.

Byron Station's RH and CS pumps do not meet the definitions of vertical line shaft pumps as provided in Subsection ISTB-2000. 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. Byron meets the ISTB requirements for centrifugal pumps by recording vibrations on the lower motor bearing in three directions and upper motor bearing in two directions.

POSITION:

Byron Station categorized the RH and CS pumps as centrifugal pumps for testing in accordance with ASME OM Code 2001 Edition through 2003 Addenda, Subsection ISTB, Inservice Testing of Pumps in Light-Water Nuclear Reactor Power Plants.

# PUMP TECHNICAL POSITION
# TP-PA-05

## TITLE:
Categorization of IST Pumps as Group A or Group B

## CODE REQUIREMENTS/DISCUSSION:
Byron has categorized the pumps required to be included in the Inservice Testing Program as either Group A or B in accordance with the requirements of Subsection ISTB-1400(b).

Group A pumps are pumps that are operated continuously or routinely during normal operation, cold shutdown, or refueling operations. The following pumps are categorized as Group A at Byron:

| Pump No. | Class | Group | Type | Function | Design Flow (gpm) |
|---|---|---|---|---|---|
| 0CC01P | 3 | A | Centrifugal | Component Cooling Pump | 5150 |
| 1CC01PA | 3 | A | Centrifugal | Component Cooling Pump 1A | 5150 |
| 1CC01PB | 3 | A | Centrifugal | Component Cooling Pump 1B | 5150 |
| 2CC01PA | 3 | A | Centrifugal | Component Cooling Pump 2A | 5150 |
| 2CC01PB | 3 | A | Centrifugal | Component Cooling Pump 2B | 5150 |
| 1CV01PA | 3 | A | Centrifugal | Centrifugal Charging Pump 1A | 520-550 |
| 1CV01PB | 3 | A | Centrifugal | Centrifugal Charging Pump 1B | 520-550 |
| 2CV01PA | 3 | A | Centrifugal | Centrifugal Charging Pump 2A | 520-550 |
| 2CV01PB | 3 | A | Centrifugal | Centrifugal Charging Pump 2B | 520-550 |
| 1RH01PA | 2 | A | Centrifugal | Residual Heat Removal Pump 1A | 3804 |
| 1RH01PB | 2 | A | Centrifugal | Residual Heat Removal Pump 1B | 3804 |
| 2RH01PA | 2 | A | Centrifugal | Residual Heat Removal Pump 2A | 3804 |
| 2RH01PB | 2 | A | Centrifugal | Residual Heat Removal Pump 2B | 3804 |
| 1SI01PA | 2 | A | Centrifugal | Safety Injection Pump 1A | 612-655 |
| 1SI01PB | 2 | A | Centrifugal | Safety Injection Pump 1A | 612-655 |
| 2SI01PA | 2 | A | Centrifugal | Safety Injection Pump 2A | 612-655 |
| 2SI01PB | 2 | A | Centrifugal | Safety Injection Pump 2B | 612-655 |
| 1SX01PA | 3 | A | Centrifugal | Essential Service Water Pump 1A | 24000 |
| 1SX01PB | 3 | A | Centrifugal | Essential Service Water Pump 1B | 24000 |
| 2SX01PA | 3 | A | Centrifugal | Essential Service Water Pump 2A | 24000 |
| 2SX01PB | 3 | A | Centrifugal | Essential Service Water Pump 2B | 24000 |
| 0WO01PA | 3 | A | Centrifugal | Control Room Chilled Water Pump A | 576 |
| 0WO01PB | 3 | A | Centrifugal | Control Room Chilled Water Pump B | 576 |

Group B pumps are those pumps in standby systems that are not operated routinely except for testing. The following pumps are categorized as Group B at Byron Nuclear Power Station:

| Pump No. | Class | Group | Type | Function | Design Flow |
|---|---|---|---|---|---|
| 1AF01PA | 3 | B | Centrifugal | Auxiliary Feedwater Pump 1A | 1066 |
| 1AF01PB | 3 | B | Centrifugal | Auxiliary Feedwater Pump 1B | 1066 |
| 2AF01PA | 3 | B | Centrifugal | Auxiliary Feedwater Pump 2A | 1066 |
| 2AF01PB | 3 | B | Centrifugal | Auxiliary Feedwater Pump 2B | 1066 |
| 1CS01PA | 2 | B | Centrifugal | Containment Spray Pump 1A | 4200 |
| 1CS01PB | 2 | B | Centrifugal | Containment Spray Pump 1B | 4600 |
| 2CS01PA | 2 | B | Centrifugal | Containment Spray Pump 2A | 4200 |
| 2CS01PB | 2 | B | Centrifugal | Containment Spray Pump 2B | 4600 |
| 0SX02PA | 3 | B | Vertical | Essential Service Water Makeup Pump | 1377 |
| 0SX02PB | 3 | B | Vertical | Essential Service Water Makeup Pump | 1377 |

## PUMP TECHNICAL POSITION
## TP-PA-05 (continued)

The following summarizes the Group A, B, and Comprehensive Pump Test requirements as specified by the ASME OM Code Subsection ISTB.

Group A Pump Tests – Group A tests are performed quarterly for each pump categorized as A. The following inservice test parameters are measured for each Group A pump test:

- Speed (if pump is variable speed)
- Differential Pressure
- Discharge Pressure, (for positive displacement pumps)
- Flow Rate
- Vibration

Group B Pump Tests – Group B tests are performed quarterly for each pump categorized as B. The following inservice test parameters are measured for each Group B pump test.

- Speed (if pump is variable speed)
- Differential Pressure[(1)]
- Flow Rate[(1)]

[(1)] For positive displacement pumps, flow rate shall be measured or determined, for all other pumps, differential pressure or flow rate shall be measured or determined.

Comprehensive Pump Tests – Comprehensive pump tests are performed biennially for all pumps in the Inservice Testing Program. Accident condition flow rates for a single pump will be used as the pump design flow rates. The following Inservice Test parameters are measured for each Comprehensive pump test:

- Speed (if pump is variable speed)
- Differential Pressure
- Discharge Pressure, (for positive displacement pumps)
- Flow Rate
- Vibration

The following instrument accuracy requirements apply to each test type:

| Parameter | Group A | Group B | Comprehensive |
|---|---|---|---|
| Pressure | +/- 2.0% | +/- 2.0% | +/- 0.5% |
| Flow Rate | +/- 2.0% | +/- 2.0% | +/- 2.0% |
| Speed | +/- 2.0% | +/- 2.0% | +/- 2.0% |
| Vibration | +/- 5.0% | +/- 5.0% | +/- 5.0% |
| Differential Pressure | +/- 2.0% | +/- 2.0% | +/- 0.5% |

# PUMP TECHNICAL POSITION
# TP-PA-06

## TITLE:

Method for determining suction pressure of SX Makeup Pumps (0SX02PA/B)

## COMPONENTS AFFECTED:

0SX02PA SX Makeup Pump A
0SX02PB SX Makeup Pump B

## CODE REQUIREMENTS/DISCUSSION:

The ASME OM Code Subsection ISTB-3520(b) requires that the differential pressure for Inservice Testing of pumps be measured directly by use of a differential pressure indicator or by the difference between the pressure at a point in the inlet (suction) and the pressure at a point in the discharge.

The Code allows differential pressure to be determined by obtaining information from a differential pressure transmitter, or by determining the difference in pressure at a point in the inlet pipe and the pressure at a point in the discharge pipe. In accordance with NRC guidance provided in NUREG-1482, Revision 1, Section 5.5.3 "the licensee may implement a calculational method without obtaining relief because the ASME Code allows for the determination of differential pressure from the discharge pressure and the pressure in the pump inlet."

## POSITION:

Differential pressure is determined by subtracting the suction pressure from the discharge pressure. Due to the vertical design of SX Makeup pumps, suction pressure is determined as follows:

$P_s = [L_r - (DL/12) - 661.75]/ 2.31$

Where;

$P_s$ = Suction Pressure (psig)
$L_r$ = River Lever (feet)
DL = Traveling Screen Differential Level (inches)
661.75 = Pump Elevation (feet)
2.31 = Constant Conversion for Water (feet of head to psi)

This calculation is documented in the Inservice Testing procedures for the subject pumps and meets the requirements of Subsection ISTB-3520(b).

As a note, the accuracy requirements of ISTB-3510(a) are met for the quarterly test of the SX Makeup Pumps.

# PUMP TECHNICAL POSITION
# TP-PA-07

## TITLE:

Instrument Accuracy Requirements for Pump Testing

## CODE REQUIREMENTS/DISCUSSION:

This position is only applicable to ASME OM Code Inservice Testing of pumps.

### Position

- The accuracy requirements of ASME OM Code 2001 Edition through 2003 Addenda, ISTB-3510 and Table ISTB-3500-1 apply to the accuracy to which installed instruments are calibrated.
- For instrument loops, the accuracy requirements apply to the accuracy to which the instrument loop is calibrated. If the instrument loop is not calibrated as a loop, then a loop accuracy calculation is performed.
- To calculate loop accuracy, either the greater of reference accuracies for individual components or the calibration tolerance for the individual components should be summed using square root of the sum of squares.

### Justification.

This position is based on a review of code interpretations and definitions in recent versions of the Code. Discussions with ASME Subgroup on Pumps members indicate that this position is consistent with industry practice and code intent. The purpose of the accuracy requirements in the code is to ensure that measurements can be used to trend pump performance and identify degradation. Calibration of instruments to the criteria in Table ISTB-3500-1 of ISTB provides the level of quality and assurance to fulfill this purpose.

Interpretation 91-3 states that Table 1 of Part 6 applies only to the calibration of the instrument. (This was in response to a question on whether the final indication of flow rate on an analog instrument must be within 2% of full scale of actual process flow rate, taking into account attributes such as orifice plate tolerances, tap locations, and process temperatures.)

Question 1 of Interpretation 95-07 states that it is the intent of Part 6 "to consider only the instrument's reference accuracy, such as supplied by the instrument manufacturer, in determination of instrument loop accuracy." An instrument loop is defined in the code as "two or more instruments or components working together to provide a single output." It was this interpretation that led to the assumption during the AE inspection that the only permissible way to determine loop accuracy was to combine reference accuracies of the individual loop components using square root of the sum of squares. However, discussions with OM-6 working group members indicate that the intent of this interpretation was to clarify that loop accuracy calculations did not need to consider environmental effects, process effects, and vibration effects on loop accuracy (see Question 2 of Interpretation 95-07).

## PUMP TECHNICAL POSITION
## TP-PA-07 (continued)

Section 5.5.4 of NUREG 1482, Revision 1 discusses the accuracy of flow rate instrument loops. It states that the accuracy for analog instruments specified in Subsection ISTB, ISTB-3500 applies only to the calibration of the instruments.

Starting with the OM-1994 addendum of the code, the definition of instrument accuracy is clarified to read, "the allowable inaccuracy of an instrument loop based on the square root of the sum of the square of the inaccuracies of each instrument or component in the loop when considered separately. Alternatively, the allowable inaccuracy of the instrument loop may be based on the output for a known input into the instrument loop." From this definition, it is clear that calibration of an instrument or instrument loop to the OM Code accuracy criteria meets the Code requirements.

# PUMP TECHNICAL POSITION
# TP-PA-08

## TITLE:
Classification of Skid Mounted Components

## PURPOSE:
The purpose of this technical position is to clarify requirements for classification of various skid mounted components, and to clarify the testing requirements of these components.

## BACKGROUND:
The ASME Code allows classification of some components as skid mounted when their satisfactory operation is demonstrated by the satisfactory performance of the associated major components. Testing of the major component is sufficient to satisfy Inservice Testing requirements for skid mounted components. In section 3.4 of NUREG 1482 Rev 1, the NRC supports the designation of components as skid mounted:

> "The staff has determined that the testing of the major component is an acceptable means to verify the operational readiness of the skid-mounted components and component subassemblies if the licensee documents this approach in the IST Program Document. This is acceptable for both Code class components and non-Code class components that are tested and tracked by the IST Program."

In the 1996a addenda to the ASME OM Code (endorsed by 10CFR50.55(a) in October 2000), the term skid-mounted was clarified by the addition of ISTA paragraph 1.7:

> ISTA 1.7 Definitions
>
> *Skid mounted components and component sub assemblies* – components integral to or that support operation of major components, even though these components may not be located directly on the skid. In general, these components are supplied by the manufacturer of the major component. Examples include: diesel skid-mounted fuel oil pumps and valves, steam admission and trip throttle valves for high-pressure coolant injection or Auxiliary Feedwater turbine-driven pumps, and solenoid-operated valve provided to control the air-operated valve.

This definition was further clarified in the 1998 and later Editions of the ASME Code:

> ISTA-2000 DEFINITIONS
>
> *Skid mounted pumps and valves* – pumps and valves integral to or that support operation of major components, even though these components may not be located directly on the skid. In general, these pumps and valves are supplied by the manufacturer of the major component.

## VALVE TECHNICAL POSITION
## TP-PA-08 (continued)

Examples include:

(a) diesel fuel oil pumps and valves;
(b) steam admission and trip throttle valves for high-pressure coolant injection pumps;
(c) steam admission and trip throttle valves for Auxiliary Feedwater turbine driven pumps;
(d) solenoid-operated valves provided to control an air-operated valve.

Additionally the Subsections pertaining to pumps (ISTB) and valves (ISTC) includes exclusions/exemptions for skid mounted components;

ISTB-1200(c) Exclusions

Skid-mounted pumps that are tested as part of the major component and are justified by the Owner to be adequately tested.

ISTC-1200 Exemptions

Skid-mounted valves are excluded from this Subsection provided they are tested as part of the major component and are justified by the Owner to be adequately tested.

**POSITION:**

The ASME OM Code definition of skid mounted will be used for classification of components in the Byron Station Inservice Testing Program. In addition, for a component to be considered skid mounted:

- The major component associated with the skid mounted component must be surveillance tested at a frequency sufficient to meet ASME Code test frequency for the skid mounted component.

- Satisfactory operation of the skid mounted component must be demonstrated by satisfactory operation of the major component.

- The IST Bases Document should describe the bases for classifying a component as skid mounted, and the IST Program Plan should reference this technical position for the component.

Recognition and classification of components as skid mounted eliminates the need for the redundant testing of the sub component(s) as the testing of major (parent) component satisfactorily demonstrates operation of the "skid mounted" component(s).

# VALVE TECHNICAL POSITION
# TP-VA-01

## 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. Subsection ISTC-2000, 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 ISTC-5000 Specific Testing Requirements, 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-02

## 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:

Subsection ISTC-3560 states that "Valves with fail-safe actuators shall be tested by observing the operation of the actuator upon loss of valve actuating power in accordance with the exercising frequency of ISTC-3510.

## 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 ISTC-3700.

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-03

## TITLE:

Manual Valve Exercise Frequency

## VALVES AFFECTED:

| Valve | Category | Class | P&ID | 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) |
| 1/2MS019A | B | 2 | M-35-2(120-2A) | C2 (D2) |
| 1/2MS019B | B | 2 | M-35-1(120-1) | E2 (E2) |
| 1/2MS019C | B | 2 | M-35-2(120-2B) | E2 (D2) |
| 1/2MS019D | B | 2 | M-35-1(120-1) | C2 (C2) |

## CODE REQUIREMENT(S)/ DISCUSSION:

The ASME OM Code 2001 through 2003 Addenda section ISTC-3540 states;

> "Manual valves shall be full-stroke exercised at least once every 5 years, except where adverse conditions[2] may require the valve to be tested more frequently to ensure operational readiness."
>
> [2]Harsh service environment, lubricant hardening, corrosive or sediment laden process fluid, or degraded valve components are some examples of adverse conditions.

In the Federal Register for the Proposed Rule Change dated September 26, 2002, the NRC stated the following with regards to manual valve exercise frequency;

> "Section 50.55a(b)(3)(vi) in the proposed rule would require an exercise interval of 2 years for manual valves within the scope of the ASME OM Code rather than the exercise interval of 5 years specified in the 1999 and the 2000 Addenda of the ASME Code. The 1998 Edition of the ASME OM Code specified an interval of 3 months for manual valves within the scope of the Code. The 1999 Addenda to the ASME OM Code revised ISTC-3540 to extend the exercise frequency for manual valves to 5 years."

## VALVE TECHNICAL POSITION
## TP-VA-03 (continued)

The NRC goes further to state that;

> "Section 50.55a(b)(3)(vi) is revised to clarify that the interval for exercising manual valves may not exceed 2 years when using the 2001 Addenda through 2003 Addenda of ISTC-3540"

**POSITION:**

Byron Station will perform exercising of manual valves within the scope of the IST Program at a frequency not to exceed 2 years.

**Justification**

The NRC Rule Change has been adopted for the frequency of exercising manual valves at least once every 2 years. This interval is more frequent than required by the Edition of the Code used by Byron, therefore no other justification is required.

# VALVE TECHNICAL POSITION
# TP-VA-04

## TITLE:

Method of Position Indication Testing

## VALVES AFFECTED:

All valves with Remote Position Indicators

## CODE REQUIREMENT(S) / DISCUSSION:

Subsection ISTC-3700, 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 ASME OM Code ISTC:

1. ISTC-3520, Exercising Requirements
2. ISTC-3700, Position Verification Testing
3. ISTC-5000, Specific Testing Requirements

In summary, the remote position indicator utilized during valve exercising (ISTC-3520) and stroke timing (ISTC-5000) is the indicator which is used to verify that valve operation is accurately indicated (ISTC-3700). However, if a valve is stroke time tested locally or manually exercised locally, a remote position indication test is not required.

## VALVE TECHNICAL POSITION
## TP-VA-04 (continued)

The remote position indication test is to be performed as follows:

> An individual is dispatched to the valve to locally observe the valve movement and he/she establishes communication with an individual at the remote position indicator. As the valve is exercised in both directions, the individual at the remote position indicator verifies that the indicator shows the proper position by communicating with the local observer, who is observing the valve stem movement. When the valve stem movement cannot be directly observed, indirect means may be employed to verify the change in valve position. These may include observations such as changes in system pressure or establishment/cessation of flow.

# VALVE TECHNICAL POSITION
# TP-VA-05
# PRECONDITIONING

Preconditioning is an issue in the nuclear industry. The NRC has issued Information Notice 97-16, Preconditioning of Plant Structures, Systems, and Components before ASME Code Inservice Testing or Technical Specification Surveillance Testing. This section provides an overview of how Byron Station and the IST Program address this issue.

Preconditioning is a concern to the validity of Inservice Testing. Two of the primary interrelationships between the IST Program and preconditioning are the scheduling of work and the surveillance procedures themselves.

Preconditioning is the unacceptable practice of grooming a component prior to performing a surveillance, in such a way that the results of the surveillance are invalidated. It is an activity performed immediately prior that enhances performance and which prevents from accurately determining if the system, structure, or component would have been capable of meeting the established acceptance criteria in an undisturbed condition.

Work activities are scheduled and controlled at Byron Station by the Work Control Department. For major Technical Specification pump systems, work windows are established in which to perform maintenance. Normally these work windows are at a significantly reduced frequency from the IST test frequency for the pumps. For work activities which can potentially affect pump performance, the ASME Code requires having the appropriate IST tests conducted afterwards to determine if the performance characteristics were affected. As such, these work windows have the surveillance test scheduled after the pump/system maintenance to test pump operability. It is required that the IST tests be successfully passed prior to declaring the pump operable. The review process for these surveillances assesses to determine if new reference values are required. Because of the normally greater frequency of conducting IST pump surveillances, most of these surveillances are in work windows in which maintenance on the associated equipment is not scheduled.

There is no work window program, which schedules valve maintenance in conjunction with periodic valve surveillances. Post maintenance testing is performed after work, which can affect the performance of the valves. This testing is assigned on a case-by-case basis depending on the work conducted.

Byron Station has identified potential preconditioning concerns and has changed surveillances to address these issues. Examples of this are stroke tests for valves requiring testing in both directions. The surveillances are being revised to stroke these valves in the first direction of opportunity to not precondition the valve. Surveillances for check valves are having precautions placed in them to not move the valve disc or affect the parts prior to inspection which may constitute preconditioning.

## VALVE TECHNICAL POSITION
## TP-VA-05
## PRECONDITIONING (continued)

The identification and addressing of preconditioning concerns at Byron Station is an ongoing concern. The first step in addressing potential preconditioning concerns is at the individual's level with supervisory involvement as necessary. Activities that are determined to violate the Byron Station Preconditioning Policy are documented through the Problem Issue Report (IR) or Engineering Request processes. Engineering will review potential violations of the preconditioning policy for appropriate disposition.

Byron Site Policy Memo 600.12, Preconditioning Position, establishes the preconditioning program at Byron Station. Refer to this Memo for guidance regarding preconditioning. (Note: The definition and reference to this policy is required by NTS # 454-556-98-PRECON-03)

# VALVE TECHNICAL POSITION
# TP-VA-06

## 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 exist 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 direction, will be exercised to only their active position. If these valves have remote position indication, the position indication verification will include verification of both positions.

# VALVE TECHNICAL POSITION
# TP-VA-07

## TITLE:
Classification of Skid Mounted Components

## PURPOSE:
The purpose of this technical position is to clarify requirements for classification of various skid mounted components, and to clarify the testing requirements of these components.

## BACKGROUND:
The ASME Code allows classification of some components as skid mounted when their satisfactory operation is demonstrated by the satisfactory performance of the associated major components. Testing of the major component is sufficient to satisfy Inservice Testing requirements for skid mounted components. In section 3.4 of NUREG 1482 Rev 1, the NRC supports the designation of components as skid mounted:

> "The staff has determined that the testing of the major component is an acceptable means to verify the operational readiness of the skid-mounted components and component subassemblies if the licensee documents this approach in the IST Program Document. This is acceptable for both Code class components and non-Code class components that are tested and tracked by the IST Program."

In the 1996a addenda to the ASME OM Code (endorsed by 10CFR50.55(a) in October 2000), the term skid-mounted was clarified by the addition of ISTA paragraph 1.7:

> ISTA 1.7 Definitions
>
> *Skid mounted components and component sub assemblies* – components integral to or that support operation of major components, even though these components may not be located directly on the skid. In general, these components are supplied by the manufacturer of the major component. Examples include: diesel skid-mounted fuel oil pumps and valves, steam admission and trip throttle valves for high-pressure coolant injection or Auxiliary Feedwater turbine-driven pumps, and solenoid-operated valve provided to control the air-operated valve.

This definition was further clarified in the 1998 and 2001 Editions of the ASME Code:

> ISTA-2000 DEFINITIONS
>
> *Skid mounted pumps and valves* – pumps and valves integral to or that support operation of major components, even though these components may not be located directly on the skid. In general, these pumps and valves are supplied by the manufacturer of the major component.

## VALVE TECHNICAL POSITION
## TP-VA-07 (continued)

Examples include:

(e) diesel fuel oil pumps and valves;
(f) steam admission and trip throttle valves for high-pressure coolant injection pumps;
(g) steam admission and trip throttle valves for Auxiliary Feedwater turbine driven pumps;
(h) solenoid-operated valves provided to control an air-operated valve.

Additionally the Subsections pertaining to pumps (ISTB) and valves (ISTC) includes exclusions/exemptions for skid mounted components;

ISTB-1200(c) Exclusions

Skid-mounted pumps that are tested as part of the major component and are justified by the Owner to be adequately tested.

ISTC-1200 Exemptions

Skid-mounted valves are excluded from this Subsection provided they are tested as part of the major component and are justified by the Owner to be adequately tested.

**POSITION:**

The ASME OM Code definition of skid mounted will be used for classification of components in the Byron Station Inservice Testing Program. In addition, for a component to be considered skid mounted:

- The major component associated with the skid mounted component must be surveillance tested at a frequency sufficient to meet ASME Code test frequency for the skid mounted component.
- Satisfactory operation of the skid mounted component must be demonstrated by satisfactory operation of the major component.
- The IST Bases Document should describe the bases for classifying a component as skid mounted, and the IST Program Plan should reference this technical position for the component.

Recognition and classification of components as skid mounted eliminates the need for the redundant testing of the sub component(s) as the testing of major (parent) component satisfactorily demonstrates operation of the "skid mounted" component(s).

# VALVE TECHNICAL POSITION
# TP-VA-08

## TITLE:

Non-Safety Function, Check Valve Exercise Testing By Normal Operations

## PURPOSE:

The purpose of this Technical Position is to establish the position for the verification of the non-safety exercise testing of check valves by normal plant operations. This position is applicable to check valves in the Inservice Testing (IST) Program as related to the ASME OM Code 2001 Edition through 2003 Addenda.

### Applicability

This Technical Position is NOT applicable to testing the safety function (position) of IST Check Valves. Safety function here means the function of the valve that meets a scoping requirement to be in the IST Program. This Technical Position is applicable to testing the **non-safety function** (position) of IST check valves. This Technical Position is applicable to check valves tested under Subsection ISTC, and to Appendix II (Condition Monitoring), of the ASME OM Code 2001 Edition through 2003 Addenda.

## BACKGROUND:

The ASME OM Code 2001 Edition through 2003 Addenda, Subsection ISTC, ISTC-3550, "Valves in Regular Use," states the following:

> "Valves that operate in the course of plant operation at a frequency that would satisfy the exercising requirements of this Subsection need not be additionally exercised, provided that the observations otherwise required for testing are made and analyzed during such operation and recorded in the plant record at intervals no greater than specified in ISTC-3510"

ISTC-3510 indicates that check valves shall be exercised nominally every 3 months with exceptions (for extended exercise periods) referenced.

ISTC-5221(a)(2) states that,

> "Check valves that have a safety function in only the open direction shall be exercised by initiating flow and observing that the obturator has traveled to either the full open position or to the position required to perform its intended function(s) (see ISTA-1100), and verify closure."

## VALVE TECHNICAL POSITION
## TP-VA-08 (continued)

ISTC-5221(a)(3) states that,

> "Check valves that have a safety function in only the close direction shall be exercised by initiating flow and observing that the obturator has traveled to at least the partially open position[3], and verify that on cessation or reversal of flow, the obturator has traveled to the seat"

Footnote 3 to this section indicates that the partially open position should correspond to the normal or expected system flow. NOTE: "Normal or expected," system flow rate may vary with plant conditions and configurations. The open safety function of a check valve usually requires meeting a specified, required limiting accident flow rate. As Operators are trained in recognizing normal plant conditions, Operator judgment is acceptable in ascertaining whether the non-safety open check valve position is providing normal or expected flow rates or plant conditions.

As stated in these two sections the non-safety function is satisfactorily demonstrated by verifying closure, or passing normal or expected flow to verify opening, as applicable.

**POSITION:**

Verification of the non-safety position of IST check valves may be performed through the execution of a dedicated surveillance. Alternately this verification may be satisfied as follows:

- An appropriate means shall be determined which establishes how the open/closed non-safety function of the specified check valve is demonstrated during normal operations. The position determination may be by direct indicator, or by other positive means such as changes in system pressure, flow rate, level, temperature, seat leakage, etc. This determination shall be documented in the respective Condition Monitoring Plan in the "Bases for Testing and Inspection Strategy," for valves in the Condition Monitoring Program. For check valves governed by Subsection ISTC and not in Condition Monitoring this determination shall be documented in the respective IST Bases Document valve group in the, "Bases Statement," section.

- Automated processes may be used to provide for the "observation and analysis," that a check valve is appropriately satisfying its' non-safety position function. An example of this would be a check valve that has a safety function in only the close direction and normally has flow through it to maintain normal plant operations. If the check valve is not opening to pass flow, alarms or indications would identify the problem to the Operator who is trained to respond to such situations and take appropriate actions. Issue Reports are normally written for abnormal plant conditions attributable to material condition concerns such as check valve failures.

## VALVE TECHNICAL POSITION
## TP-VA-08 (continued)

- The "observation and analysis," of logs and other such records is satisfied by Operator reviews. Operating personnel are trained to look for off-normal data and adverse trends and take actions as appropriate. This would effectively determine if a check valve were satisfactorily fulfilling its' non-safety function.

- The open/closed non-safety function shall be recorded at a periodicity required by ISTC-3510, with exceptions as provided, in plant records such as Operator logs, Electronic Rounds, chart recorders, automated data loggers, etc. NOTE: The safety function testing of these valves constitutes requiring a Quality Record. Records as indicated above are appropriate for the non-safety testing. Should any concerns arise regarding the material condition/operation of these check valves an Issue Report is written which is a Quality Record. The method in which the check valve position is recorded shall be included in the Condition Monitoring Plan or Bases Document sections as indicated above.

### Justification

This Technical Position requires that the method of determining the non-safety position be established. The plant systems and Operator actions provide for the observations and analysis that the valve is satisfying its' non-safety function. Finally, the recording of parameters demonstrating valve position is satisfied at a frequency specified in ISTC-3510. These actions collectively satisfy demonstrating the non-safety position of IST check valves in regular use as required by ISTC-3550.

# VALVE TECHNICAL POSITION
# TP-VA-09

## TITLE:

Disassembly and Examination of check valves to verify the open and closed exercise capability.

## CODE REQUIREMENT(S)/DISCUSSION:

ASME OM Code 2001 Edition through 2003 Addenda, "Code for Operation and Maintenance of Nuclear Power Plants," governs this issue. Subsection ISTC-5221(c), states the following:

> "If the test methods in ISTC-5221(a) and ISTC-5221(b) are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly examination program shall be used to verify valve obturator movement".

Subsection ISTC-5221(c)(2) further states that:

> "During the disassembly process, the full-stroke motion of the obturator shall be verified. Full-stroke motion of the obturator shall be reverified prior to completing reassembly".

In addition, ISTC-5221(c)(4) requires the following:

> "Before return to service, valves that were disassembled for examination or that received maintenance that could affect their performance, shall be exercised full- or part-stroke, if practicable, with flow..."

## Background:

Generic Letter 89-04, Position 2, Alternative to Full-flow Testing of Check Valves was issued by the NRC to allow disassembly and examination of check valves as an alternative to the traditional Code requirements for exercising check valves. The NRC staff position in the GL is that valve disassembly and inspection can be used as a positive means of determining that a valve's disk will full-stoke exercise open or of verifying closure.

The 1995 and later editions of the ASME OM Code have incorporated an alternative to the traditional requirements for check valve testing by allowing Owners to establish a Check Valve Condition Monitoring Program. Once a check valve or group of check valves is placed in to the Condition Monitoring Program, the rules of ISTC-5221, Valve Obturator Movement, no longer apply. Activities and intervals are established within the Check Valve Condition Monitoring Program outside of the frequency requirements of ISTC. As a note, activities such as disassembly/examination may be used within this program for check valves which may be difficult or impossible to test. If a check valve or group of valves is removed from the Condition Monitoring Program for any reason, the valves shall be required to be tested in accordance with the ISTC requirements.

## VALVE TECHNICAL POSITION
## TP-VA-09 (continued)

Byron Station has adopted this alternative for Check Valve Condition Monitoring. Typically, valves which are disassembled and examined for IST purposes are included in this program as well as other check valves which are difficult to test or have had poor performance.

### POSITION:

When using disassembly and examination to determine the necessary check valve obturator movement in accordance with ISTB-5221, Byron station will determine the full stroke exercise open and closure capability of each check valve.

Byron station will verify the Open and Closed functions of each check valve which is disassembled and examined for IST purposes within the Check Valve Condition Monitoring Program or in accordance with ISTC-5221 if the valve is not included in the Condition Monitoring Program. The open and closed function satisfies the bi-directional test requirements for check valves whether they are in Condition Monitoring or not.

If an IST check valve is disassembled or if maintenance is performed outside of the Condition Monitoring program, the valve will be exercised with flow, if practicable prior to returning the valve to service. In this case, a justification for not performing a full or part-stroke of the valve following disassembly or maintenance is required to be documented in the IST Program Plan.

# VALVE TECHNICAL POSITION
# TP-VA-10

## TITLE:

Bases for testing series check valves 1/2RY085A/B and 1/2RY086A/B as a unit.

## VALVES AFFECTED:

1/2RY085A/B
1/2RY086A/B

## CODE REQUIREMENT(S)/DISCUSSION:

ASME OM Code 2001 Edition through 2003 Addenda, "Code for Operation and Maintenance of Nuclear Power Plants," governs this issue. Subsection ISTC-5223, Series Valve in Pairs, states the following:

> "If two check valves are in a series configuration without provisions to verify individual reverse flow closure (e.g., keepfill pressurization valves) and the plant safety analysis assumes closure of either valve (but not both), the valve pair may be operationally tested closed as a unit.
>
> If the plant safety analysis assumes that a specific valve or both valves of the pair close to perform the safety function(s), the required valve(s) shall be tested to demonstrate individual valve closure."

Subsection ISTC-9200, Test Plans, states the following:

> "...the Owner shall maintain a record of test plans that shall include the following," (Subsection ISTC-9200(d)), "bases for testing series check valve pairs as a unit in accordance with ISTC-5222."

**<u>Bases for series pair testing:</u>**
Valves 1/2RY085A/B and 1/2RY086A/B are tested as series pairs ('A' valves in series, 'B' valves in series) because they have no intermediate test taps. These valves were installed in Unit 1 under Modification M 06-1-85-049. Since Unit 2 was in the pre-fuel load stage the changes were made under ECN 24497. In the Modification they were tested as a series pair in a pressure decay test. There is no mention anywhere in the Modification indicating a design requirement to test the valves individually. If there were such a requirement it would need to have been prescribed in the Modification and the test executed prior to accepting the Modification. As such, the design allows for the closure of either valve to perform the function of maintaining pressure integrity.

## VALVE TECHNICAL POSITION
## TP-VA-10 (continued)

### POSITION:

These check valves are in a series configuration without provisions to verify individual reverse flow closure. The Modification that installed these valves allowed for the closure of either valve to perform the function of maintaining pressure integrity. The Modification acceptance test was a pressure decay test which tested these valves as a series pair. As such it is appropriate to test these valves as a series pair.

# VALVE TECHNICAL POSITION
# TP-VA-11

## TITLE:

Use of ASME Code Case OMN-8.

## VALVES AFFECTED:

1SX168
2SX168

## CODE REQUIREMENT(S)/DISCUSSION:

ASME OM Code 2001 Edition through 2003 Addenda, Code Case OMN-8, "Alternative Rules for Preservice and Inservice Testing of Power-Operated Valves That Are Used for System Control and Have a Safety Function per OM-10" is approved for use per Regulatory Guide 1.192, OPERATION AND MAINTENANCE CODE CASE ACCEPTABILITY - ASME OM CODE.

Code Case OMN-8 is based on the following Code Inquiry and response:

> *Inquiry:* What alternative requirements to those of ASME/ANSI OMa-1998, Part 10, para. 4.2 through OM Code-1995, ISTC 4.2 may be used for power-operated control valves that have only a fail safe function?
>
> *Reply:* It is the opinion of the Committee that the requirements of ASME/ANSI OMa-1998, Part 10, para. 4.2.1.4, Power-Operated Valve Stroke Testing; para. 4.2.1.8, Stroke Time Acceptance Criteria; and para. 4.2.1.9(b) need not be met. All other requirements of para. 4.2 shall be met for ASME/ANSI OMa-1988, Part 10.
>
> Further, the requirements of OM Code-1995, ISTC 4.2.4, Power-Operated Valve Stroke Testing; ISTC 4.2.8, Stroke Time Acceptance Criteria; and ISTC 4.2.9(b) need not be met. All other applicable requirements of the paragraph shall be met.
>
> Any abnormality or erratic action experienced during valve exercising shall be recorded in the record of tests, and an evaluation shall be made regarding need for corrective action.

Valves 1SX168 and 2SX168 are temperature control valves which open to provide a flow path for essential service water to the cubicle coolers for the B (Diesel driven) AFW pump room. The valves operate off of a temperature controller (Thermostat) for the room. This valve oscillates open and closed to maintain the correct room temperature and fails in the open direction. No stroke time testing is required since this function is excluded from testing based on ASME Code Case OMN-8. The fail-safe function is required to be tested to ensure a flow path of essential service water to the cubicle coolers upon loss of power. This valve fails open on loss of electrical power or pneumatic supply. The fail safe function of this valve will be tested in accordance with the ASME OM Code requirements of ISTC-3560

# ATTACHMENT 12

## INSERVICE TESTING PUMP TABLE INDEX

(Page 1 of 1)

| System Number | System Description |
|---|---|
| AF | Auxiliary Feedwater |
| CC | Component Cooling |
| CS | Containment Spray |
| CV | Chemical and Volume Control |
| RH | Residual Heat Removal |
| SI | Safety Injection |
| SX | Essential Service Water |
| WO | Chilled Water |

# ATTACHMENT 12

## INSERVICE TESTING PUMP TABLE

## Aux Feed Water (Page 1)

| Pump EPN | Safety Class | Pump Type | Pump Driver | Pump Group | P&ID | P&ID Coor. | Test Type | Test Frequency | Relief Request | Technical Position |
|---|---|---|---|---|---|---|---|---|---|---|
| 1AF01PA | 3 | C | MOTOR | B | M-37 | D-4 | Differential Pressure | M3/Y2 | | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | | |
| | | | | | | | Vibration | Y2 | | |
| Pump Name AUXILIARY FEEDWATER 1A PUMP (MOTOR) | | | | | | | | | | |
| 1AF01PB | 3 | C | MOTOR | B | M-37 | B-4 | Differential Pressure | M3/Y2 | | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | | |
| | | | | | | | Speed | M3/Y2 | | |
| | | | | | | | Vibration | Y2 | | |
| Pump Name AUXILIARY FEEDWATER 1B PUMP (DIESEL) | | | | | | | | | | |
| 2AF01PA | 3 | C | MOTOR | B | M-122 | E-5 | Differential Pressure | M3/Y2 | | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | | |
| | | | | | | | Vibration | Y2 | | |
| Pump Name AUXILIARY FEEDWATER 2A PUMP (MOTOR) | | | | | | | | | | |
| 2AF01PB | 3 | C | MOTOR | B | M-122 | B-5 | Differential Pressure | M3/Y2 | | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | | |
| | | | | | | | Speed | M3/Y2 | | |
| | | | | | | | Vibration | Y2 | | |
| Pump Name AUXILIARY FEEDWATER 2B PUMP (DIESEL) | | | | | | | | | | |

## Component Cooling Water (Page 1)

| Pump EPN | Safety Class | Pump Type | Pump Driver | Pump Group | P&ID | P&ID Coor. | Test Type | Test Frequency | Relief Request | Technical Position |
|---|---|---|---|---|---|---|---|---|---|---|
| 0CC01P | 3 | C | MOTOR | A | M-66-3A | E-5 | Differential Pressure | M3/Y2 | RP-2 | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-2 | |
| | | | | | | | Vibration | M3/Y2 | RP-2 | |
| Pump Name | COMPONENT COOLING COMMON PUMP | | | | | | | | | |
| 1CC01PA | 3 | C | MOTOR | A | M-66-3A | E-6 | Differential Pressure | M3/Y2 | RP-2 | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-2 | |
| | | | | | | | Vibration | M3/Y2 | RP-2 | |
| Pump Name | COMPONENT COOLING PUMP 1A | | | | | | | | | |
| 1CC01PB | 3 | C | MOTOR | A | M-66-3A | E-7 | Differential Pressure | M3/Y2 | RP-2 | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-2 | |
| | | | | | | | Vibration | M3/Y2 | RP-2 | |
| Pump Name | COMPONENT COOLING PUMP 1B | | | | | | | | | |
| 2CC01PA | 3 | C | MOTOR | A | M-66-3A | E-3 | Differential Pressure | M3/Y2 | RP-2 | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-2 | |
| | | | | | | | Vibration | M3/Y2 | RP-2 | |
| Pump Name | COMPONENT COOLING PUMP 2A | | | | | | | | | |
| 2CC01PB | 3 | C | MOTOR | A | M-66-3A | E-2 | Differential Pressure | M3/Y2 | RP-2 | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-2 | |
| | | | | | | | Vibration | M3/Y2 | RP-2 | |
| Pump Name | COMPONENT COOLING PUMP 2B | | | | | | | | | |

## Containment Spray (Page 1)

| Pump EPN | Safety Class | Pump Type | Pump Driver | Pump Group | P&ID | P&ID Coor. | Test Type | Test Frequency | Relief Request | Technical Position |
|---|---|---|---|---|---|---|---|---|---|---|
| 1CS01PA | 2 | C | MOTOR | B | M-46-1A | E-5 | Differential Pressure | M3/Y2 | | PA-4, 5 |
| | | | | | | | Flow Rate | M3/Y2 | | PA-4 |
| | | | | | | | Vibration | Y2 | | PA-4 |
| Pump Name CONTAINMENT SPRAY PUMP | | | | | | | | | | |
| 1CS01PB | 2 | C | MOTOR | B | M-46-1A | B-5 | Differential Pressure | M3/Y2 | | PA-4, 5 |
| | | | | | | | Flow Rate | M3/Y2 | | PA-4 |
| | | | | | | | Vibration | Y2 | | PA-4 |
| Pump Name CONTAINMENT SPRAY PUMP | | | | | | | | | | |
| 2CS01PA | 2 | C | MOTOR | B | M-129 | E-5 | Differential Pressure | M3/Y2 | | PA-4, 5 |
| | | | | | | | Flow Rate | M3/Y2 | | PA-4 |
| | | | | | | | Vibration | Y2 | | PA-4 |
| Pump Name CONTAINMENT SPRAY PUMP | | | | | | | | | | |
| 2CS01PB | 2 | C | MOTOR | B | M-129 | B-5 | Differential Pressure | M3/Y2 | | PA-4, 5 |
| | | | | | | | Flow Rate | M3/Y2 | | PA-4 |
| | | | | | | | Vibration | Y2 | | PA-4 |
| Pump Name CONTAINMENT SPRAY PUMP | | | | | | | | | | |

## Charging (Page 1)

| Pump EPN | Safety Class | Pump Type | Pump Driver | Pump Group | P&ID | P&ID Coor. | Test Type | Test Frequency | Relief Request | Technical Position |
|---|---|---|---|---|---|---|---|---|---|---|
| 1CV01PA | 2 | C | Motor | A | M-64-3A | D-5 | Differential Pressure | M3/Y2 | RP-6 | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-6 | |
| | | | | | | | Vibration | M3/Y2 | RP-6 | |
| Pump Name | CENTRIFUGAL CHARGING PUMP | | | | | | | | | |
| 1CV01PB | 2 | C | Motor | A | M-64-3A | C-5 | Differential Pressure | M3/Y2 | RP-6 | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-6 | |
| | | | | | | | Vibration | M3/Y2 | RP-6 | |
| Pump Name | CENTRIFUGAL CHARGING PUMP | | | | | | | | | |
| 2CV01PA | 2 | C | Motor | A | M-138-3A | D-5 | Differential Pressure | M3/Y2 | RP-6 | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-6 | |
| | | | | | | | Vibration | M3/Y2 | RP-6 | |
| Pump Name | CENTRIFUGAL CHARGING PUMP | | | | | | | | | |
| 2CV01PB | 2 | C | Motor | A | M-138-3A | C-5 | Differential Pressure | M3/Y2 | RP-6 | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-6 | |
| | | | | | | | Vibration | M3/Y2 | RP-6 | |
| Pump Name | CENTRIFUGAL CHARGING PUMP | | | | | | | | | |

## Residual Heat Removal (Page 1)

| Pump EPN | Safety Class | Pump Type | Pump Driver | Pump Group | P&ID | P&ID Coor. | Test Type | Test Frequency | Relief Request | Technical Position |
|---|---|---|---|---|---|---|---|---|---|---|
| 1RH01PA | 2 | C | MOTOR | A | M-62 | E-3 | Differential Pressure | M3/Y2 | RP-6 | PA-4, 5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-6 | PA-4 |
| | | | | | | | Vibration | M3/Y2 | RP-6 | PA-4 |
| Pump Name RESIDUAL HEAT REMOVAL PUMP | | | | | | | | | | |
| 1RH01PB | 2 | C | MOTOR | A | M-62 | B-3 | Differential Pressure | M3/Y2 | RP-6 | PA-4, 5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-6 | PA-4 |
| | | | | | | | Vibration | M3/Y2 | RP-6 | PA-4 |
| Pump Name RESIDUAL HEAT REMOVAL PUMP | | | | | | | | | | |
| 2RH01PA | 2 | C | MOTOR | A | M-137 | E-3 | Differential Pressure | M3/Y2 | RP-6 | PA-4, 5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-6 | PA-4 |
| | | | | | | | Vibration | M3/Y2 | RP-6 | PA-4 |
| Pump Name RESIDUAL HEAT REMOVAL PUMP | | | | | | | | | | |
| 2RH01PB | 2 | C | MOTOR | A | M-137 | B-3 | Differential Pressure | M3/Y2 | RP-6 | PA-4, 5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-6 | PA-4 |
| | | | | | | | Vibration | M3/Y2 | RP-6 | PA-4 |
| Pump Name RESIDUAL HEAT REMOVAL PUMP | | | | | | | | | | |

## Safety Injection (Page 1)

| Pump EPN | Safety Class | Pump Type | Pump Driver | Pump Group | P&ID | P&ID Coor. | Test Type | Test Frequency | Relief Request | Technical Position |
|---|---|---|---|---|---|---|---|---|---|---|
| 1SI01PA | 2 | C | MOTOR | A | M-61 | E-5 | Differential Pressure | M3/Y2 | RP-6 | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-6 | |
| | | | | | | | Vibration | M3/Y2 | RP-6 | |
| Pump Name | SAFETY INJECTION PUMP | | | | | | | | | |
| 1SI01PB | 2 | C | MOTOR | A | M-61 | C-5 | Differential Pressure | M3/Y2 | RP-6 | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-6 | |
| | | | | | | | Vibration | M3/Y2 | RP-6 | |
| Pump Name | SAFETY INJECTION PUMP | | | | | | | | | |
| 2SI01PA | 2 | C | MOTOR | A | M-136 | B-4 | Differential Pressure | M3/Y2 | RP-6 | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-6 | |
| | | | | | | | Vibration | M3/Y2 | RP-6 | |
| Pump Name | SAFETY INJECTION PUMP | | | | | | | | | |
| 2SI01PB | 2 | C | MOTOR | A | M-136 | D-4 | Differential Pressure | M3/Y2 | RP-6 | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-6 | |
| | | | | | | | Vibration | M3/Y2 | RP-6 | |
| Pump Name | SAFETY INJECTION PUMP | | | | | | | | | |

## Service Water (Page 1)

| Pump EPN | Safety Class | Pump Type | Pump Driver | Pump Group | P&ID | P&ID Coor. | Test Type | Test Frequency | Relief Request | Technical Position |
|---|---|---|---|---|---|---|---|---|---|---|
| 0SX02PA | 3 | V | DIESEL | B | M-42-6 | B-8 | Differential Pressure | M3/Y2 | RP-5 | PA-5, 6 |
| | | | | | | | Flow Rate | M3/Y2 | | |
| | | | | | | | Speed | M3/Y2 | | |
| | | | | | | | Vibration | Y2 | RP-1 | PA-1 |
| Pump Name | ESSENTIAL SERVICE WATER MAKE-UP PUMP | | | | | | | | | |
| 0SX02PB | 3 | V | DIESEL | B | M-42-6 | B-6 | Differential Pressure | M3/Y2 | RP-5 | PA-5, 6 |
| | | | | | | | Flow Rate | M3/Y2 | | |
| | | | | | | | Speed | M3/Y2 | | |
| | | | | | | | Vibration | Y2 | RP-1 | PA-1 |
| Pump Name | ESSENTIAL SERVICE WATER MAKE-UP PUMP | | | | | | | | | |
| 1SX01PA | 3 | C | MOTOR | A | M-42-1B | E-6 | Differential Pressure | M3/Y2 | | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | | |
| | | | | | | | Vibration | M3/Y2 | | |
| Pump Name | ESSENTIAL SERVICE WATER PUMP | | | | | | | | | |
| 1SX01PB | 3 | C | MOTOR | A | M-42-1A | E-6 | Differential Pressure | M3/Y2 | | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | | |
| | | | | | | | Vibration | M3/Y2 | | |
| Pump Name | ESSENTIAL SERVICE WATER PUMP | | | | | | | | | |
| 2SX01PA | 3 | C | MOTOR | A | M-42-1B | B-6 | Differential Pressure | M3/Y2 | | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | | |
| | | | | | | | Vibration | M3/Y2 | | |
| Pump Name | ESSENTIAL SERVICE WATER PUMP | | | | | | | | | |
| 2SX01PB | 3 | C | MOTOR | A | M-42-1A | B-6 | Differential Pressure | M3/Y2 | | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | | |
| | | | | | | | Vibration | M3/Y2 | | |
| Pump Name | ESSENTIAL SERVICE WATER PUMP | | | | | | | | | |

## Chilled Water (Page 1)

| Pump EPN | Safety Class | Pump Type | Pump Driver | Pump Group | P&ID | P&ID Coor. | Test Type | Test Frequency | Relief Request | Technical Position |
|---|---|---|---|---|---|---|---|---|---|---|
| 0WO01PA | 3 | C | MOTOR | A | M-118-1 | D-7 | Differential Pressure | M3/Y2 | RP-3 | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-3 | |
| | | | | | | | Vibration | M3/Y2 | RP-3 | |
| Pump Name | CONTROL ROOM CHILLED WATER PUMP | | | | | | | | | |
| 0WO01PB | 3 | C | MOTOR | A | M-118-1 | B-7 | Differential Pressure | M3/Y2 | RP-3 | PA-5 |
| | | | | | | | Flow Rate | M3/Y2 | RP-3 | |
| | | | | | | | Vibration | M3/Y2 | RP-3 | |
| Pump Name | CONTROL ROOM CHILLED WATER PUMP | | | | | | | | | |

# ATTACHMENT 13

## INSERVICE TESTING VALVE TABLE INDEX

(Page 1 of 2)

| System Number | System Description |
|---|---|
| AF | Auxiliary Feedwater |
| CC | Component Cooling |
| CS | Containment Spray |
| CV | Chemical and Volume Control |
| DG | Diesel Generator Starting Air (includes select Service Air valves) |
| DO | Diesel Oil |
| FC | Fuel Pool Cooling |
| FP | Fire Protection |
| FW | Feedwater |
| GW | Radioactive Waste Gas |
| IA | Instrument Air |
| MS | Main Steam |
| OG | Off Gas |
| RP | Process Radiation Monitoring |
| PS | Process Sampling |
| RC | Reactor Coolant (includes select Pressurizer (RY) valves) |
| RE | Reactor Building and Containment Equipment Drains |
| RF | Reactor Building and Containment Floor Drains |

# ATTACHMENT 13

## INSERVICE TESTING VALVE TABLE INDEX

(Page 2 of 2)

| System Number | System Description |
|---|---|
| RH | Residual Heat Removal |
| SA | Service Air |
| SD | Steam Generator Blowdown |
| SI | Safety Injection |
| SX | Essential Service Water |
| VQ | Primary Containment Purge |
| WM | Make-up Demineralizer |
| WO | Chilled Water |

# ATTACHMENT 14

## INSERVICE TESTING VALVE TABLE

## Aux Feed Water (Page 1)

| Valve EPN | Safety Class | Category | Size | Valve Type | Act. Type | Active / Passive | Normal Position | Safety Position | P&ID | P&ID Coor. | Test Type | Test Freq. | Relief Request | Deferred Just. | Tech. Pos. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1AF001A | 3 | C | 6 | CK | SA | A | SYS | C | M-37 | D-2 | CCA | CM | | | |
| | | | | | | | | | | | COA | CM | | | |
| | | Valve Name | CST TO AUX FEEDWATER PUMP 1A SUCTION CHECK VALVE | | | | | | | | | | | | |
| 1AF001B | 3 | C | 6 | CK | SA | A | SYS | C | M-37 | B-2 | CCA | CM | | | |
| | | | | | | | | | | | COA | CM | | | |
| | | Valve Name | CST TO AUX FEEDWATER PUMP 1B SUCTION CHECK VALVE | | | | | | | | | | | | |
| 1AF003A | 3 | C | 6 | CK | SA | A | SYS | O | M-37 | D-4 | CCA | CM | | | |
| | | | | | | | | | | | COA | CM | | | |
| | | Valve Name | AUX FEEDWATER PUMP 1A DISCHARGE CHECK VALVE | | | | | | | | | | | | |
| 1AF003B | 3 | C | 6 | CK | SA | A | SYS | O | M-37 | B-4 | CCA | CM | | | |
| | | | | | | | | | | | COA | CM | | | |
| | | Valve Name | AUX FEEDWATER PUMP 1B DISCHARGE CHECK VALVE | | | | | | | | | | | | |
| 1AF004A | 3 | B | 6 | GL | AO | P | O | O | M-37 | D-5 | PI | Y2 | | | VA-4 |
| | | Valve Name | AUX FEEDWATER PUMP 1A DISCHARGE ISOLATION VALVE | | | | | | | | | | | | |
| 1AF004B | 3 | B | 6 | GL | AO | P | O | O | M-37 | B-5 | PI | Y2 | | | VA-4 |
| | | Valve Name | AUX FEEDWATER PUMP 1B DISCHARGE ISOLATION VALVE | | | | | | | | | | | | |
| 1AF006A | 3 | B | 6 | GA | MO | A | C | O | M-37 | E-3 | PI | Y2 | | | VA-4 |
| | | | | | | | | | | | SO | M3 | | | VA-1 |
| | | Valve Name | AUX FEEDWATER PUMP 1A SX SUCT DWST ISOL VLV | | | | | | | | | | | | |
| 1AF006B | 3 | B | 6 | GA | MO | A | C | O | M-37 | B-3 | PI | Y2 | | | VA-4 |
| | | | | | | | | | | | SO | M3 | | | VA-1 |
| | | Valve Name | AUX FEEDWATER PUMP 1B SX SUCT DWST ISOL VLV | | | | | | | | | | | | |
| 1AF013A | 2 | B | 4 | GL | MO | A | O | O/C | M-37 | D-7 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 1A ISOL VLV | | | | | | | | | | | | |
| 1AF013B | 2 | B | 4 | GL | MO | A | O | O/C | M-37 | A-7 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 1B ISOL VLV | | | | | | | | | | | | |
| 1AF013C | 2 | B | 4 | GL | MO | A | O | O/C | M-37 | E-7 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 1C ISOL VLV | | | | | | | | | | | | |
| 1AF013D | 2 | B | 4 | GL | MO | A | O | O/C | M-37 | D-7 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 1D ISOL VLV | | | | | | | | | | | | |
| 1AF013E | 2 | B | 4 | GL | MO | A | O | O/C | M-37 | D-7 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 1A ISOL VLV | | | | | | | | | | | | |

## Aux Feed Water (Page 2)

| Valve EPN | Safety Class | Category | Size | Valve Type | Act. Type | Active / Passive | Normal Position | Safety Position | P&ID | P&ID Coor. | Test Type | Test Freq. | Relief Request | Deferred Just. | Tech. Pos. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1AF013F | 2 | B | 4 | GL | MO | A | O | O/C | M-37 | B-7 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 1B ISOL VLV | | | | | | | | | | | |
| 1AF013G | 2 | B | 4 | GL | MO | A | O | O/C | M-37 | E-7 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 1C ISOL VLV | | | | | | | | | | | |
| 1AF013H | 2 | B | 4 | GL | MO | A | O | O/C | M-37 | C-7 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 1D ISOL VLV | | | | | | | | | | | |
| 1AF014A | 2 | C | 4 | CK | SA | A | C | O/C | M-37 | D-8 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | | Valve Name | AUX FEEDWATER TO S/G 1A CHECK VALVE | | | | | | | | | | | |
| 1AF014B | 2 | C | 4 | CK | SA | A | C | O/C | M-37 | A-8 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | | Valve Name | AUX FEEDWATER TO S/G 1B CHECK VALVE | | | | | | | | | | | |
| 1AF014C | 2 | C | 4 | CK | SA | A | C | O/C | M-37 | E-8 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | | Valve Name | AUX FEEDWATER TO S/G 1C CHECK VALVE | | | | | | | | | | | |
| 1AF014D | 2 | C | 4 | CK | SA | A | C | O/C | M-37 | B-8 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | | Valve Name | AUX FEEDWATER TO S/G 1D CHECK VALVE | | | | | | | | | | | |
| 1AF014E | 2 | C | 4 | CK | SA | A | C | O/C | M-37 | D-8 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | | Valve Name | AUX FEEDWATER TO S/G 1A CHECK VALVE | | | | | | | | | | | |
| 1AF014F | 2 | C | 4 | CK | SA | A | C | O/C | M-37 | B-8 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | | Valve Name | AUX FEEDWATER TO S/G 1B CHECK VALVE | | | | | | | | | | | |
| 1AF014G | 2 | C | 4 | CK | SA | A | C | O/C | M-37 | E-8 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | | Valve Name | AUX FEEDWATER TO S/G 1C CHECK VALVE | | | | | | | | | | | |
| 1AF014H | 2 | C | 4 | CK | SA | A | C | O/C | M-37 | C-8 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | | Valve Name | AUX FEEDWATER TO S/G 1D CHECK VALVE | | | | | | | | | | | |
| 1AF017A | 3 | B | 6 | GA | MO | A | C | O | M-37 | F-3 | PI | Y2 | | | VA-4 |
| | | | | | | | | | | | SO | M3 | | | VA-1 |
| | | | Valve Name | AUX FEEDWATER PUMP 1A SX SUCT UPST ISOL VLV | | | | | | | | | | | |
| 1AF017B | 3 | B | 6 | GA | MO | A | C | O | M-37 | C-3 | PI | Y2 | | | VA-4 |
| | | | | | | | | | | | SO | M3 | | | VA-1 |
| | | | Valve Name | AUX FEEDWATER PUMP 1B SX SUCT UPST ISOL VLV | | | | | | | | | | | |

## Aux Feed Water (Page 3)

| Valve EPN | Safety Class | Category | Size | Valve Type | Act. Type | Active / Passive | Normal Position | Safety Position | P&ID | P&ID Coor. | Test Type | Test Freq. | Relief Request | Deferred Just. | Tech. Pos. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1AF022A | 3 | B | 2 | GL | AO | P | O | O | M-37 | D-4 | PI | Y2 | | | VA-4 |
| | | | Valve Name | CST MINFLOW RECIRCULATION FLOW VALVE | | | | | | | | | | | |
| 1AF022B | 3 | B | 2 | GL | AO | P | O | O | M-37 | C-3 | PI | Y2 | | | VA-4 |
| | | | Valve Name | CST MINFLOW RECIRCULATION FLOW VALVE | | | | | | | | | | | |
| 1AF029A | 3 | C | 6 | CK | SA | A | SYS | O | M-37 | C-5 | CCA | CM | | | |
| | | | | | | | | | | | COA | CM | | | |
| | | | Valve Name | AUX FEEDWATER PUMP 1A TO S/G CHECK VALVE | | | | | | | | | | | |
| 1AF029B | 3 | C | 6 | CK | SA | A | SYS | O | M-37 | B-5 | CCA | CM | | | |
| | | | | | | | | | | | COA | CM | | | |
| | | | Valve Name | AUX FEEDWATER PUMP 1B TO S/G CHECK VALVE | | | | | | | | | | | |
| 2AF001A | 3 | C | 6 | CK | SA | A | SYS | C | M-122 | E-7 | CCA | CM | | | |
| | | | | | | | | | | | COA | CM | | | |
| | | | Valve Name | CST TO AUX FEEDWATER PUMP 2A SUCTION CHECK VALVE | | | | | | | | | | | |
| 2AF001B | 3 | C | 6 | CK | SA | A | SYS | C | M-122 | B-7 | CCA | CM | | | |
| | | | | | | | | | | | COA | CM | | | |
| | | | Valve Name | CST TO AUX FEEDWATER PUMP 2B SUCTION CHECK VALVE | | | | | | | | | | | |
| 2AF003A | 3 | C | 6 | CK | SA | A | SYS | O | M-122 | E-7 | CCA | CM | | | |
| | | | | | | | | | | | COA | CM | | | |
| | | | Valve Name | AUX FEEDWATER PUMP 2A DISCHARGE CHECK VALVE | | | | | | | | | | | |
| 2AF003B | 3 | C | 6 | CK | SA | A | SYS | O | M-122 | B-7 | CCA | CM | | | |
| | | | | | | | | | | | COA | CM | | | |
| | | | Valve Name | AUX FEEDWATER PUMP 2B DISCHARGE CHECK VALVE | | | | | | | | | | | |
| 2AF004A | 3 | B | 6 | GL | AO | P | O | O | M-122 | E-5 | PI | Y2 | | | VA-4 |
| | | | Valve Name | AUX FEEDWATER PUMP 2A DISCHARGE ISOLATION VALVE | | | | | | | | | | | |
| 2AF004B | 3 | B | 6 | GL | AO | P | O | O | M-122 | B-5 | PI | Y2 | | | VA-4 |
| | | | Valve Name | AUX FEEDWATER PUMP 2B DISCHARGE ISOLATION VALVE | | | | | | | | | | | |
| 2AF006A | 3 | B | 6 | GA | MO | A | C | O | M-122 | E-6 | PI | Y2 | | | VA-4 |
| | | | | | | | | | | | SO | M3 | | | VA-1 |
| | | | Valve Name | AUX FEEDWATER PUMP 2A SX SUCT DWST ISOL VLV | | | | | | | | | | | |
| 2AF006B | 3 | B | 6 | GA | MO | A | C | O | M-122 | C-6 | PI | Y2 | | | VA-4 |
| | | | | | | | | | | | SO | M3 | | | VA-1 |
| | | | Valve Name | AUX FEEDWATER PUMP 2B SX SUCT DWST ISOL VLV | | | | | | | | | | | |
| 2AF013A | 2 | B | 4 | GL | MO | A | O | O/C | M-122 | D-2 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 2A ISOL VLV | | | | | | | | | | | |
| 2AF013B | 2 | B | 4 | GL | MO | A | O | O/C | M-122 | A-2 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 2B ISOL VLV | | | | | | | | | | | |

## Aux Feed Water (Page 4)

| Valve EPN | Safety Class | Category | Size | Valve Type | Act. Type | Active / Passive | Normal Position | Safety Position | P&ID | P&ID Coor. | Test Type | Test Freq. | Relief Request | Deferred Just. | Tech. Pos. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2AF013C | 2 | B | 4 | GL | MO | A | O | O/C | M-122 | E-2 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 2C ISOL VLV | | | | | | | | | | | | |
| 2AF013D | 2 | B | 4 | GL | MO | A | O | O/C | M-122 | C-2 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 2D ISOL VLV | | | | | | | | | | | | |
| 2AF013E | 2 | B | 4 | GL | MO | A | O | O/C | M-122 | E-2 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 2A ISOL VLV | | | | | | | | | | | | |
| 2AF013F | 2 | B | 4 | GL | MO | A | O | O/C | M-122 | B-2 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 2B ISOL VLV | | | | | | | | | | | | |
| 2AF013G | 2 | B | 4 | GL | MO | A | O | O/C | M-122 | C-2 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 2C ISOL VLV | | | | | | | | | | | | |
| 2AF013H | 2 | B | 4 | GL | MO | A | O | O/C | M-122 | F-2 | PI | Y2 | | | VA-4, 6 |
| | | | | | | | | | | | SC | M3 | | | VA-1 |
| | | Valve Name | AUX FEEDWATER PUMP DSCH HDR TO S/G 2D ISOL VLV | | | | | | | | | | | | |
| 2AF014A | 2 | C | 4 | CK | SA | A | C | O/C | M-122 | D-2 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | Valve Name | AUX FEEDWATER TO S/G 2A CHECK VALVE | | | | | | | | | | | | |
| 2AF014B | 2 | C | 4 | CK | SA | A | C | O/C | M-122 | A-2 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | Valve Name | AUX FEEDWATER TO S/G 2BCHECK VALVE | | | | | | | | | | | | |
| 2AF014C | 2 | C | 4 | CK | SA | A | C | O/C | M-122 | E-2 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | Valve Name | AUX FEEDWATER TO S/G 2C CHECK VALVE | | | | | | | | | | | | |
| 2AF014D | 2 | C | 4 | CK | SA | A | C | O/C | M-122 | C-2 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | Valve Name | AUX FEEDWATER TO S/G 2D CHECK VALVE | | | | | | | | | | | | |
| 2AF014E | 2 | C | 4 | CK | SA | A | C | O/C | M-122 | E-2 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | Valve Name | AUX FEEDWATER TO S/G 2A CHECK VALVE | | | | | | | | | | | | |
| 2AF014F | 2 | C | 4 | CK | SA | A | C | O/C | M-122 | B-2 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | Valve Name | AUX FEEDWATER TO S/G 2B CHECK VALVE | | | | | | | | | | | | |
| 2AF014G | 2 | C | 4 | CK | SA | A | C | O/C | M-122 | C-2 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | Valve Name | AUX FEEDWATER TO S/G 2C CHECK VALVE | | | | | | | | | | | | |

## Aux Feed Water (Page 5)

| Valve EPN | Safety Class | Category | Size | Valve Type | Act. Type | Active / Passive | Normal Position | Safety Position | P&ID | P&ID Coor. | Test Type | Test Freq. | Relief Request | Deferred Just. | Tech. Pos. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2AF014H | 2 | C | 4 | CK | SA | A | C | O/C | M-122 | F-2 | CCD | CM | | | |
| | | | | | | | | | | | COD | CM | | | |
| | | Valve Name | AUX FEEDWATER TO S/G 2D CHECK VALVE | | | | | | | | | | | | |
| 2AF017A | 3 | B | 6 | GA | MO | A | C | O | M-122 | F-6 | PI | Y2 | | | VA-4 |
| | | | | | | | | | | | SO | M3 | | | VA-1 |
| | | Valve Name | AUX FEEDWATER PUMP 2A SX SUCT UPST ISOL VLV | | | | | | | | | | | | |
| 2AF017B | 3 | B | 6 | GA | MO | A | C | O | M-122 | C-6 | PI | Y2 | | | VA-4 |
| | | | | | | | | | | | SO | M3 | | | VA-1 |
| | | Valve Name | AUX FEEDWATER PUMP 2B SX SUCT UPST ISOL VLV | | | | | | | | | | | | |
| 2AF022A | 3 | B | 2 | GL | AO | P | O | O | M-122 | D-5 | PI | Y2 | | | VA-4 |
| | | Valve Name | CST MINFLOW RECIRCULATION FLOW VALVE | | | | | | | | | | | | |
| 2AF022B | 3 | B | 2 | GL | AO | P | O | O | M-122 | C-5 | PI | Y2 | | | VA-4 |
| | | Valve Name | CST MINFLOW RECIRCULATION FLOW VALVE | | | | | | | | | | | | |
| 2AF029A | 3 | C | 6 | CK | SA | A | SYS | O | M-122 | E-5 | CCA | CM | | | |
| | | | | | | | | | | | COA | CM | | | |
| | | Valve Name | AUX FEEDWATER PUMP 2A TO S/G CHECK VALVE | | | | | | | | | | | | |
| 2AF029B | 3 | C | 6 | CK | SA | A | SYS | O | M-122 | B-4 | CCA | CM | | | |
| | | | | | | | | | | | COA | CM | | | |
| | | Valve Name | AUX FEEDWATER PUMP 2B TO S/G CHECK VALVE | | | | | | | | | | | | |