

DUKE POWER COMPANY

McGUIRE NUCLEAR STATION

PUMP AND VALVE INSERVICE TESTING

UNIT 2

REVISION #4

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DUKE POWER COMPANY
MCGUIRE NUCLEAR STATION
PUMP INSERVICE TESTING PROGRAM
ASME SECTION XI, SUBSECTION IWP

The inservice testing of ASME Code Class 1, 2, and 3 pumps provided with an emergency power source will be tested as required by Section XI, Subsection IWP, of the ASME Boiler and Pressure Vessel Code 1980 Edition, except where specific written relief has been granted by the Commission. A description of the proposed inservice testing program, as well as specific requests for relief from code requirements determined to be impractical, is described by the following.

- I. The following are specific requests for relief from certain code requirements.
 - A) IWP-4120 requires the full scale range of each instrument to be three times the reference value or less. This was changed from four times the reference value in the edition of Section XI that was in effect prior to unit licensing. 10CFR, Section 50.55a(g)(4) states that design provisions are excluded from the requirement to upgrade to subsequent editions of Section XI. Since any cases where the three-times reference value criterion is not met would require design changes in instrumentation, we will continue to apply the four-times reference value criterion, as interpreted in B) below, for instrument accuracy evaluation.
 - B) In several cases, instrumentation does not meet the four times reference value criterion. These cases predominantly involve suction pressure gauges where a larger range is required to accommodate varying conditions at the suction of the pump. In all cases where the four-times reference value criterion cannot be met, an instrument error evaluation is performed to demonstrate that the overall accuracy of the differential pressure measurement is within the limits established by IWP. These cases are RHR discharge, nuclear service water suction, and control room chilled water suction gages.
 - C) Table IWP-3100-1 establishes the parameters that are to be measured. The previous edition of Section 11 specified that in a fixed resistance system, either ΔP or Q was to be measured, not both. The centrifugal charging pumps are tested using fixed resistance flow paths, with no flow indication provided. The Safety Injection Pumps are in a fixed resistance system that does have a flow gauge available, but unnecessary radiation exposure and manpower is required to measure the flow. Based on the design change exclusion provided by 10CFR50.55a(g)(4), we will continue to apply the criterion that it is not required to measure flow in a fixed resistance system. The Residual Heat Removal Pumps are in a fixed resistance system that does have a flow gauge available. There is no way to adjust flow in the system and the gauge is not sufficiently accurate at low flows to provide a precise indication of flow. For these pumps, a flow will be recorded but will not be used for comparison to any reference values.
 - D) Table IWP-4110-1 states that vibration measurement should have an accuracy of $\pm 5\%$. McGuire has no permanently installed vibration instrumentation. The portable instruments used to measure vibration have an uncertainty of $\pm 11\%$.

- II. The following Safety Class 1, 2, and 3 pumps (See Attachment #1 for specific safety class and available instrumentation) will be tested in accordance with the intent of Subsection IWP of the ASME code:

NUCLEAR SERVICE WATER PUMPS (2A, 2B)
CONTAINMENT SPRAY PUMPS (2A, 2B)
SAFETY INJECTION PUMPS (2A, 2B)
MOTOR-DRIVEN AUX. FEEDWATER PUMPS (2A, 2B)
TURBINE-DRIVEN AUX. FEEDWATER PUMP (NO. 1)
CENTRIFUGAL CHARGING PUMPS (2A, 2B)
COMPONENT COOLING PUMPS (2A1, 2A2, 2B1, 2B2)
RESIDUAL HEAT REMOVAL PUMPS (2A, 2B)

- III. The following Safety Class 1, 2, and 3 pumps (See Attachment #1 for specific safety class and available instrumentation) will be tested in accordance with the intent of Subsection IWP, except for the request for relief for the specific requirements determined to be impractical as described below.

A) PUMP: CONTROL AREA CHILLED WATER PUMPS (CRA-P-1, CRA-P-2)

SAFETY CLASS: 3

FUNCTION: To provide chilled water to air handling units supplying control area air conditioning

TEST REQUIREMENTS: 1. Measure pump bearing temperature during inservice testing.

2. Annually run pumps until bearing temperatures stabilize.

BASIS FOR RELIEF: There is no instrumentation installed to measure bearing temperature, and no meaningful data can be obtained from bearing housing surface temperature measurements.

ALTERNATE TESTING: The inservice testing of the Control Area Chilled Water Pumps will be in accordance with the intent of Subsection IWP except that bearing temperature will not be monitored and subsequently the pumps will not be run annually until bearing temperature stabilizes.

- IV. The following Safety Class 1, 2, and 3 pumps are provided with insufficient instrumentation to perform any meaningful testing in accordance with the intent of Subsection IWP and therefore the following alternate testing methods, as well as requests for relief from compliance with Subsection IWP, are described by the following.

SAFETY RELATED CLASS 1, 2 AND 3 PUMPS PROVIDED WITH AN
EMERGENCY POWER SOURCE

PUMPS	Safety Class	Test Frequency	Speed, N	Inlet Pres., P _i	Diff. Pres., ΔP	Flow Rate, Q	Vib. Amplitude, V	Lubricant Level	Bearing Temp, T _b	Discharge Pres., P _d	Duke Flow Diagram
Nuclear Service Water Pumps (2A, 2B) (RN)	3	QU	NR	X	X	X	X(1)	X	X	X	MC-2574-1.1
Containment Spray Pumps (2A, 2B) (NS)	2	QU	NR	X	X	X	X(1)	X(3)	X(2)	X	MC-2563-1.1
Residual Heat Removal Pumps (2A, 2B) (ND)	2	QU	NR	X	X	X	X(1)	X(3)	X(2)	X	MC-2561-1.0
4 Safety Injection Pumps (2A, 2B) (NI)	2	QU	NR	X	X	NR	X(1)	X	X	X	MC-2562-3.0
M/D Aux. Feedwater Pumps (2A, 2B) (CA)	3	MO	NR	X	X	X	X(1)	X	X	X	MC-2592-1.1
T/D Aux. Feedwater Pump (No. 1) (CA)	3	MO	X	X	X	X	X(1)	X	X	X	MC-2592-1.1
Cent. Charging Pumps (2A, 2B) (NV)	2	QU	NR	X	X	NR	X(1)	X	X	X	MC-2554-3.1
Component Cooling Pumps (2A1, 2A2, 2B1, 2B2) (KC)	3	QU	NR	X	X	X	X(1)	X	X	X	MC-2573-1.0
Control Area Chilled Water Pumps (CRA-P-1,2) (YC)	3	QU	NR	X	X	X	X(1)	X	X(4)	X	MC-1618-1.0
D/G Fuel Oil Transfer Pumps (2A, 2B) (FD)	3	QU	NR	-	-	X	X(1)	-	-	X	MC-2609-3.0
D/G Room Sump Pumps (2A2, 2A3, 2B2, 3B3) (WN)	3	QU	NR	-	-	-	-	-	-	X	MC-2609-7.0
1 Standby Makeup Pump (1) (NV)	NS	QU	NR	-	-	X	X(1)	-	-	-	MC-2554-1.3

NOTES

1. Vibration to be measured with portable instrumentation (Accuracy $\pm 11\%$).
2. Pump contains no bearings, but is close coupled, therefore motor bearing will be monitored.
3. Pump is close coupled, therefore motor lubricant level will be observed.
4. No instrumentation is installed to measure bearing temperature.

LEGEND

X - Instrumentation
 - - Instrumentation not available
 NS - Non Safety Related

MO - Monthly
 NR - Not required for IWP Compliance

QU - Quarterly
 () - Note

DEFINITIONS OF TESTING REQUIREMENTS AND ALTERNATIVES

Cold Shutdown (CS)

Testing will be performed when the unit is in a cold shutdown (Mode 5) whose planned length is of sufficient duration to establish necessary test conditions and to perform the test. In the case of frequent shutdowns, the testing will not be performed more than one per three (3) months. Testing will commence as soon as the cold shutdown condition is achieved but not later than 48 hours after shutdown, and continue until complete or the plant is ready to return to power. Completion of all valve testing is not a prerequisite to return to power. Any testing not completed at one cold shutdown will be performed during any subsequent cold shutdowns that may occur before refueling to meet the code-specified testing frequency.

Cycle and Time (CT)

Valve will be tested to verify that its stroke time is less than the maximum allowable stroke time specified by McGuire Nuclear Station.

Leak Test (LT)

Valve will be tested to verify that the seat leakage is limited to a specific maximum amount.

Movement Test (MT)

Valve will be tested to verify that the valve is operable and/or the valve moves to the position required to fulfill its purpose. No timing is involved.

Quarterly (Q)

Testing will be performed at least once per three (3) months.

Refueling Outage (RF)

Testing will be performed when the unit is shut down for refueling (Mode 6). Safety valves will be tested periodically per the testing schedule defined in ASME Subsection IWV-3510.

Refueling Outage (RF*)

Valve will normally be tested during refueling outages, however, testing is not required more often than once per 24 months per Appendix J to 10CFR50.

Refueling Outage (RF#)

Valve will normally be tested on a routine basis via a sample valve disassembly program (1 valve from a group of identical valves under similar system conditions). Failure of one valve of the group during a refueling outage will result in all remaining valves of the group being tested during that outage.

Setpoint (SP)

Valve will be tested to verify that it will relieve pressure at its specified setpoint.

GENERAL RELIEF

- 1 | I. TEST REQUIREMENT: Perform trend analyses on category A and B valves as described in IWV-3417(a).
- BASIS FOR RELIEF: Trend analyses performed on rapid acting valves does not give reliable indication of valve stroke time deterioration.
- TESTING ALTERNATIVE: Trend analyses will not be performed on valves that normally operate with cycle times of less than 5 seconds. Maintenance will be initiated if valve time exceeds max. limit.
- II. TEST REQUIREMENT: Measure the full-stroke time for valves requiring cycle time test as defined in IWV-3413.
- BASIS FOR RELIEF: McGuire's Operator Aid Computer and Portable Valve Timers operate by measuring the time between limit switch operations, rather than from the initiation of the actuating signal. The only way to time the valve using the initiation signal is through some manual means, such as a stopwatch. It is felt that more consistent and repeatable results can be obtained by automated timing of the valve from limit switch to limit switch.
- TESTING ALTERNATIVE: Valves will normally be times from limit switch to limit switch. In cases where this is not practical, timing will be manually done from initiating signal.
- III. TEST REQUIREMENT: Leak rate test Category A valves in accordance with IWV-3420.
- BASIS FOR RELIEF: McGuire Tech Specs require leak rate testing in accordance with 10CFR50 Appendix J. The Tech Specs establish the required acceptance criteria, which is more restrictive than that required by IWV. In order to eliminate redundant paperwork, all valve leak rate testing will be conducted as per Appendix J.
- TESTING ALTERNATIVE: Category A valves will be leak tested in accordance with 10CFR50 Appendix J.

Valve Number	Class	Drawing Number	Coordinates	Valve Category				Testing Requirements	Relief Requests	Testing Alternative	System: Auxiliary Feedwater
				A	B	C	D				Remarks
2CA-7A	C	MC-2592-1.1	B-10		X			CT			10 sec. cycle time
2CA-15A	C	MC-2592-1.1	D-3		X			CT			10 sec. cycle time
2CA-86A	C	MC-2592-1.1	C-14		X			CT			10 sec. max. cycle time
2CA-116B	C	MC-2592-1.1	L-7		X			CT			10 sec. max. cycle time
2CA-26	C	MC-2592-1.1	I-4			X		MT			
2CA-27A	C	MC-2592-1.1	J-5		X			CT	X		60 sec. max. cycle time
2CA-32	C	MC-2592-1.1	I-7		X			CT	X		60 sec. max. cycle time
2CA-31	C	MC-2592-1.1	I-7			X		MT			
2CA-22	C	MC-2592-1.1	I-10			X		MT			
2CA-20A,B	C	MC-2592-1.1	I-10		X			CT	X		60 sec. max. cycle time

VALVE: 2CA-20, 2CA-27, 2CA-32

CATEGORY: B

CLASS: C

FUNCTION: Maintains minimum flow for Auxiliary Feedwater Pumps.

TEST REQUIREMENT: Full stroke exercise and stroke time quarterly

BASIS FOR RELIEF: This valve automatically regulates to maintain the minimum flow through the pump by monitoring the flow on the suction of the pump. There are not sufficient manual controls on this valve to permit the desired testing. These valves will operate during testing of the pump and their operability will be verified then.

ALTERNATE TESTING: These valves will be full stroke exercised quarterly and stroke timed during ESF testing.

VALVE: 2CA-165, 2CA-166

CATEGORY: C

CLASS: C

FUNCTION: Prevents backflow from Aux. Feedwater System to Nuclear Service Water System

TEST REQUIREMENT: Full stroke exercise quarterly

BASIS FOR RELIEF: Flow cannot be put through these valves because this would contaminate the aux. feed system with raw water.

ALTERNATE TESTING: At least one of these two valves will be disassembled and full stroked during each refueling outage, and both valves will have been disassembled and full stroked after two consecutive refueling outages. Failure of one valve to properly full stroke during a refueling outage will result in the remaining valve being disassembled and full stroked during that outage.

SYSTEM: CONTAINMENT SPRAY

FLOW DIAGRAMS: MC-2563-1.0

Valve Number	Class	Drawing Number	Coordinates	Valve Category				Test Requirements	Relief Requests	Testing Alternative	System: Containment Spray
											Remarks
2NS-43A	B	MC-2563-1.0	K-5		X			CT			10 sec. max. cycle time
2NS-46	B	MC-2563-1.0	K-3			X		MT	X	RF	
2NS-38B	B	MC-25643-1.0	J-5		X			CT			10 sec. max. cycle time
2NS-41	B	MC-2563-1.0	J-3			X		MT	X	RF	
2NS-18A	B	MC-2563-1.0	G-13		X			CT			30 sec. max. cycle time
2NS-20A	B	MC-2563-1.0	F-13		X			CT			30 sec. max. cycle time
4 2NS-21	B	MC-2563-1.0	F-12			X		MT	X	RF#	
2NS-32A	B	MC-2563-1.0	H-4		X			CT			10 sec. max. cycle time
2NS-29A	B	MC-2563-1.0	F-4		X			CT			10 sec. max. cycle time
2NS-30	B	MC-2563-1.0	F-2			X		MT	X	RF	

System: Containment Spray											
Valve Number	Class	Drawing Number	Coordinates	Valve Category				Test Requirements	Relief Requests	Testing Alternative	Remarks
				Valve Category							
				A	B	C	D				
2NS-33	B	MC-2563-1.0	H-2			X		MT	X	RF	
2NS-4	B	MC-2563-1.0	B-12			X		MT	X	RF#	
2NS-3R	B	MC-2563-1.0	B-13		X			CT			30 sec. max. cycle time
2NS-1B	B	MC-2563-1.0	C-13		X			CT			30 sec. max. cycle time
2NS-15B	B	MC-2563-1.0	D-4		X			CT			10 sec. max. cycle time
2NS-16	B	MC-2563-1.0	D-2			X		MT	X	RF	
2NS-12B	B	MC-2563-1.0	C-4		X			CT			10 sec. max. cycle time
2NS-13	B	MC-2563-1.0	B-2			X		MT	X	RF	

System: Containment Spray

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VALVE: 2NS-30, 2NS-33, 2NS-16, 2NS-13, 2NS-46, 2NS-41

CATEGORY: C

CLASS: B

FUNCTION: Open on flow from the Containment Spray Pumps.

TEST REQUIREMENT: Verify proper valve movement once per three months, IWV-3522.

BASIS FOR RELIEF: Full stroke exercising of these check valves is not practical since there is no external indication of disk movement. Full stroke exercising would require for the pumps and spray nozzles to be activated which would require a large scale clean up effort. Provisions for disassembly of these 8 inch valves are not installed, thus subjecting personnel to an extreme hazard due to the valves location up near the containment dome.

ALTERNATE TESTING: These valves will be tested during refueling outages by partial stroke exercising the valves using air.

VALVE: 2NS-21, 2NS-4

CATEGORY: C

CLASS: B

FUNCTION: Prevent flow path from the Containment Recirculation Sump to the FWST.

TEST REQUIREMENT: Verify proper valve movement once per three months.

BASIS FOR RELIEF: Full stroke exercising with flow would require spraying the reactor building.

ALTERNATE TESTING: At least one of these two valves will be disassembled and full stroked during each refueling outage, and both valves will have been disassembled and full stroked after two consecutive refueling outages. Failure of one valve to properly full stroke during a refueling outage will result in the remaining valve being disassembled and full stroked during that outage. Valves will be partial stroked quarterly.

4	VALVE:	2SM-1AB, 2SM-3AB, 2SM-5AB, 2SM-7AB	
	CATEGORY:	B	
	CLASS:	B	
4	FUNCTION:	Main Steam Isolation Valves (MSIV's).	
	TEST REQUIREMENT:	Cycle and Time Valves Quarterly.	
4	BASIS FOR RELIEF:	2SM-1, 3, 5, and 7, MSIV's, cannot be full stroke exercised during power operation, because closure of these valves would result in unit shutdown. The plant Tech. Specs. do not permit isolation of a steam generator. Hot shutdown conditions are required to exercise the isolation valves because of valve design.	
4	ALTERNATE TESTING:	These valves will be partially stroked quarterly while in Modes 1, 2, or 3. These valves will be full stroked and timed at hot shutdown conditions either prior to or after a cold shutdown.	

VALVE: 2SM-9AB, 2SM-10AB, 2SM-11AB, 2SM-12AB

CATEGORY: B

CLASS: B

FUNCTION: Main Steam Isolation Valve Bypass Valves (MSIV Bypass Valves).

TEST REQUIREMENT: Cycle and Time Valves Quarterly.

BASIS FOR RELIEF: 2SM-9, 10, 11, and 12, MSIV Bypass valves, can be full stroke exercised quarterly. However, these valves cannot be timed at this frequency since its operation is done utilizing a manual loader.

ALTERNATE TESTING: These valves will be full stroked quarterly and will be full stroked and timed either in hot shutdown or cold shutdown conditions.

VALVE: 2RN-276A, 2RN-277B

CATEGORY: A

CLASS: B

FUNCTION: Provides containment isolation.

TEST REQUIREMENT: Cycle and time valve every three months.

BASIS FOR RELIEF: These valves must remain open to maintain the cooling water flow path for the Reactor Coolant Pump Motor Air Coolers. If one of these valves were to fail in the closed position during testing, the flow would be restricted. This action could result in damage to the Reactor Coolant Pump Motors.

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ALTERNATE TESTING: These valves will be tested during cold shutdowns.

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VALVE: 2RN-42A

CATEGORY: B

CLASS: C

FUNCTION: Isolates Nuclear Service Water System Non-essential Header.

TEST REQUIREMENT: Cycle and time valve every three months.

4 | BASIS FOR RELIEF: Failure of this valve in the closed position during testing would inhibit cooling flow to the charging pump. This action could result in damage to the equipment served by these heat exchangers. This equipment includes the PD charging pump and the computer room A/C.

ALTERNATE TESTING: This valve will be tested during cold shutdowns.

Valve Number	Class	Drawing Number	Coordinates	Valve Category				Test Requirements	Relief Requests	Testing Alternative	System: Safety Injection
				A	B	C	D				Remarks
2NI-242B	B	MC-2562-4.0	E-8		X			CT			3 sec. max. cycle time
2NI-245A	B	MC-2562-4.0	F-7		X			CT			3 sec. max. cycle time
2NI-243A	B	MC-2562-4.0	E-7		X			CT			3 sec. max. cycle time
2NI-258	B	MC-2562-4.0	F-5		X			CT			10 sec. max. cycle time
2NI-255B	B	MC-2562-4.0	F-5		X			CT			10 sec. max. cycle time
2NI-248	A	MC-2562-4.0	E-5	X		X		LT MT	X	RF#	
2NI-249	A	MC-2562-4.0	E-3	X		X		LT MT	X	RF#	
2NI-266A	A	MC-2562-4.0	E-3	X				CT LT			Isolation time \leq 10 sec.
2NI-267A	A	MC-2562-4.0	E-4	X				CT LT			Isolation time \leq 10 sec.

Valve Number	Class	Drawing Number	Coordinates	Valve Category				Test Requirements	Relief Requests	Testing Alternative	Remarks
				A	B	C	D				
2NI-336	B	MC-2562-4.0	G-2			X		LT			
2NI-264	B	MC-2562-4.0	G-3	X				CT LT			Isolation time <10 sec.
2NI-253	A	MC-2562-4.0	C-6	X		X		LT MT	X	RF	
2NI-252	A	MC-2562-4.0	C-4	X		X		LT MT	X	RF	
2NI-251	A	MC-2562-4.0	C-3	X		X		LT MT	X	RF	
2NI-250	A	MC-2562-4.0	C-2	X		X		LT MT	X	RF	
UHI Rupture Disc	B	MC-2562-4.0	I-8				X				Tested per tech. spec.

VALVE: 2NI-9A, 2NI-10B

CATEGORY: B

CLASS: B

FUNCTION: Isolate NV Charging Pumps discharge from the safety injection lines.

TEST REQUIREMENT: Cycle time quarterly

BASIS FOR RELIEF: Opening either of these valves would increase the charging flow into the Reactor Coolant System, resulting in an increase of pressure and a rapid change in the boron concentration. This would create a transient and a possible shutdown.

ALTERNATE TESTING: Valve will be cycle timed at cold shutdowns.

VALVE: 2NI-15, 2NI-354, 2NI-17, 2NI-347, 2NI-19, 2NI-348,
2NI-21, 2NI-349

CATEGORY: C

CLASS: A

4 | FUNCTION: Provides safety injection flow path. |

TEST REQUIREMENT: Full stroke exercise quarterly.

BASIS FOR RELIEF: Full or partial stroke during power operation would result in thermal shock to injection nozzles. Valve cannot be stroked during shutdown due to possible low temperature overpressurization.

ALTERNATE TESTING: Valve will be full stroked at refueling.

VALVE: 2NI-12

CATEGORY: C

CLASS: B

4 | FUNCTION: Provides safety injection flow path. |

TEST REQUIREMENT: Full stroke exercise quarterly.

BASIS FOR RELIEF: Full or partial stroke during power operation would result in thermal shock to injection nozzles. Valve cannot be stroked during shutdown due to possible low temperature overpressurization.

ALTERNATE TESTING: Valve will be full stroked at refueling.

VALVE: 2NI-430A, 2NI-431B

CATEGORY: B

CLASS: B

FUNCTION: Supplies air to low pressure PORV's during blackout.

TEST REQUIREMENT: Cycle time quarterly.

BASIS FOR RELIEF: Valves are interlocked closed when RCS temperature is above 300 °F.

ALTERNATE TESTING: Valves will be cycle timed at cold shutdown.

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MC-2562-3.1

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VALVE: 2NI-183B

CATEGORY: B

CLASS: B

FUNCTION: Isolates ND flow to the hot legs.

TEST REQUIREMENT: Cycle and time valve quarterly.

BASIS FOR RELIEF: The valve is normally aligned for safety injection with power removed, as required by McGuire Technical Specification 4.5.2. Cycling the valve with the plant in operation requires that the power be restored to the valve and moved from the event-initiation position. The valve is required for alignment for hot-leg recirculation following an accident. It is not required to automatically actuate on initiation of a safety event. The past test history of the valve is very good.

ALTERNATE TESTING: Cycle and time the valve at cold shutdown.

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VALVE: 2NI-248, 2NI-249, 2NI-250, 2NI-251, 2NI-252, 2NI-253

CATEGORY: A, C

CLASS: A

FUNCTION: Open when Reactor Coolant System pressure decreases below 1500 psig during accident conditions.

TEST REQUIREMENT: Verify valves open on flow from upper head injection accumulator.

BASIS FOR RELIEF: The pressure in the UHI accumulator (1500 psig) is not sufficient to open the valves into the Reactor Coolant System (2235 psig). At cold shutdown, the high velocity water could cause damage to reactor internals. This, also, could cause low temperature overpressurization.

ALTERNATE TESTING: At least one of the two valves 2NI-248 and 2NI-249 will be disassembled and full stroked during each refueling outage, and both valves will have been disassembled and full stroked after two consecutive refueling outages. Failure of one of these two valves to properly full stroke during a refueling outage will result in the remaining valve being disassembled and full stroked during that outage. 2NI-250, 2NI-251, 2NI-252, and 2NI-253 will be full stroked manually at refueling.

SYSTEM: STREAM GENERATOR BLOWDOWN RECYCLE

FLOW DIAGRAMS: MC-2580-1.0

System: Steam Generator Blowdown Recycle									
Valve Number	Class	Drawing Number	Coordinates	Valve Category				Test Requirements	Relief Requests
				A	B	C	D		
4 2BB-1B	B	MC-1580-1.0	H-2		X			CT Q	
4 2BB-5A	B	MC-1580-1.0	F-2		X			CT Q	
4 2BB-2B	B	MC-1580-1.0	H-4		X			CT Q	
4 2BB-6A	B	MC-1580-1.0	F-4		X			CT Q	
4 2BB-3B	B	MC-1580-1.0	H-12		X			CT Q	
4 2BB-7A	B	MC-1580-1.0	F-12		X			CT Q	
4 2BB-4R	B	MC-1580-1.0	H-10		X			CT Q	
									Testing Alternative
									Remarks
									Isolation time <10 sec.
									Isolation time <10 sec.
									Isolation time <10 sec.
									Isolation time <10 sec.
									Isolation time <10 sec.
									Isolation time <10 sec.
									Isolation time <10 sec.

