



HIGH HEAD SAFETY INJECTION PUMPS AND
VALVES (MONTHLY)
UNIT 1

Date _____
DSS _____

1.0 PURPOSE

- 1.1 The purpose of this test is to perform the following periodic inservice tests as required by Technical Specifications and/or the ASME Boiler & Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components."
- 1.1.1 Monthly functional test of the SI pumps as per Technical Specification 15.4.5.II.A.1.
- 1.1.2 Monthly functional test of 1SI-825A&B, SI pump RWST suction valves, as required by Technical Specification 15.4.5.II.B.1.
- 1.1.3 Monthly functional test of 1SI-826A, B & C, SI pump BAT suction valves, as required by Technical Specification 15.4.5.II.B.4.
- 1.1.4 Quarterly full stroke test of 1SI-826B & C as required by ASME Section XI. This test will be performed monthly with 1.1.3 above.
- 1.1.5 Quarterly partial stroke of 1SI-889A&B, SI pump discharge check valves, as required by ASME Section XI. This test will be done monthly along with the pump test.
- 1.1.6 Quarterly full stroke of 1SI-891A&B, SI pump mini-recirc check valves, as required by ASME Section XI. This test will be done monthly along with the pump test.
- 1.1.7 Quarterly leak test of 1SI-842A & B, accumulator discharge check valves, as required by ASME Section XI. This test will be done monthly during the pump test.
- 1.2 The functional test of the SI pumps also satisfies environmental qualification requirements.

2.0 PRECAUTIONS AND LIMITATIONS

- 2.1 If there is any problem in performing this test, immediately notify the duty shift superintendent. Operation of this equipment is a Technical Specification requirement.
- 2.2 Monitor accumulator levels while the SI pumps are running. A level increase will indicate leakage past the accumulator check valve.
- 2.3 The suction pressure gauge shall be isolated except for the time required to take readings.
- 2.4 There is no installed instrumentation to measure the flow through 1SI-891A or B, SI pump recirc line check valves. Satisfactory operation of an SI pump for 15 minutes without overheating is positive indication that its respective recirc line check valve is operable.
- 2.5 Technical Specifications prohibit the testing of a safeguards component if the opposite train's diesel generator is out of service.



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- 2.6 If at any time pump suction pressure is less than the NPSH required, this test must be discontinued until the problem is corrected.

3.0 INITIAL CONDITIONS

INITIALS

- 3.1 This test is being done to satisfy:

_____ The normally scheduled callup. Task Sheet No. _____

_____ Post maintenance operability test for _____ (equip. ID)
MWR No.(s) _____
Task Sheet No.(s) _____

_____ Special test - no numbers
Explain: _____

- 3.2 SIS is aligned for critical operation as per CL-7A or the valve lineup for mini-recirculation operation is checked.
- 3.3 G01 & G02, emergency diesel generators, are in service or the component(s) to be tested is/are in the same safeguards train as the diesel generator that is out of service.
- 3.4 **Permission to Perform Test**

The conditions required by this test are consistent with required plant conditions including equipment operability. Permission is granted to perform this test.

DSS _____ TIME _____ DATE _____

4.0 PROCEDURE

4.1 Pre-Test Valve Position Verification/Alignment

Position

1SI-876A	1P15A mini-recirc
1SI-876B	1P15B mini-recirc
1SI-897A	SI test line AOV
1SI-897B	SI test line AOV
1SI-828	Blender to RWST
1WL-1729	RCDT pump to RWST
1SF-811	P33 to RWST
1RH-742A	RHR to RWST low flow
1SI-884	Containment SI test line
1SI-825A	1P15A&B RWST suction MOV
1SI-825B	1P15A&B RWST suction MOV

Open	_____
Open	_____
Gag Open	_____
Gag Open	_____
Shut	_____
Shut	_____
Shut	_____
Shut	_____
Open	_____
Open	_____
Open	_____



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NOTE: When post-maintenance or operability testing of 1P15A or Train "A" components is not required, then NA all of Section 4.2 sub-steps.

4.2 1P15A and Train "A" Test

CAUTION: 1PI-974, SUCTION PRESSURE GAUGE FOR 1P15A&B,
SHALL BE ISOLATED EXCEPT FOR THE TIME REQUIRED
TO TAKE DATA.

NOTE: Accumulator level data is required to determine the position of
1SI-842A&B, accumulator discharge check valves, when an SI
pump is operating.

4.2.1 Record accumulator level.

1T34A level per 1LI-938 _____ %

1T34B level per 1LI-934 _____ %

4.2.2 Check oil level of 1F15A at or above one-half
sightglass. Contact the DSS for the type of
replacement oil.

4.2.3 Verify open 1SI-896A, 1P15A pump suction MOV.

4.2.4 Record 1P15A static suction pressure on Attachment A.

4.2.5 Start 1P15A. Time start _____

4.2.6 Verify 1P15A suction pressure is ≥ 5 psig.

4.2.7 Check the mechanical seals and pump for excessive leakage,
unusual noise, and overheating.

4.2.8 Check all flanges, packing, and joints, up to the containment
penetrations, for leaks.

4.2.9 After a 15-minute run time, record data on Attachment A.
Reference Note 2 for pump run time requirements when taking
bearing temperature readings.

4.2.10 Record accumulator level and compare with Step 4.2.1 level.

1T34A level per 1LI-938 _____ % _____ % ΔL

1T34B level per 1LI-934 _____ % _____ % ΔL

4.2.11 Remove the locking device and open 1SI-879B, containment SI
test line isolation valve.



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N^o 1 A flow reading greater than 0 gpm verifies the partial stroke of 1SI-889A.

4.2.12 Record 1FI-929 test line flow on Attachment A, then shut 1SI-879B.

4.2.13 Stop 1P15A and observe its coastdown behavior for unusual noises, vibrations, or other abnormal conditions. Note results on Attachment A. Time stop _____

4.2.14 Check pump operability by comparing the pump data with the limits in the Operations Standing Order.

NOTE: When post-maintenance or operability testing of 1P15B or Train "B" components is not required, then NA all of Section 4.3 sub-steps.

4.3 1P15B and Train "B" Test

CAUTION: 1PI-974A, SUCTION PRESSURE GAUGE FOR 1P15A&B, SHALL BE ISOLATED EXCEPT FOR THE TIME REQUIRED TO TAKE DATA.

NOTE: Accumulator level data is required to determine the position of 1SI-842A&B, accumulator discharge check valves, when an Si pump is operating.

4.3.1 Record accumulator level.

1T34A level per 1LI-938 _____ %

1T34B level per 1LI-934 _____ %

4.3.2 Check oil level of 1P15B at or above one-half sightglass. Contact the DSS for the type of replacement oil.

4.3.3 Verify open 1SI-896B, 1P15B pump suction MOV.

4.3.4 Record 1P15B static suction pressure on Attachment B.

4.3.5 Start 1P15B. Time start _____

4.3.6 Verify 1P15B suction pressure is ≥ 5 psig.

4.3.7 Check the mechanical seals and pump for excessive leakage, unusual noise, and overheating.

4.3.8 Check all packing, flanges, and joints, up to the containment penetrations, for leaks.



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4.3.9 After a 15-minute run time, record data on Attachment B.
Reference Note 2 for pump run time requirements when taking
bearing temperature readings.

4.3.10 Record accumulator level and compare with Step 4.3.1 level.

1T34A level per 1LI-938 _____ % _____ % Δ L

1T34B level per 1LI-934 _____ % _____ % Δ L

4.3.11 Open 1SI-879B containment SI test line isolation valve.

NOTE: A flow reading greater than 0 gpm verifies the partial stroke of
1SI-889B.

4.3.12 Record test line flow on 1FI-929 on Attachment B, then shut
1SI-879B.

4.3.13 Stop 1P15B and observe its coastdown behavior for unusual
noises, vibrations, or other abnormal conditions. Note results
on Attachment B. Time stop _____

4.3.14 Check pump operability by comparing the pump data with the
limits in the Operations Standing Order.

NOTE: When post-maintenance or operability testing of 1SI-845A or B or E or F is not
required, then NA all of Section 4.4 sub-steps.

NOTE: Test of SI check valves per Section 4.4 should be performed whenever an SI
pump is operated per Section 4.2 and/or 4.3.

4.4 Test of 1SI-845A, B, E & F

NOTE: This test measures the seat leakage of the four check valves in a
parallel configuration against accumulator pressure, thereby
verifying check valve position.

4.4.1 Verify 1SI-884 open, then open 1SI-879B, containment SI test line
isolation valves.

4.4.2 Observe test line flow and record.

1FI-929 _____ gpm



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NOTE: If indicated flow in Step 4.4.2 was \geq a minimum discernable flow of 10 gpm, then NA Steps 4.4.2 and 4.4.4 and proceed to Step 4.4.5.

4.4.3 Shut 1SI-884 and observe 1PI-929 test line pressure for a period of 2 minutes and record pressure at the end of 2 minutes.

1PI-929 _____ psig

NOTE: If indicated pressure in Step 4.4.2 was \leq 500 psig, then NA Step 4.4.4 and proceed to Step 4.4.5.

4.4.4 Depressurize the test line by throttling open 1SI-883 test line drain until a constant 100 psig test line pressure is indicated on 1PI-929. Measure the drain rate with a graduated cylinder and record, then shut 1SI-883.

Drain Rate _____ sccm

4.4.5 Shut and lock containment SI test line isolation valves:

1SI-879B Shut, Lock No. _____
1SI-884 Shut, Lock No. _____

NOTE: When post-maintenance or operability testing of 1SI-826A a, b or c is not required, then NA all of Section 4.5 sub-steps.

4.5 Stroke Test of 1SI-826A, B & C

4.5.1 Shut 1SI-826A.

Check the rising stem position indicator for shut indication.

4.5.2 Open 1SI-826B.

a. Time to open. _____ seconds

b. Check the rising stem position indicator for open indication.

4.5.3 Shut 1SI-826B.

a. Time to shut. _____ seconds

b. Check the rising stem position indicator for shut indication.

4.5.4 Check valve operability by comparing the valve data with the limits in the Operations Standing Order.



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4.5.5 Open 1SI-826C.

a. Time to open. _____ seconds

b. Check the rising stem position indicator for open indication.

4.5.6 Shut 1SI-826C.

a. Time to shut. _____ seconds

b. Check the rising stem position indicator for shut indication.

4.5.7 Open 1SI-826A.

a. Time to open. _____ seconds

b. Check the rising stem position indicator for open indication.

4.5.8 Check valve operability by comparing the valve data with the limits in the Operations Standing Order.

4.5.9 Record stop watch ID No. _____

4.5.10 Shut 1P-15 A&B SI pump suction from RWST MOV 1SI-825A.

4.5.11 Shut 1P-15 A&B SI pump suction from RWST MOV 1SI-825B.

4.6 Post-Test Independent Operator Verification:

Valve

Position

1SI-825A 1P-15A&B SI pump suction from RWST MOV

Auto-Shut

1SI-825B 1P-15A&B SI pump suction from RWST MOV

Auto-Shut

1SI-826A 1P-15A&B SI pump suction from BAT MOV

Auto-Open

1SI-826B 1P-15A&B SI pump suction from BAT MOV

Auto-Shut

1SI-826C 1P-15A&B SI pump suction from BAT MOV

Auto-Shut

1SI-879B Containment SI test line manual

Locked Shut

1SI-884 Containment SI test line manual

Locked Shut

1SI-D&C 1PI-974 gauge isolation

Shut

Safety injection/spray ready status panel lights normal

Off



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INITIALS

5.0 ANALYSIS

NOTE: To be completed within 96 hours by manager - Operations or his representative.

5.1 Comparisons with allowable ranges of test values and analysis of deviations complete.

5.2 Any requirements for corrective action:

Yes _____ No _____

(If yes, give details in the remarks section.)

5.3 Data analyzed by _____

Time and date _____

Remarks:



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ATTACHMENT A
DATA SHEET
1P15A, "A" SAFETY INJECTION PUMP

PARAMETERS				INSTRUMENT	UNITS	READING	
Motor Current				C01 Amp	amps		
Pump Discharge Pressure				1PI-923	psig		
RWST Level During Test				1LI-972	%		
Pump Suction Pressure Before Test				1PI-974	psig		
Pump Suction Pressure During Test				1PI-974	psig		
Pump Differential Pressure				Note 3	psid		
Pump Vibration	Inboard Bearing	Vertical	C	Note 1, 5	mils/ips	<u> mils </u>	<u> ips </u>
		Horizontal	D	Note 1, 5	mils/ips		
		Axial	E	Note 1, 5	mils/ips		
	Outboard Bearing	Vertical	A	Note 1, 5	mils/ips		
		Horizontal	B	Note 1, 5	mils/ips		
	Bearing Temp. (Note 2)	Pump	Inboard	H	Note 1, 5	°F	
Outboard			J	Note 1, 5	°F		
Motor		Inboard	F	Note 1, 5	°F		
		Outboard	G	Note 1, 5	°F		
Ambient Air Temperature			Note 1, 4	°F			
RWST Temperature				1TI-960	°F		
Coastdown Behavior Check (v) If OK				N/A	N/A		

Valve Stroke Verification Data	INSTRUMENT	UNITS	READING
1SI-889A Test Line Flow	1FI-929	gpm	



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ATTACHMENT B
DATA SHEET
1P15B, "B" SAFETY INJECTION PUMP

PARAMETERS				INSTRUMENT	UNITS	READING	
Motor Current				C01 Amps	amps		
Pump Discharge Pressure				1PI-922	psig		
RWST Level During Test				1LI-972	%		
Pump Suction Pressure Before Test				1PI-974	psig		
Pump Suction Pressure During Test				1PI-974	psig		
Pump Differential Pressure				Note 3	psid		
Pump Vibration	Inboard Bearing	Vertical	C	Note 1, 5	mls/ips	<u> </u> mls	<u> </u> ips
		Horizontal	D	Note 1, 5	mls/ips		
		Axial	E	Note 1, 5	mls/ips		
	Outboard Bearing	Vertical	A	Note 1, 5	mls/ips		
		Horizontal	B	Note 1, 5	mls/ips		
	Bearing Temp. (Note 2)	Pump	Inboard	H	Note 1, 5	°F	
Outboard			J	Note 1, 5	°F		
Motor		Inboard	F	Note 1, 5	°F		
		Outboard	G	Note 1, 5	°F		
Ambient Air Temperature				Note 1, 4	°F		
Coastdown Behavior Check (v) if OK				N/A	N/A		

Valve Stroke Verification Data	INSTRUMENT	UNITS	READING
1SI-889B Test Line Flow	1FI-929	gpm	

PARAMETER	TEST INSTRUMENT ID NO.
Vibration	
Bearing Temperature	
Ambient Air Temperature	



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NOTES

- NOTE 1: *Log the identification number of the portable instrument being used.*
- NOTE 2: *Readings taken only during the first run of January, after pump maintenance, or when establishing new reference values. These readings will be taken after bearing temperatures have stabilized. Stabilized is defined as being three successive readings taken at 10-minute intervals that do not vary by more than 3% (approximately $\pm 3^{\circ}\text{F}$).*
- NOTE 3: *Differential pressure = Pump discharge pressure - Pump suction pressure during test.*
- NOTE 4: *Ambient air temperature is taken approximately one foot above the pump inboard bearing.*
- NOTE 5: *Vibration readings will be taken at locations A, B, C, D and E as shown on Figure 1. Temperature readings will be taken at locations F, G, H and J.*



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SAFETY INJECTION PUMP
FIGURE 1

