STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

EMERGENCY INSTRUCTION SO1-1.2-1.0

REACTOR TRIP OR SAFETY INJECTION

I. PURPOSE

The purpose of this instruction is to verify proper response of the automatic protection systems following actuation of a REACTOR TRIP OR SAFETY INJECTION and to assess plant conditions and identify the appropriate instruction for the specific condition present.

II. SYMPTOMS:

A. The following are symptoms of a reactor trip:

1. Any reactor trip annunciator initiated.
2. Reactor Trip breakers open.
3. Control rods fully inserted.
4. Rapid decrease in neutron flux.

B. The following are symptoms of safety injection actuation:

1. The SI annunciator initiated.
2. SLSS surveillance panel load group lights off.
3. SI system blue lights on.

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	NOTE: Foldout page should be open.	
1	Verify Reactor Trip:	
	a. Reactor trip breakers - OPEN.	• Manually trip reactor. IF reactor will NOT trip, THEN go to SO1-1.2-16, ANTICIPATED TRANSIENT WITHOUT SCRAM.
	b. Rod bottom lights - ON.	
	c. Neutron flux - DECREASING.	
2	Verify Turbine Trip:	
	a. All turbine stop valves - CLOSED.	a. Manually trip turbine OR locally trip turbine from the turbine front standard.
3	Verify The AC Busses Energized:	
	a. 4 KV busses 1C and 2C voltage - NORMAL.	a. IF NOT energized, THEN go to SO1-1.7-1, LOSS OF OFF-SITE POWER/ STATION BLACKOUT.
	b. 480 V busses 1, 2 and 3 voltage - NORMAL.	b. Manually energize busses.
4	Check If SI Is Actuated:	
	a. SI alarm - INITIATED.	• IF NOT actuated, THEN go to SO1-1.2-1.0T, REACTOR TRIP RESPONSE.
	b. SLSS surveillance panel load group lights - OFF.	

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5	Verify RCPs Tripped:	
	a. RCP breakers - OPEN.	a. Manually trip pumps.
	NOTE: The check boxes in steps 6 and 7 are provided as an aid in assuring that a minimum of one SI train (A or B) is fully aligned.	
6	Verify SI Pumps Running:	
	a. One charging pump breaker - CLOSED.	a. Manually start preselected charging pump.
	b. SI pump breakers:	b. Manually start pumps.
	12C05 - CLOSED. E(A) ☐	
	11C05 - CLOSED. W(B) ☐	
	c. Feed pump breakers:	c. Manually start pumps.
	12C04 - CLOSED. E(A) ☐	
	11C04 - CLOSED. W(B) ☐	

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(7) Verify SI Valve Alignment:

a. Feed pump valves:

	A	B
HV 852A&B - CLOSED.	☐	☐
HV 854A&B - CLOSED.	☐	☐
HV 851A&B - OPEN.	☐	☐
HV 853A&B - OPEN.	☐	☐
CV 875A&B - OPEN.	☐	☐

a. Manually open or close valves as appropriate.

b. RCS SI injection MOVs 850 A, B AND C - OPEN.

b. Manually open valves.

(8) Align Charging Pump Suction:

a. MOV 1100B AND D - OUT OF AUTO AND OPEN.

b. MOV 1100C - OUT OF AUTO AND CLOSED.

- Manually open or close valves as appropriate.

CAUTION

If SI flow cannot be verified, symptoms should be monitored for RESPONSE TO INADEQUATE CORE COOLING per SO1-1.2-14.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
(9)	Verify SI Flow:	
	a. RC charging flow GREATER THAN 80 GPM.	a. Manually align valves as appropriate.
	b. IF RCS pressure is less than 1170 psig, THEN check SI line loop indicators - CHECK FOR FLOW.	

CAUTION

RWST level should be monitored and the actions of SO1-1.2-1.13 TRANSFER TO COLD LEG INJECTION AND RECIRCULATION must be completed if level decreases to 21%.

(10)	Verify AFW Valve Alignment:	
	a. Motor driven pump:	a. Manually open or close valves as appropriate.
	1) AFW header discharge valve - OPEN.	
	2) Main FW header discharge valve - CLOSED.	
	b. Turbine driven pump AFW header discharge valve - OPEN.	b. Manually open valve.
	c. AFW header flow CV controllers - AT PRESET POSITION.	c. Manually position controllers.
	FCV - 2301 50% FCV - 2300 100% FCV - 3300 100% FCV - 3301 50%	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
(11)	Verify AFW Pumps Running:	
	a. Motor driven pump breaker - CLOSED.	a. Manually start pump. 1) IF pump tripped on low discharge pressure, THEN lower AFW flow controllers to one-half their present position. 2) Reset and manually start pump.
	b. Turbine driven pump. Steam warmup valve - OPEN. OR Steam supply valve - OPEN.	b. Manually open valves.
(12)	Verify AFW Flow:	
	a. Total flow - GREATER THAN 250 GPM.	a. Manually start pumps and align valves as appropriate. IF AFW flow NOT established, THEN go to SOI-1.2-15, RESPONSE TO LOSS OF SECONDARY HEAT SINK.
(13)	Verify Containment Isolation:	
	a. All automatic isolation valves - CLOSED.	a. Manually close automatic isolation valves.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
(14)	Verify Both Salt Water Cooling Pumps Running:	
	a. Both salt water cooling pump breakers - CLOSED.	a. Manually start pumps. IF both pumps will NOT run, THEN start aux. salt water cooling pump.
(15)	Verify Two CCW Pumps Running:	
	a. CCW pump breakers - CLOSED.	a. Manually start pumps.
(16)	Block SI:	
	a. Operate SI Block Switches CS1 AND CS2 to BLOCK Position.	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION
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If at any time containment pressure increases above 10 psig, containment spray initiation must be verified.

(17) Check Containment Pressure:

a. Containment pressure - LESS THAN 10 PSIG.

a. IF pressure greater than 10 psig, THEN

1) Verify running OR start both refueling water pumps.

2) Verify OR open containment spray valves, CV 82 AND CV 114, AND verify spray flow greater than 1080 gpm.

3) Verify running OR start both hydrazine additive pumps.

4) Verify OR open spray additive pump discharge valves, SV 600 AND SV 601, AND verify flow 0.4 gpm per pump.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	NOTE: If automatic steam dump has actuated RCS average temperature should be decreasing to 535°F.	
(18)	Verify RCS Heat Removal:	
	a. Place steam dump mode selector switch to PRESSURE CONTROL- CONDENSER.	a. IF steam dump to the condenser not available, place steam dump mode selector switch to PRESSURE CONTROL - ATMOS.
	b. Verify steam dump controller - SET TO 930 PSIG.	b. Set steam dump controller to 930 psig.
(19)	Verify Diesel Generator Operation:	
	a. Verify diesel generators 1 and 2 - RUNNING.	a. Manually start diesels.
	b. Diesel Frequency APPROXIMATELY 60 CYCLES.	b. Manually adjust diesel speed to obtain approximately 60 cycles.
	c. Diesel voltage APPROXIMATELY 4.2 KV.	c. Manually adjust diesel voltage to approximately 4.2 KV.
20	Locally Isolate Feed Pump From Secondary Plant:	
	a. Verify feed pump mini flow to condenser - CLOSED.	a. Close mini flow block valve.
	b. Isolate seal water return from feed pump to condenser.	
	c. Isolate seal water supply to feed pump.	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	Place Control Room Emergency Air Conditioning In Service: a. Start control room air conditioning fan A 33.	
22	Check RCS Pressure: a. Pressure - GREATER THAN 1840 PSIG. b. Pressure - STABLE OR INCREASING.	a. IF less than 1840 psig, THEN go to step 27. b. IF decreasing, THEN go to step 27.

CAUTION
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Radiation monitors utilized in the following steps have GM tubes which may fail downscale when saturated.

23	Check Containment Conditions: a. Containment pressure - LESS THAN 1.4 PSIG. b. Containment radiation on ARMS 1232 - LESS THAN ALARM SET POINT. c. Containment sump level - LESS THAN SUMP LEVEL ALARM POINT.	• IF high, THEN go to step 27.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	Check For RCS To Secondary Integrity:	
	a. SG blowdown radiation on ORMS - 1216 LESS THAN ALARM SET POINT.	• IF any high, THEN go to step 27.
	b. Air ejector radiation on ORMS - 1215 LESS THAN ALARM SET POINT.	
	c. Main steam line post accident radiation - monitors LESS THAN ALARM SET POINT.	
25	Check If SI Can Be Terminated:	
	a. RCS pressure - GREATER THAN 1840 PSIG AND INCREASING.	a. DO NOT TERMINATE SI. Go to step 27.
	b. Pressurizer level - GREATER THAN 15%.	b. DO NOT TERMINATE SI. Go to step 27.
	c. RCS subcooling - GREATER THAN 40°F.	c. DO NOT TERMINATE SI. Go to step 27.
	d. Secondary heat sink: Total flow to SGs - GREATER THAN 250 GPM. OR Narrow range level in at least one SG - GREATER THAN 10%.	d. IF neither condition is satisfied, THEN DO NOT TERMINATE SI. Go to step 27.
26	Terminate SI:	
	a. Go to S01-1.2-1.03, SI TERMINATION FOLLOWING SPURIOUS SI.	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	Check If RCS Depressurization Can Be Stopped:	
	a. Pressurizer PORVs - CLOSED.	a. Manually close PORVs. IF any PORV valve cannot be closed, THEN manually close its block valve.
	b. Pressurizer safety valves - CLOSED.	b. IF open AND RCS pressure is less than 2485 psig, THEN go to SO1-1.2-1.1, LOSS OF REACTOR COOLANT.
	c. Pressurizer vent valves - CLOSED.	c. Manually close valves.
	d. Reactor head vent valves - CLOSED.	d. Manually close valves.
28	Check For Secondary Integrity:	
	a. Steam header pressure - GREATER THAN 500 PSIG. (IF vertical board pressure not available use TSC computer)	a. IF steam header pressure less than 500 psig, THEN go to SO1-1.2-1.2, LOSS OF SECONDARY COOLANT.
	b. Steam flow prior to trip - APPROXIMATELY EQUAL TO FEED FLOW ON ALL SGs.	b. IF steam flow prior to trip exceeds feed flow on at least two SG, THEN go to SO1.2-1.2, LOSS OF SECONDARY COOLANT.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29	Check For RCS Integrity:	
	a. Containment pressure - LESS THAN 1.4 PSIG AND NOT INCREASING.	• IF high, OR increasing THEN go to S01-1.2-1.1, LOSS OF REACTOR COOLANT.
	b. Containment radiation on ARMS 1232 - LESS THAN ALARM SET POINT AND NOT INCREASING.	
	c. Containment sump level - LESS THAN SUMP LEVEL ALARM POINT AND NOT INCREASING.	
30	Check For RCS To Secondary Integrity:	
	a. SG blowdown radiation on ORMS 1216 - LESS THAN ALARM SET POINT AND NOT INCREASING.	• IF high, THEN go to S01-1.2-1.3, STEAM GENERATOR TUBE RUPTURE.
	b. Air ejector radiation on ORMS 1215 - LESS THAN ALARM SET POINT AND NOT INCREASING.	
	c. Main steam line post accident radiation monitors - LESS THAN ALARM SET POINT AND NOT INCREASING.	
31	Check Steam Header Pressure:	
	a. Steam header pressure - STABLE AT 900 TO 950 PSIG.	a. Adjust steam dump controller setpoint.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
32	Check Steam Generator Levels:	
	a. Narrow range level - GREATER THAN 26%.	a. IF less than 26%, THEN maintain: 1) Total AFW flow - GREATER THAN 250 GPM. 2) AFW flow per SG - LESS THAN 150 GPM.
	b. Throttle AFW flow to maintain narrow range level at 50%.	b. IF narrow range level in one SG continues to increase, THEN: 1) Secure AFW to that SG. 2) Request activity sample of that SG IF high activity present, THEN go to SO1-1.2-1.3, STEAM GENERATOR TUBE RUPTURE. 3) For a RAPID level increase in one SG, go to SO1-1.2-1.3, STEAM GENERATOR TUBE RUPTURE.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33	Check PRT Conditions: a. PRT level - BETWEEN 65% AND 70%. b. PRT temperature - LESS THAN 120°F. c. PRT pressure - LESS THAN 5 PSIG.	• IF PRT conditions abnormal, THEN evaluate cause of abnormal conditions AND go to step 34.
34	Rediagnose Plant Conditions: a. Return to step 22.	

-END-

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MOTOR DRIVEN AFW PUMP RESTART CRITERIA

a. IF a motor driven AFW pump trips on low discharge pressure, THEN:

1) Lower AFW flow controllers.
2) Reset AND restart pump.

SI TERMINATION CRITERIA FOR SPURIOUS SI

a. Terminate SI when ALL parameters listed below are met:

1)	Containment Conditions	- NORMAL.
2)	RCS Pressure	- GREATER THAN 1840 PSIG.
3)	RCS Subcooling	- 40 °F.
4)	Pressurizer Level	- GREATER THAN 15%.
5)	Heat Sink:	
	(a) SG Level	- GREATER THAN 10%.
	OR	
	(b) AFW Flow	- GREATER THAN 250 GPM.

SI REINITIATION CRITERIA FOLLOWING SPURIOUS SI

a. Reinitiate SI if ANY ONE of the parameters listed below occurs:

1)	RCS Pressure	- LESS THAN 1735 PSIG.
2)	RCS Subcooling	- LESS THAN 40 °F.
3)	Pressurizer Level	- LESS THAN 10%.
4)	Containment Pressure	- GREATER THAN 1.4 PSIG.

COLD LEG RECIRCULATION SWITCHOVER CRITERIA

a. IF RWST level less than 21% THEN align SI system for cold leg recirculation per SOI-1.2-1.13, TRANSFER TO COLD LEG INJECTION AND RECIRCULATION.

SYMPTOMS FOR RESPONSE TO INADEQUATE CORE COOLING

a. Go to SOI-1.2-14, RESPONSE TO INADEQUATE CORE COOLING, when ANY ONE of the following symptoms occur:

1) Five or more core exit TCs - GREATER THAN 1200 °F.
OR
2) RCS hot leg temperatures - GREATER THAN 700 °F.

SYMPTOMS FOR RESPONSE TO LOSS OF SECONDARY HEAT SINK

a. Go to SOI-1.2-15, RESPONSE TO LOSS OF SECONDARY HEAT SINK IF AFW Flow is NOT AVAILABLE.

IF EVENTS REQUIRE IMPLEMENTATION OF THIS PROCEDURE

a. Notify Shift Technical Advisor.
b. Notify Shift Communicator.
c. Determine if event is classified as an emergency and requires notification of offsite agencies and implementation of the Emergency Plan per SOI23-VIII-11, RECOGNITION AND CLASSIFICATION OF EMERGENCIES.
d. IF event is NOT classified as an emergency in c above THEN determine if notification of the NRC is required within one hour per SOI-14-13, NOTIFICATION TO NRC OF SIGNIFICANT EVENTS.