

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

EMERGENCY INSTRUCTION S01-1.2-1.21

SI TERMINATION FOLLOWING LOSS OF SECONDARY COOLANT

I. PURPOSE:

The purpose of this instruction is to provide a method to terminate safety injection after a loss of secondary coolant once RCS conditions have stabilized to SI termination criteria. Normal charging and letdown will be established. Guidance is provided to insure controlled conditions are maintained by monitoring the need to reinitiate safety injection.

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NOTE: Foldout page should be open.

CAUTION

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If offsite power is lost after SI is reset, manual SI initiation will be necessary to load safeguard equipment onto the diesel powered 4 KV busses.

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| 1 | <u>Verify SI Reset:</u> <ul style="list-style-type: none">a. SLSS surveillance panel load group lights - ON.b. Verify lockout switches - RESET. | <ul style="list-style-type: none">a. Reset SI at SLSS surveillance panels.b. Manually reset lockout switches. |
| 2 | <u>Stop SI System Pumps And Place In Standby:</u> <ul style="list-style-type: none">a. Stop both feed pumps.b. Stop both SI pumps. | |

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Verify SI Reinitiation NOT
Required:

- a. After SI termination RCS pressure decreases - LESS THAN 200 psi.
- b. After SI termination pressurizer level decreases - LESS THAN 10%.
- c. RCS subcooling - GREATER THAN 40 °F.

- Manually reinitiate SI AND go to S01-1.2-1.0 REACTOR TRIP OR SAFETY INJECTION, step 5.

CAUTION

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AFW pump water supply must be maintained to ensure adequate heat sink.

4

Check CST Level:

- a. CST Level - GREATER THAN 4 FT.

- a. IF CST level low, THEN transfer to alternate AFW water supply per S01-7-3, AUXILIARY FEEDWATER SYSTEM.

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CAUTION

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Maintain at least 25 gpm AFW flow to each SG with established AFW flow until SG narrow range level reaches 50%.

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Adjust AFW Flow:

- a. Verify present cooldown rate - LESS THAN 100 °F/HR AND SG narrow range level - GREATER THAN 10%.

- b. While maintain cooldown rate less than 100 °F/hr, attempt to adjust AFW flow to maintain SG narrow range level at 50%.

- a. Adjust AFW flow to maintain cooldown rate less than 100 °F/HR AND IF possible to reestablish SG narrow range level greater than 10%.

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Verify Offsite Power Available:

- a. 220 KV switchyard voltage - NORMAL.

- a. IF low, THEN go to S01-1.7.T, LOSS OF OFFSITE POWER/STATION BLACKOUT.

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7	<u>Reset Containment Isolation:</u> a. Containment pressure is - LESS THAN 1.4 PSIG. b. Depress Train A AND B containment isolation pushbuttons.	a. IF high, THEN depress override pushbuttons for valves needed open as containment systems are placed in service. Go to step 8.
8	<u>Verify Charging Established:</u> a. One charging pump breaker - CLOSED.	a. Start standby charging pump.
9	<u>Establish Pressurizer Level:</u> a. Adjust charging flow to obtain pressurizer level at 25%.	
10	<u>Verify CCW System Operation:</u> a. Two CCW pump breakers - CLOSED. b. CCW flow indication - GREATER THAN 1620 GPM. c. CCW low pressure alarm - RESET.	a. Manually start pumps. b. IF low, THEN start third CCW pump. c. IF low, THEN start third CCW pump.

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11	<u>Align Letdown System:</u>	
	a. Place inservice RHR heat exchanger temperature controller to - MANUAL, SET AT 25% OPEN.	
	b. Place letdown pressure controller PCV 1115 to MANUAL, SET AT 50% OPEN.	
	c. Verify RCS letdown CV 525 <u>AND</u> CV 526 - OPEN.	c. Manually open valves.
	d. Verify LCV 1112 - OPEN.	d. Manually open valve.
	e. Verify LCV 1100 A control switch - AUTO.	e. Manually position switch.
12	<u>Place Letdown In Service:</u>	
	a. Open an orifice isolation valve <u>AND</u> manually adjust letdown pressure and temperature to stable conditions.	
	b. Place letdown pressure controller to - AUTO, SET AT 350 PSIG.	
	c. Place inservice RHR heat exchanger temperature controller PCV 1105 to - AUTO, SET AT 120 °F.	

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13	<p><u>Align Charging Pump Suction To VCT:</u></p> <ul style="list-style-type: none"> a. Verify VCT level - GREATER THAN 20%. b. Open MOV 1100 C. c. Close MOV 1100 B <u>AND</u> D. d. Place control switches for MOV 1100 B, D <u>AND</u> C in AUTO. 	<ul style="list-style-type: none"> a. Manually restore level.
14	<p><u>Establish Normal Charging:</u></p> <ul style="list-style-type: none"> a. Establish desired charging flow with FCV 1112. 	
16	<p><u>Align VCT Makeup Control System:</u></p> <ul style="list-style-type: none"> a. Set makeup controller for COLD SHUTDOWN CONCENTRATION. b. Makeup set for automatic. 	<ul style="list-style-type: none"> b. Adjust controls as appropriate.

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16	<p><u>Check RCP Cooling:</u></p> <ul style="list-style-type: none"> a. RCP low CCW flow alarms - RESET. b. RCP seal injection flow established with RCP thermal barrier delta pressures - GREATER THAN 10 INCHES. c. Verify RCP seal return CV 527 <u>AND</u> CV 528 - OPEN. d. Verify seal leakoff is - LESS THAN 4.5 GPM. 	<ul style="list-style-type: none"> a. Manually adjust CCW flow. b. Establish seal water place flow controllers in AUTO set to maintain a positive delta pressure. c. Manually open valves. d. Place PCV 1115 A, B <u>AND</u> C in AUTO.
17	<p><u>Establish Pressurizer Level Control:</u></p> <ul style="list-style-type: none"> a. Verify charging flow controller FCV 1112 in - AUTO, CASCADE CONTROL. b. Place pressurizer level controller in - AUTO, MAN SET <u>AND</u> SET AT 50%. 	

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18	<u>Establish Pressurizer Pressure Control:</u>	
	a. Operate spray valves to control pressurizer pressure within Tech Spec Limits for existing RCS temperature.	
	b. Energize one control <u>AND</u> one backup set of pressurizer heaters.	
	c. Operate remaining control <u>AND</u> backup set of pressurizer heaters as necessary to maintain pressure within Tech Spec Limits for existing RCS temperature.	
	d. Use auxiliary spray as necessary.	
19	<u>Check RCS Temperature:</u>	
	a. RCS subcooling - GREATER THAN 50 °F.	a. Dump steam to establish 50 °F subcooling.
		1) Limit RCS cooldown rate less than 50 °F/hr.
		2) Dump steam to condenser if available.
		<u>OR</u>
		Dump steam to atmosphere.
	b. Attempt to adjust RCS cooldown rate less than 50 °F/hr by throttling AFW flow.	

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CAUTION

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If possible RCPs should be run such that pressurizer spray capability is assured.

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Establish Conditions For
RCP Operation:

- a. Start at least one RCP per S01-1-3, REACTOR COOLANT PUMP OPERATION.
- a. IF an RCP cannot be started, THEN go to step 21.
- b. IF at least one RCP is running, THEN go to step 22.

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Verify For RCS Natural
Circulation Using Trended Values:

- a. RCS subcooling
- GREATER THAN 50 °F.
 - b. Steam pressure
- STABLE.
 - c. RCS cold leg temperature
- STABLE OR SLOWLY DECREASING
AND NEAR SATURATION
TEMPERATURE FOR STEAM HEADER
PRESSURE.
 - d. Core exit TCs - STABLE OR
SLOWLY DECREASING.
 - e. Refer to S01-3-6, PLANT
OPERATION WITH NATURAL
CIRCULATION.
- Attempt to establish natural circulation by increasing feed to SGs.

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22	<p><u>Check Intermediate Range Flux:</u></p> <p>a. Flux - LESS THAN 2×10^{-9} AMPS.</p> <p>b. Verify source range detectors high voltage - ON.</p> <p>c. Transfer NIS recorders to source range.</p>	<p>a. Continue with step 20. WHEN flux decreases below 2×10^{-9} amps, THEN perform steps <u>22.b AND 22.c.</u></p>
23	<p><u>Depressurize RCS:</u></p> <p>a. Use normal pressurizer spray to remain within Tech. Spec. Pressure Temperature Limits.</p>	<p>a. IF letdown in service, THEN use auxiliary spray. IF NOT in service, THEN use one pressurizer PORV.</p>
24	<p><u>Verify SI Reinitiation NOT Required:</u></p> <p>a. RCS pressure - STABLE OR DECREASING IN A CONTROLLED MANNER.</p> <p>b. Pressurizer level - GREATER THAN 10%.</p> <p>c. RCS subcooling - GREATER THAN 50 OF.</p>	<p>• Manually reinitiate SI. Go to S01-1.2-1.0, REACTOR TRIP OR SAFETY INJECTION, step 5.</p>

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Return SI Valving To Standby Status:

- a. Close MOV 850 A, B, AND C.
- b. Close HV 851 A AND B.
- c. Close HV 853 A AND B.
- d. Close CV 875 A AND B.
- e. Close SV 2900 AND SV 3900.
- f. Close bonnet vent block valves for HV 853 A AND B.

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Check Containment Spray System:

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| <ul style="list-style-type: none"> a. Refueling water pump breakers - CLOSED. b. Containment pressure - LESS THAN 1.4 PSIG. c. RWST level - GREATER THAN 21%. d. Stop containment spray and place in standby: <ul style="list-style-type: none"> 1) Reset CSAS Trains A AND B. 2) Stop both hydrazine additive pumps. 3) Close SV 600 AND SV 601. 4) Close spray valves CV 82 AND CV 114. 5) Stop both refueling water pumps. | <ul style="list-style-type: none"> a. Go to step 26. b. IF pressure high, THEN maintain containment spray until containment pressure is reduced below 1.4 psig. Go to step 26. c. IF less than 21%, THEN align containment spray for recirculation per S01-1.2-1.22, CONTAINMENT SPRAY RECIRCULATION FOLLOWING LOSS OF SECONDARY COOLANT. |
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CAUTION

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If containment pressure increases above 10 PSIG containment spray must be reinitiated.

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| 27 | <u>Check if RHR System Can Be Placed In Service:</u> | |
| | a. RCS pressure - LESS THAN 400 PSIG. | a. IF greater than 400 psig, THEN return to step 19. |
| 28 | <u>Place RHR In Service:</u> | |
| | a. Place RHR in service per S01-4-9, RESIDUAL HEAT REMOVAL SYSTEM. | a. IF break is inside containment AND RHR is NOT available, THEN go to S01-1.2-1.23, LOSS OF RHR DUE TO LOSS OF SECONDARY COOLANT IN CONTAINMENT. |
| 29 | <u>Investigate Cause of SI:</u> | |
| | a. Emergency Coordinator will determine cause of SI.
b. Evaluate long term plant status. | |
| 30 | <u>Shutdown Unnecessary Plant Equipment And Align Plant Systems For Cooldown:</u> | |
| | a. Go to S01-1.2-1.01 REACTOR TRIP RESPONSE, step 10. | |

-END-

H. E. MORGAN
MANAGER, STATION OPERATIONS

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 REINITIATION CRITERIA FOLLOWING LOSS OF SECONDARY COOLANT

- a. Reinitiate SI if ANY ONE of the parameters listed below occurs:
- 1) RCS Pressure - DECREASES BY 200-PSI AFTER SI TERMINATION.
 - 2) RCS Subcooling - LESS THAN 40 OF.
 - 3) Pressurizer Level - DECREASES BY 10% AFTER SI TERMINATION.

AFW SUPPLY SWITCHOVER CRITERION

- a. IF CST level less than 4 FEET, THEN switch to alternate AFW supply.

COLD LEG RECIRCULATION SWITCHOVER CRITERIA

- a. IF RWST level less than 21%, THEN align SI system for cold leg injection and recirculation per SO1-1.2-T.13, TRANSFER TO COLD LEG INJECTION AND RECIRCULATION.

SYMPTOMS FOR RESPONSE TO INADEQUATE CORE COOLING

- a. Go to SO1-1.2-14, RESPONSE TO INADEQUATE CORE COOLING, when ANY ONE of the following symptoms occur:
- 1) Five of more core exit TCs - GREATER THAN 1200 OF.
 - OR
 - 2) RCS hot leg temperatures - GREATER THAN 700 OF.

SYMPTOMS FOR RESPONSE TO LOSS OF SECONDARY HEAT SINK

- a. Go to SO1-1.2-15, 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 SO123-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 SO1-14-13, NOTIFICATION TO NRC OF SIGNIFICANT EVENTS.