

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

## EMERGENCY INSTRUCTION S01-1.2-1.2

## LOSS OF SECONDARY COOLANT

## I. PURPOSE:

The purpose of this instruction is to provide the diagnostics to enable confirmation of a LOSS OF SECONDARY COOLANT, the assurance of an adequate heat sink, and the identification of SI reset criteria for the conditions present. Additionally, this instruction directs the implementation of procedures to insure long term shutdown and cooling of the reactor.

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NOTE: Foldout page should be open.

1

Check Motor Drive AFW Pump:

a. Pump breaker - CLOSED.

a. Return pump to service:

1) IF pump tripped on Low discharge pressure, THEN lower AFW flow controllers to one half of their preset positions.

2) Go to MANUAL AND RESET.

3) Manually start pump.

4) Throttle AFW flow:  
Total flow  
- GREATER THAN  
250 GPM.

AND

Flow per SG - LESS  
THAN 150 GPM.

b. Turbine driven pump:

Steam warmup valve  
- OPEN.

OR

Steam supply valve  
- OPEN.

b. Manually open valves.

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2

Check If AFW Isolation To  
One SG Is Required:

a. AFW flow - APPROXIMATELY  
EQUAL TO ALL SGs.

b. AFW header flow  
controllers AT  
- PRESET POSITION.

FCV - 2301	50%
FCV - 2300	100%
FCV - 3300	100%
FCV - 3301	50%

c. Steam flow - APPROXIMATELY  
EQUAL FOR ALL SGs.

a. IF AFW flow to one SG  
abnormally high com-  
pared to others,  
THEN isolate AFW to  
that SG. Go to  
step 3.

b. IF controller position  
was significantly  
reduced to meet flow  
limit of 150 gpm to  
one SG, THEN isolate  
AFW to that SG. Go to  
step 3.

c. IF one SG steam flow  
is pegged downscale  
compared to others,  
THEN isolate AFW to  
that SG.

3

Check AFW Flow:

a. Total AFW flow - GREATER  
THAN 250 GPM.

b. Each SG with established  
AFW flow - LESS THAN  
150 GPM.

a. Adjust flow as  
required.

b. Adjust flow as  
required.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4	Check Level In SGs With <u>Established AFW Flow:</u>	
	a. Narrow range level - GREATER THAN 26%.	a. IF less than 26% in all SGs, <u>THEN</u> go to step 3.
	b. Throttle AFW flow to maintain narrow range level at 50%.	b. IF narrow range level In one SG continues increase, <u>THEN</u> :  1) Secure AFW to that SG.  2) Request activity sample of that SG. IF high activity present, <u>THEN</u> go to S01-1.2-1.3, STEAM GENERATOR TUBE RUPTURE.  3) For a RAPID level increase in one SG, go to S01-1.2-1.3, STEAM GENERATOR TUBE RUPTURE.

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## CAUTION

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If RCS temperature is increasing, then control AFW flow to stabilize RCS temperature.

5

Check RCS Cooldown Rate:

a. Cooldown Rate - LESS THAN 100 °F/HR.

a. IF cooldown rate greater than 100 °F/hr, THEN throttle flow to each SG with established AFW flow to 25 gpm.

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6

Check Pressurizer PORVs And  
Block Valves:

a. Power available to block  
valves.

b. PORVs - CLOSED.

c. Block valves - OPEN.

a. Restore power to block  
valves.

b. IF RCS pressure less  
than 2085 psig, THEN  
manually close PORVs.  
IF any PORV cannot be  
closed, THEN manually  
close its block  
valve. IF block  
valve cannot be  
closed, THEN go to  
S01-1.2-1.1, LOSS OF  
REACTOR COOLANT.

c. Open block valve  
unless it was closed  
to isolate a faulty  
PORV.

## CAUTION

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If any pressurizer PORV opens because of high RCS  
pressure, repeat step 6 after pressure drops below PORV  
setpoint.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	<u>Check CST Level:</u> 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.
8	<u>Check Containment Spray System:</u> a. Refueling water pump breakers - CLOSED. b. Containment pressure - LESS THAN 1.4 PSIG. c. Stop containment spray and place in standby. 1) Reset CSAS Trains A AND B. 2) Stop both hydrazine additive pumps. 3) Close spray additive pump discharge valves SV 600 AND SV 601. 4) Close spray valves CY 82 AND CY 114. 5) Stop both refueling water pumps.	a. IF pumps NOT running, THEN go to step 9. b. IF pressure high, THEN maintain containment spray until containment pressure is less than 1.4 psig.

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

9

Check RWST Level:

a. RWST level - GREATER THAN 21%.

a. IF less than 21%, THEN align SI system for cold leg recirculation per S01-1.2-1.22, CONTAINMENT SPRAY RECIRCULATION FOLLOWING LOSS OF SECONDARY COOLANT.

CAUTION  
=====

If RCS cold leg temperature is less than 350 °F, it is important to Reactor Vessel Integrity that SI be terminated immediately when SI termination criteria is met.

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Check RCS Cold Leg Temperatures:

a. ALL RCS cold leg temperatures - GREATER THAN 350 °F.

a. IF any RCS cold leg temperature less than 350 °F, THEN go to step 16.



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Check Containment Conditions:

- a. Containment pressure  
- LESS THAN 1.4 PSIG  
AND NOT INCREASING.
- b. Containment radiation on  
ARMS 1232 - LESS THAN  
ALARM SET POINT AND  
NOT INCREASING.
- c. Containment sump level  
- LESS THAN ALARM SET  
POINT AND NOT INCREASING.

- IF ANY condition high  
OR increasing, THEN  
go to step 14.

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## CAUTION

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If containment conditions of step 11 exhibit high or increasing readings while doing step 12, go to step 14.

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Check If SI Can Be Terminated  
- Under NORMAL Containment  
Conditions:

- |   |  |
|---|--|
| a. RCS pressure - GREATER THAN 1400 PSIG <u>AND</u> INCREASING.                             | a. DO NOT TERMINATE SI, return to step 9.  |
| b. Pressurizer level - GREATER THAN 20%.  | b. DO NOT TERMINATE SI, return to step 9.  |
| c. RCS subcooling - GREATER THAN 40 OF.   | c. DO NOT TERMINATE SI, return to step 9.  |
| d. Secondary heat sink:<br>Flow to each SG with established AFW flow - GREATER THAN 25 GPM. | d. IF neither condition <u>IS</u> satisfied, THEN DO NOT TERMINATE <u>SI</u> , return to step 9. |

AND

RCS hot leg temperatures  
 - STABLE OR DECREASING.

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Terminate SI:

- a. Go to S01-1.2-1.21, SI TERMINATION FOLLOWING LOSS OF SECONDARY COOLANT.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	<p><u>Check If SI Can Be Terminated</u>  <u>- Under ABNORMAL Containment</u>  <u>Conditions:</u></p> <p>a. RCS pressure - GREATER THAN 1400 PSIG AND STABLE OR INCREASING.</p> <p>b. Pressurizer level - GREATER THAN 50%.</p> <p>c. RCS subcooling - GREATER THAN 40 °F.</p> <p>d. Secondary heat sink:  Total flow to SGs with established AFW flow - GREATER THAN 250 GPM.</p> <p style="text-align: center;"><u>OR</u></p> <p>Narrow range level in at least one SG with established AFW flow - GREATER THAN 26%.</p>	<p>a. DO NOT TERMINATE SI, return to step 9.</p> <p>b. DO NOT TERMINATE SI, return to step 9.</p> <p>c. DO NOT TERMINATE SI, return to step 9.</p> <p>d. IF neither condition IS satisfied, THEN DO NOT TERMINATE SI, return to step 9.</p>
15	<p><u>Terminate SI:</u></p> <p>a. Go to S01-1.2-1.21, SI TERMINATION FOLLOWING LOSS OF SECONDARY COOLANT.</p>	

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## CAUTION

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If RCS cold leg temperature is less than 350 °F, it is important to Reactor Vessel Integrity that SI be terminated immediately when SI termination criteria is met.

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Check If SI Can Be Terminated  
- RCS Cold Leg Temperature Below  
350 °F:

- |  |  |
|--|--|
| a. RCS pressure - GREATER THAN 700 PSIG AND STABLE <u>OR</u> INCREASING.                             | a. DO NOT TERMINATE SI, return to step 9.  |
| b. Pressurizer level<br>- GREATER THAN 20%.  | b. DO NOT TERMINATE SI, return to step 9.  |
| c. RCS subcooling - GREATER THAN 40 °F.  | c. DO NOT TERMINATE SI, return to step 9.  |
| d. Secondary heat sink:<br><br>Total flow to SGs with established AFW flow<br>- GREATER THAN 10 GPM. | d. <u>IF</u> neither condition <u>IS</u> satisfied, <u>THEN</u> DO NOT TERMINATE SI, return to step 9. |

OR

Narrow range level in at least one SG with established AFW flow  
 - GREATER THAN 26%.

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Terminate SI:

- a. Go to S01-1.2-1.1, SI  
TERMINATION FOLLOWING  
LOSS OF SECONDARY COOLANT.

-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 °F.
  - 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 S01-1.2-T.13, TRANSFER TO COLD LEG INJECTION AND RECIRCULATION.

SYMPTOMS FOR RESPONSE TO INADEQUATE CORE COOLING

- a. Go to S01-1.2-14, RESPONSE TO INADEQUATE CORE COOLING, when ANY ONE of the following symptoms occur:
- 1) Five of more core exit TCs - GREATER THAN 1200 °F.
  - OR
  - 2) RCS hot leg temperatures - GREATER THAN 700 °F.

SYMPTOMS FOR RESPONSE TO LOSS OF SECONDARY HEAT SINK

- a. Go to S01-1.2-15, 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 S0123-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 S01-14-13, NOTIFICATION TO NRC OF SIGNIFICANT EVENTS.