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March 21, 2001

U. S. Nuclear Regulatory Commission
Washington D.C. 20555-0001
ATTENTION: Document Control Desk

Subject: Duke Energy Corporation
Catawba Nuclear Station, Units 1 and 2
Docket Nos. 50-413 and 414
Topical Report DPC-NE-3002, Revision 4

- Reference: 1) Letter, Duke Energy Corporation to U.S.
Nuclear Regulatory Commission, ATTENTION:
Document Control Desk, Dated April 19, 2000,
SUBJECT: Topical Report DPC-NE-3002,
Revision 4
- 2) Letter, Duke Energy Corporation to U.S.
Nuclear Regulatory Commission, ATTENTION:
Document Control Desk, Dated August 24,
2000, SUBJECT: Topical Report DPC-NE-3002,
Revision 4
- 3) Letter, Duke Energy Corporation to U.S.
Nuclear Regulatory Commission, ATTENTION:
Document Control Desk, Dated September 22,
2000, SUBJECT: Topical Report DPC-NE-3002,
Revision 4

In the letters referenced above, Duke Energy Corporation submitted proposed Revision 4 to Topical Report DPC-NE-3002, *UFSAR Chapter 15 Transient Analysis Methodology*. In order to support the NRC's review and approval of this topical report, Duke is submitting the attached Catawba Procedure EP/1/A/5000/E-3, *Steam Generator Tube Rupture*.

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Please address any questions to J. S. Warren at (704) 382-4986.

Very truly yours,

M. S. Tuckman

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Attachment

xc w/Attachment:

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bxc:

w/o Attachment

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ELL

A. Purpose

This procedure provides actions to terminate leakage of reactor coolant into the secondary system following a steam generator tube rupture.

B. Symptoms or Entry Conditions

This procedure is entered from:

- a. EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection), Step 25, when condenser air ejector radiation, S/G blowdown radiation or steamline radiation is abnormal.
- b. EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection), Step 30, EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant), Step 4, EP/1/A/5000/E-2 (Faulted Steam Generator Isolation), Step 10, EP/1/A/5000/ECA-2.1 (Uncontrolled Depressurization Of All Steam Generators), Step 7, and EP/1/A/5000/FR-H.3 (Response To Steam Generator High Level), Step 8, when secondary radiation is abnormal.
- c. EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection), Step 29, EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant), Step 3, EP/1/A/5000/ES-1.2 (Post LOCA Cooldown And Depressurization), Step 7, EP/1/A/5000/ES-3.1 (Post - SGTR Cooldown Using Backfill), Step 5, EP/1/A/5000/ES-3.2 (Post - SGTR Cooldown Using Blowdown), Step 5, EP/1/A/5000/ES-3.3 (Post - SGTR Cooldown Using Steam Dump), Step 7, EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired), Step 11, and EP/1/A/5000/ECA-3.2 (SGTR With Loss Of Reactor Coolant - Saturated Recovery Desired), Step 6, when a S/G N/R level increases in an uncontrolled manner.
- d. E-1 series foldout page whenever any S/G level increases in an uncontrolled manner or any S/G has abnormal radiation.

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ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

C. Operator Actions

 1. **Monitor Enclosure 1 (Foldout Page).**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

2. Identify ruptured S/G(s) as follows:

- ___ • S/G level - INCREASING IN AN UNCONTROLLED MANNER.
- OR
- ___ • Chemistry or RP determines ruptured S/G by frisking the cation columns in the CT lab.

OR

- The following EMF trip 1 lights - LIT:

- ___ • 1EMF-26 (Steamline 1A)
- ___ • 1EMF-27 (Steamline 1B)
- ___ • 1EMF-28 (Steamline 1C)
- ___ • 1EMF-29 (Steamline 1D).

OR

- ___ • Chemistry determines ruptured S/G using 1EMF-34 (S/G Sample).

OR

- **IF** S/G Sampling is required to identify ruptured S/G(s), **THEN**:

- a. Ensure the following signals - RESET:

- ___ 1) Phase A Containment Isolations
- ___ 2) CA System valve control
- ___ 3) KC NC NI NM St signals.

- ___ b. Align all S/Gs for Chemistry sampling.

- ___ c. Notify Chemistry to sample all S/Gs for activity.

- ___ 3. **Verify at least one intact S/G - AVAILABLE FOR NC SYSTEM COOLDOWN.**

Perform the following:

- ___ a. **WHEN** ruptured S/G(s) is identified, **THEN** perform Steps 3 through 6.
- ___ b. **GO TO** Step 7.

- ___ **Maintain one S/G available for NC System cooldown in subsequent steps.**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

4. Isolate steam flow from ruptured S/G(s)
as follows:

___ a. Verify all ruptured S/G(s) PORV -
CLOSED.

___ b. Verify S/G(s) 1B and 1C - INTACT.

a. **WHEN** ruptured S/G(s) pressure is less
than 1090 PSIG, **THEN** perform the
following:

___ 1) Ensure ruptured S/G(s) PORV -
CLOSED.

___ 2) **IF** ruptured S/G(s) PORV will not
close, **THEN** manually close
ruptured S/G(s) PORV isolation
valve.

___ 3) **IF** ruptured S/G(s) PORV isolation
valve will not manually close, **THEN**
dispatch operator to close ruptured
S/G(s) PORV isolation valve.

b. Perform the following:

___ 1) **IF** CA Pump #1 is the only source of
feedwater, **THEN** maintain steam
flow to the CAPT from at least one
S/G.

2) **IF** S/G 1B is ruptured, **THEN**:

___ a) Dispatch two operators to unlock
and close 1SA-1 (Main Steam
1B To CAPT Maintenance Isol)
(DH-624, FF-53, Rm 572)
(Breakaway lock installed).

___ b) **IF** 1SA-1 cannot be closed,
THEN dispatch two operators to
unlock and close 1SA-3 (S/G 1B
SM To CAPT Stop Check)
(AB-551, DD-53, Rm 217)
(Breakaway lock installed).

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

4. (Continued)

3) **IF** S/G 1C is ruptured, **THEN**:

- ___ a) Dispatch two operators to unlock and close 1SA-4 (Main Steam 1C To CAPT Maintenance Isol) (DH-624, FF-53, Rm 572) (Breakaway lock installed).
- ___ b) **IF** 1SA-4 cannot be closed, **THEN** dispatch two operators to unlock and close 1SA-6 (S/G 1C SM To CAPT Stop Check) (AB-551, DD-53, Rm 217) (Breakaway lock installed) (Ladder needed).

c. Isolate blowdown and steam drain on all ruptured S/G(s) as follows:

• S/G 1A:

- ___ 1) Close 1SM-77A (S/G 1A Otlt Hdr Bldwn C/V).
- 2) Verify the following blowdown isolation valves - CLOSED:
 - ___ a) 1BB-56A (S/G 1A Bldwn Cont Isol Insd).
 - ___ b) 1BB-148B (S/G 1A Bldwn Cont Isol Byp).

- ___ 1) Dispatch operator to close 1SM-77A (S/G 1A Otlt Hdr Bldwn C/V) (DH-583, FF-GG, 43-44, Rm 591).
 - ___ a) Manually close valve.
 - b) Perform the following:
 - ___ (1) Manually close valve.
 - ___ (2) **IF** valve will not close **AND** 1BB-56A is open, **THEN** dispatch operator to close 1BB-148B (S/G 1A Bldwn Cont Isol Byp) (DH-580, EE-FF, 44-45, Rm 591).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

4. (Continued)

___ c) 1BB-57B (S/G 1A Bldwn Cont Isol Otsd).

c) Perform the following:

___ (1) Manually close valve.

___ (2) **IF** valve will not close **AND** 1BB-56A is open, **THEN** dispatch operator to close 1BB-57B (S/G 1A Bldwn Cont Isol Otsd) (DH-580, EE-FF, 44-45, Rm 591).

• S/G 1B:

___ 1) Close 1SM-76B (S/G 1B Otlt Hdr Bldwn C/V).

___ 1) Dispatch operator to close 1SM-76B (S/G 1B Otlt Hdr Bldwn C/V) (DH-583, FF-53, Rm 572).

2) Verify the following blowdown isolation valves - CLOSED:

___ a) 1BB-19A (S/G 1B Bldwn Cont Isol Insd).

___ a) Manually close valve.

___ b) 1BB-150B (S/G 1B Bldwn Cont Isol Byp).

b) Perform the following:

___ (1) Manually close valve.

___ (2) **IF** valve will not close **AND** 1BB-19A is open, **THEN** dispatch operator to close 1BB-150B (S/G 1B Bldwn Cont Isol Byp) (DH-580, EE-FF, 52-53, Rm 572).

___ c) 1BB-21B (S/G 1B Bldwn Cont Isol Otsd).

c) Perform the following:

___ (1) Manually close valve.

___ (2) **IF** valve will not close **AND** 1BB-19A is open, **THEN** dispatch operator to close 1BB-21B (S/G 1B Bldwn Cont Isol Otsd) (DH-580, EE-FF, 52-53, Rm 572).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

4. (Continued)

• S/G 1C:

___ 1) Close 1SM-75A (S/G 1C Otlt Hdr Bldwn C/V).

2) Verify the following blowdown isolation valves - CLOSED:

___ a) 1BB-60A (S/G 1C Bldwn Cont Isol Insd).

___ b) 1BB-149B (S/G 1C Bldwn Cont Isol Byp).

___ c) 1BB-61B (S/G 1C Bldwn Cont Isol Otsd).

___ 1) Dispatch operator to close 1SM-75A (S/G 1C Otlt Hdr Bldwn C/V) (DH-580, GG, 52-53, Rm 572).

___ a) Manually close valve.

b) Perform the following:

___ (1) Manually close valve.

___ (2) **IF** valve will not close **AND** 1BB-60A is open, **THEN** dispatch operator to close 1BB-149B (S/G 1C Bldwn Cont Isol Byp) (DH-578, FF-GG, 52-53, Rm 572).

c) Perform the following:

___ (1) Manually close valve.

___ (2) **IF** valve will not close **AND** 1BB-60A is open, **THEN** dispatch operator to close 1BB-61B (S/G 1C Bldwn Cont Isol Otsd) (DH-578, FF-GG, 52-53, Rm 572).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

4. (Continued)

• S/G 1D:

___ 1) Close 1SM-74B (S/G 1D Otlt Hdr Bldwn C/V).

2) Verify the following blowdown isolation valves - CLOSED:

___ a) 1BB-8A (S/G 1D Bldwn Cont Isol Insd).

___ b) 1BB-147B (S/G 1D Bldwn Cont Isol Byp).

___ c) 1BB-10B (S/G 1D Bldwn Cont Isol Otsd).

___ 1) Dispatch operator to close 1SM-74B (S/G 1D Otlt Hdr Bldwn C/V) (DH-583, FF-GG, 44-45, Rm 591).

___ a) Manually close valve.

b) Perform the following:

___ (1) Manually close valve.

___ (2) **IF** valve will not close **AND** 1BB-8A is open, **THEN** dispatch operator to close 1BB-147B (S/G 1D Bldwn Cont Isol Byp) (DH-582, EE-FF, 43-44, Rm 591).

c) Perform the following:

___ (1) Manually close valve.

___ (2) **IF** valve will not close **AND** 1BB-8A is open, **THEN** dispatch operator to close 1BB-10B (S/G 1D Bldwn Cont Isol Otsd) (DH-582, EE-FF, 43-44, Rm 591).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

5. Close the following valves on all ruptured S/G(s):

- ☐ • MSIV
- ☐ • MSIV bypass valve.

Perform the following:

- a. Close the following valves on remaining S/Gs:
 - ☐ • MSIV
 - ☐ • MSIV bypass valve.
- ☐ b. Place steam dump control in manual and lower controller output to 0%.
- ☐ c. Place "STEAM DUMP SELECT" switch in pressure mode.
- d. Transfer turbine steam seal supply to AS as follows:
 - ☐ 1) Open 1TL-8 (Aux Stm To Stm Seal Reg).
 - ☐ 2) Close 1TL-2 (Main Stm To Stm Seal Reg).
- e. Ensure the following turbine S/V before seat drain valves - CLOSED:
 - ☐ • 1SM-41 (Stop Vlv #1 Before Seat Drn)
 - ☐ • 1SM-44 (Stop Vlv #2 Before Seat Drn)
 - ☐ • 1SM-43 (Stop Vlv #3 Before Seat Drn)
 - ☐ • 1SM-42 (Stop Vlv #4 Before Seat Drn).
- ☐ f. Close 1AS-1 (SM To AS Inlet).
- g. Ensure the following valves - CLOSED:
 - ☐ • 1HM-1 (MSRH 1A&1B SSRH Stm Source)
 - ☐ • 1HM-2 (MSRH 1C&1D SSRH Stm Source).

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

5. (Continued)

- ___ h. Dispatch operator to isolate steam flow from all ruptured S/G(s). **REFER TO** Enclosure 2 (Locally Isolating Steam Flow From Ruptured S/G(s)).
- ___ i. Use intact S/G(s) PORV for steam release.
- ___ j. **IF** at least one intact S/G cannot be isolated from all ruptured S/G(s), **THEN GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

6. Control ruptured S/G(s) level as follows:

- ___ a. Verify ruptured S/G(s) N/R level - GREATER THAN 16% (29% ACC).
- a. Perform the following:
 - ___ 1) **IF** any ruptured S/G is also faulted, **THEN** do not establish feed flow to the ruptured S/G unless needed for NC System cooldown.
 - 2) **IF** any ruptured S/G(s) is not faulted **OR** is required for cooldown, **THEN**:
 - ___ a) Establish and maintain feed flow to affected S/G(s).
 - ___ b) **WHEN** affected S/G(s) N/R level greater than 16% (29% ACC), **THEN** perform Steps 6.b and 6.c.
 - ___ 3) **GO TO** Step 7.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

6. (Continued)

b. Isolate feed flow to all ruptured S/G(s)
as follows:

• S/G 1A:

___ 1) Close 1CA-62A (CA Pmp A Disch
To S/G 1A Isol).

___ 2) Close 1CA-66B (CA Pmp 1 Disch
To S/G 1A Isol).

• S/G 1B:

___ 1) Close 1CA-58A (CA Pmp A Disch
To S/G 1B Isol).

___ 2) Close 1CA-54B (CA Pmp 1 Disch
To S/G 1B Isol).

1) Perform the following:

___ a) Close 1CA-60 (CA Pump 1A
Flow To S/G 1A).

___ b) Dispatch operator to close
1CA-62A (CA Pmp A Disch
To S/G 1A Isol) (DH-587,
DD-EE, 44-45, Rm 591).

2) Perform the following:

___ a) Close 1CA-64 (CA Pump #1
Flow To S/G 1A).

___ b) Dispatch operator to close
1CA-66B (CA Pmp 1 Disch To
S/G 1A Isol) (DH-584, DD-EE,
44-45, Rm 591).

1) Perform the following:

___ a) Close 1CA-56 (CA Pump 1A
Flow To S/G 1B).

___ b) Dispatch operator to close
1CA-58A (CA Pmp A Disch
To S/G 1B Isol) (DH-586,
DD-EE, 52-53, Rm 572).

2) Perform the following:

___ a) Close 1CA-52 (CA Pump #1
Flow To S/G 1B).

___ b) Dispatch operator to close
1CA-54B (CA Pmp 1 Disch To
S/G 1B Isol) (DH-584, DD-EE,
52-53, Rm 572).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

6. (Continued)

• S/G 1C:

- ___ 1) Close 1CA-46B (CA Pmp B Disch To S/G 1C Isol).

- ___ 2) Close 1CA-50A (CA Pmp 1 Disch To S/G 1C Isol).

• S/G 1D:

- ___ 1) Close 1CA-42B (CA Pmp B Disch To S/G 1D Isol).

- ___ 2) Close 1CA-38A (CA Pmp 1 Disch To S/G 1D Isol).

1) Perform the following:

- ___ a) Close 1CA-44 (CA Pump 1B Flow To S/G 1C).
- ___ b) Dispatch operator to close 1CA-46B (CA Pmp B Disch To S/G 1C Isol) (DH-586, DD, 53-54, Rm 572).

2) Perform the following:

- ___ a) Close 1CA-48 (CA Pump #1 Flow To S/G 1C).
- ___ b) Dispatch operator to close 1CA-50A (CA Pmp 1 Disch To S/G 1C Isol) (DH-584, EE-53, Rm 572).

1) Perform the following:

- ___ a) Close 1CA-40 (CA Pump 1B Flow To S/G 1D).
- ___ b) Dispatch operator to close 1CA-42B (CA Pmp B Disch To S/G 1D Isol) (DH-586, DD-EE, 43-44, Rm 591).

2) Perform the following:

- ___ a) Close 1CA-36 (CA Pump #1 Flow To S/G 1D).
- ___ b) Dispatch operator to close 1CA-38A (CA Pmp 1 Disch To S/G 1D Isol) (DH-584, DD-EE, 43-44, Rm 591).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

6. (Continued)

- ___ c. **IF AT ANY TIME** ruptured S/G(s) N/R level is less than 16% (29% ACC), **THEN** perform Step 6.

7. **Verify Pzr PORV and isolation valve status as follows:**

- ___ a. Power to all Pzr PORV isolation valves - AVAILABLE.

- a. Dispatch operator to restore power to affected Pzr PORV isolation valve(s):

- ___ • 1EMXD-F02C (Pressurizer Power Operated Relief Isol. Valve 1NC31B) (AB-560, BB-50, Rm 372)
- ___ • 1EMXC-F03C (Pressurizer Power Operated Relief Isol. Valve 1NC33A) (AB-577, BB-50, Rm 496)
- ___ • 1EMXD-F05A (Pressurizer Power Operated Relief Isol. Valve 1NC35B) (AB-560, BB-50, Rm 372).

- ___ b. All Pzr PORVs - CLOSED.

- b. **IF** Pzr pressure is less than 2315 PSIG, **THEN**:

- ___ 1) Manually close Pzr PORV(s).
- ___ 2) **IF** any Pzr PORV cannot be closed, **THEN** close its isolation valve.
- ___ 3) **IF** Pzr PORV cannot be closed **OR** isolated, **THEN GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

- ___ c. At least one Pzr PORV isolation valve - OPEN.

- ___ c. Open one Pzr PORV isolation valve unless it was closed to isolate an open Pzr PORV.

- ___ d. **IF AT ANY TIME** a Pzr PORV opens due to high pressure while in this procedure, **THEN**, after Pzr pressure decreases to less than 2315 PSIG, perform Step 7.b.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

8. Verify main steamlines are intact as follows:

- ___ • All S/G pressures - STABLE OR INCREASING
- ___ • All S/Gs - PRESSURIZED.

9. Control intact S/G levels as follows:

- ___ a. Verify N/R level in all intact S/Gs - GREATER THAN 11% (29% ACC).
- ___ b. Throttle feed flow to maintain all intact S/G N/R levels between 11% (29% ACC) and 50%.
- ___ c. Ensure CA suction source switchover criterion is monitored. **REFER TO** Enclosure 1 (Foldout Page).

IF pressure in any S/G is decreasing in an uncontrolled manner OR any S/G is depressurized, THEN:

- ___ a. **IF** EP/1/A/5000/E-2 (Faulted Steam Generator Isolation) has been performed for all faulted S/G(s) not needed for NC System cooldown, **THEN GO TO** Step 9.
- ___ b. **IF** faulted S/G(s) are not isolated **AND** faulted S/G(s) are not needed for NC System cooldown, **THEN GO TO** EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).
- a. Perform the following:
 - ___ 1) Maintain total feed flow greater than 450 GPM to intact S/Gs until at least one intact S/G N/R level greater than 11% (29% ACC).
 - 2) **IF** total feed flow greater than 450 GPM cannot be established, **THEN** contact station management for guidance to establish feed flow from one of the following alternate sources:
 - ___ • CF
 - ___ • CM
 - ___ • Alternate low pressure water source.
- ___ b. **IF** N/R level in any intact S/G continues to increase in an uncontrolled manner, **THEN RETURN TO** Step 1.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

10. **Ensure S/I - RESET:**

- ☐ a. ECCS.
 - ☐ b. D/G load sequencers.
 - ☐ c. **IF AT ANY TIME** a B/O occurs, **THEN** restart S/I equipment previously on.
- ☐ b. Dispatch operator to open the affected sequencer(s) control power breaker:
 - ☐ • 1EDE-F01F (Diesel Generator Load Sequencer Panel 1DGLSA) (AB-577, BB-46, Rm 496)
 - ☐ • 1EDF-F01F (Diesel Generator Load Sequencer Panel 1DGLSB) (AB-560, BB-46, Rm 372).

11. **Ensure the following containment isolation signals - RESET:**

- ☐ • Phase A
- ☐ • Phase B.

12. **Establish VI to containment as follows:**

- ☐ • Ensure 1VI-77B (VI Cont Isol) - OPEN.
- ☐ • Verify VI pressure - GREATER THAN 85 PSIG.

Perform the following:

- ☐ a. Align N₂ to the Pzr PORVs by opening the following valves:
 - ☐ • 1NI-438A (Emer N2 From CLA A To 1NC-34A)
 - ☐ • 1NI-439B (Emer N2 From CLA B To 1NC-32B).
- ☐ b. **IF** VI pressure is less than 85 PSIG, **THEN** dispatch operator to ensure proper VI compressor operation.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

13. **Verify all AC busses are energized by offsite power as follows:**

- A Train:
- ___ • "FTA B/O NORM FDR FRM ATC" - CLOSED
- ___ • "D/G 1A BKR TO ETA" - OPEN
- ___ • 1ETA - ENERGIZED.
- B Train:
- ___ • "FTB B/O NORM FDR FRM ATD" - CLOSED
- ___ • "D/G 1B BKR TO ETB" - OPEN
- ___ • 1ETB - ENERGIZED.

14. **Verify criteria to stop operating ND pumps as follows:**

- ___ a. At least one ND pump - ON.
- ___ b. NC pressure - GREATER THAN 285 PSIG.
- ___ c. Ensure all ND pump(s) not supporting Cold Leg Recirc - STOPPED.
- ___ d. **IF AT ANY TIME** NC pressure decreases to less than 285 PSIG in an uncontrolled manner, **THEN** restart ND pumps.

Perform the following:

- ___ a. **WHEN** time allows, **THEN** attempt to restore offsite power while continuing with this procedure. **REFER TO** AP/1/A/5500/07 (Loss Of Normal Power).
- b. Manually start following equipment:
 - ___ • Start all available CRD vent fans.
 - ___ • Dispatch operator to start available VI compressors.

- ___ a. **GO TO** Step 14.d.
- ___ b. **GO TO** Step 15.

___ 15. **Verify ruptured S/G(s) - IDENTIFIED.**

___ **Do not continue in this procedure until ruptured S/G(s) identified.**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

16. Verify the following valves on all ruptured S/G(s) - CLOSED:

- ☐ • MSIV
- ☐ • MSIV bypass valves.

Perform the following:

- a. Verify the following valves on at least one intact S/G - CLOSED:

- ☐ • MSIV
- ☐ • MSIV bypass valve.

- ☐ b. **IF** at least one intact S/G cannot be isolated from all ruptured S/G(s), **THEN GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

☐ 17. Verify all ruptured S/G(s) pressure - GREATER THAN 320 PSIG.

- ☐ **GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

18. **WHEN "P-11 PZR S/I BLOCK PERMISSIVE" status light (1SI-18) is lit, THEN:**

- ☐ a. Depress ECCS steam pressure "BLOCK" pushbuttons.
- ☐ b. Verify main steam isolation blocked status lights (1SI-13) - LIT.
- c. Maintain NC pressure less than 1955 PSIG using one of the following:

- ☐ • Pzr spray

OR

- ☐ • Pzr PORV.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

- NC pump trip criteria based on NC subcooling does not apply after starting a controlled cooldown.
- After the low steamline pressure main steam isolation signal is blocked, Main Steam Isolation will occur if the high steam pressure rate setpoint is exceeded.

19. Initiate NC System cooldown as follows:

- ___ a. Determine required core exit temperature from the table below:

LOWEST RUPTURED S/G PRESSURE (PSIG)	CORE EXIT T/Cs (°F)
EQUAL TO OR GREATER THAN 1200	532 (512 ACC)
1100 - 1199	520 (501 ACC)
1000 - 1099	507 (489 ACC)
900 - 999	494 (476 ACC)
800 - 899	479 (461 ACC)
700 - 799	462 (445 ACC)
600 - 699	442 (426 ACC)
500 - 599	420 (405 ACC)
400 - 499	392 (379 ACC)
320 - 399	364 (352 ACC)

- b. Verify the condenser is available as follows:

- ___ b. **GO TO** Step 19.e RNO.

- ___ • "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT
- ___ • MSIV on intact S/G(s) - OPEN.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

19. (Continued)

___ c. **WHEN** "P-12 LO-LO TAVG" status light (1SI-18) is lit, **THEN** place the steam dump interlock bypass switches in "BYP INTLK."

___ d. Verify steam dumps - IN PRESSURE MODE.

d. Place steam dumps in pressure mode as follows:

- ___ 1) Place "STM DUMP CTRL" in manual.
- ___ 2) Manually adjust the "STM DUMP CTRL" to match "STM DUMP CTRL" demand and "% STM DUMP DEMAND".
- ___ 3) **WHEN** demand on the "STM DUMP CTRL" is equal to the "% STM DUMP DEMAND", **THEN** place the steam dumps in pressure mode.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

19. (Continued)

- ___ e. Dump steam to condenser from intact S/G(s) at maximum rate while attempting to avoid a Main Steam Isolation.

e. Perform the following:

- ___ 1) Dump steam from all intact S/G(s) with S/G PORV(s) at maximum rate while attempting to avoid a Main Steam Isolation.
- ___ 2) **IF** any intact S/G PORV cannot be opened from the control room, **THEN** dispatch operator(s) to dump steam at maximum rate from intact S/G(s) PORV. **REFER TO** Enclosure 3 (Local Operation of S/G PORVs).
- 3) **IF** operator(s) were dispatched to S/G PORV(s), **THEN**:
- ___ a) Obtain sound powered phone from storage box on rear wall of control room.
- ___ b) Connect sound powered phone to jack on 1MC-11.
- ___ c) Monitor sound powered phone for communication from the Doghouse(s).
- 4) **IF** no intact S/G is available for NC System cooldown, **THEN** contact station management to determine which of the following to perform:
- ___ • Use faulted S/G
- OR
- ___ • **GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).
- ___ 5) **GO TO** Step 19.f.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

19. (Continued)

___ f. Verify main steam isolation blocked status light (1SI-13) - LIT.

f. **IF** pressure in S/G(s) used for cooldown is approaching 800 PSIG, **THEN**:

1) Depressurize NC System to less than 1955 PSIG using one of the following:

___ • Pzr spray

OR

___ • Pzr PORV.

___ 2) Maintain NC pressure less than 1955 PSIG.

___ g. Verify core exit T/Cs - LESS THAN REQUIRED TEMPERATURE.

___ g. **RETURN TO** Step 19.e.

___ h. Stabilize core exit T/Cs - LESS THAN REQUIRED TEMPERATURE.

___ 20. **Verify NC System cooldown in Step 19 - COMPLETED.**

___ **The NC System cooldown in Step 19 should be completed before continuing in this procedure.**

21. **Verify ruptured S/G(s) pressure is under operator control as follows:**

___ a. All ruptured S/G(s) pressure - STABLE **OR** INCREASING.

a. Perform the following:

___ 1) Ensure ruptured S/G(s) isolated. **REFER TO** Steps 3 through 6.

___ 2) **IF** ruptured S/G(s) pressure is less than intact S/G(s) used for cooldown, **THEN GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

21. (Continued)

3) **IF** D/P between ruptured S/G(s) and intact S/G(s) used for cooldown is less than 250 PSIG, **THEN**:

- • Maintain total NC System cooldown less than 100°F in an hour.
- • Dump steam from intact S/Gs to maintain intact S/G pressures 250 PSIG below ruptured S/G(s) pressure.

— 4) **IF** intact S/G(s) used for cooldown can not be maintained at least 250 PSIG below the pressure of the ruptured S/G(s), **THEN GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

5) **IF AT ANY TIME** while in this procedure the following cannot be maintained, **THEN RETURN TO** Step 21:

- • NC System cooldown less than 100°F in an hour.
- • Intact S/G pressures 250 PSIG below ruptured S/G(s) pressure.

— 6) **GO TO** Step 22.

— b. **IF AT ANY TIME** ruptured S/G(s) pressure is decreasing while in this procedure, **THEN** perform Step 21.

— 22. Verify NC subcooling based on core exit T/Cs - GREATER THAN 20°F.

— **IF** NC subcooling cannot be promptly restored to greater than 20°F, **THEN GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

23. **Depressurize NC System using PZR
Spray as follows:**

- ___ a. Verify normal PZR spray flow - AVAILABLE.
- ___ b. Verify PZR level - LESS THAN 76% (73% ACC)
- ___ c. Depressurize NC System with maximum available spray.
- ___ d. Verify subcooling based on core exit T/Cs - GREATER THAN 0°F
- ___ e. Verify PZR level - LESS THAN 76% (73% ACC)
- ___ f. Verify NC pressure - LESS THAN RUPTURED S/G(s) PRESSURE
- ___ g. Verify PZR level - GREATER THAN 11% (20% ACC).

- ___ a. **GO TO** Step 24.
- ___ b. Observe Caution prior to Step 26 and **GO TO** Step 26.
- ___ d. **GO TO** Step 23.h.
- ___ e. **GO TO** Step 23.h.
- f. Perform the following:
 - ___ 1) **IF** spray valves are not effective in reducing NC pressure **OR** the ruptured S/G(s) N/R level is approaching 83%, **THEN GO TO** Step 24.
 - ___ 2) **RETURN TO** Step 23.d.
- g. Perform the following:
 - ___ 1) **IF** spray valves are not effective in reducing NC pressure **OR** the ruptured S/G(s) N/R level is approaching 83%, **THEN GO TO** Step 24.
 - ___ 2) **RETURN TO** Step 23.d.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

23. (Continued)

h. Close the following valve(s):

___ 1) Pzr spray valves.

___ 2) 1NV-37A (NV Supply To Pzr Aux Spray).

___ i. Observe Caution prior to Step 26 and **GO TO** Step 26.

24. **Depressurize NC System using Pzr PORV as follows:**

___ a. Verify at least one Pzr PORV - AVAILABLE.

___ 1) Stop NC pump(s) supplying failed Pzr spray valve(s).

2) Ensure one of the following valves - CLOSED:

___ • 1NV-312A (Chrg Line Cont Isol)

OR

___ • 1NV-314B (Chrg Line Cont Isol).

a. Establish NV aux spray as follows:

___ 1) Ensure at least one NI pump - ON.

___ 2) Ensure at least one NV pump - ON.

3) Ensure the following NV pump miniflow valves - OPEN:

___ • 1NV-203A (NV Pumps A&B Recirc Isol)

___ • 1NV-202B (NV Pmps A&B Recirc Isol).

4) Close the following valves:

___ • 1NI-9A (NV Pmp C/L Inj Isol)

___ • 1NI-10B (NV Pmp C/L Inj Isol).

___ 5) Manually throttle 1NV-294 (NV Pmps A&B Disch Flow Ctrl) for 32 GPM charging line flow.

___ 6) Manually close 1NV-309 (Seal Water Injection Flow).

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

24. (Continued)

- | | |
|---|---|
| <p>___ b. Verify Pzr level - LESS THAN 76% (73% ACC)</p> <p>___ c. Open one Pzr PORV.</p> <p>___ d. Verify subcooling based on core exit T/Cs - GREATER THAN 0°F</p> <p>___ e. Verify Pzr level - LESS THAN 76% (73% ACC)</p> <p>___ f. Verify NC pressure - LESS THAN RUPTURED S/G(s) PRESSURE</p> | <p>7) Open the following valves:</p> <p>___ • 1NV-312A (Chrg Line Cont Isol)</p> <p>___ • 1NV-314B (Chrg Line Cont Isol).</p> <p>___ 8) Place 1NV-309 in "AUTO".</p> <p>9) Ensure the following valves - CLOSED:</p> <p>___ • 1NC-27 (Pzr Spray Ctrl Frm Loop A)</p> <p>___ • 1NC-29 (Pzr Spray Ctrl Frm Loop B)</p> <p>___ • 1NV-39A (NV Supply To Loop D Isol)</p> <p>___ • 1NV-32B (NV Supply To Loop A Isol).</p> <p>___ 10) Maintain charging flow less than 180 GPM.</p> <p>___ 11) Throttle 1NV-37A (NV Supply To Pzr Aux Spray) and charging flow as required.</p> <p>___ 12) <u>RETURN TO</u> Step 23.b.</p> <p>___ b. Observe Caution prior to Step 26 and <u>GO TO</u> Step 26.</p> <p>___ d. <u>GO TO</u> Step 24.h.</p> <p>___ e. <u>GO TO</u> Step 24.h.</p> <p>___ f. <u>RETURN TO</u> Step 24.d.</p> |
|---|---|

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

24. (Continued)

___ g. Verify Pzr level - GREATER THAN 11% (20% ACC).

___ h. Close Pzr PORV.

___ i. Close Pzr spray valve(s).

___ g. **RETURN TO** Step 24.d.

___ h. Close Pzr PORV isolation valve.

___ i. Stop NC pump(s) supplying failed valve(s).

___ 25. Verify NC pressure - INCREASING.

Perform the following:

___ a. Close Pzr PORV isolation valve.

___ b. **IF** pressure continues to decrease, **THEN GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

CAUTION S/I must be terminated when termination criteria are satisfied to prevent overfilling the ruptured S/G(s).

26. Verify S/I termination criteria as follows:

___ a. NC subcooling based on core exit T/Cs - GREATER THAN 0°F.

b. Verify secondary heat sink as follows:

___ • N/R level in at least one intact S/G - GREATER THAN 11% (29% ACC)

OR

___ • Total feed flow available to S/G(s) - GREATER THAN 450 GPM.

___ c. NC pressure - STABLE OR INCREASING.

___ d. Pzr level - GREATER THAN 11% (20% ACC).

___ a. **GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

___ b. **GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

___ c. **GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

___ d. **RETURN TO** Step 17.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

27. Stop S/I pumps as follows:

___ a. Stop NI pumps.

a. Perform the following:

1) **IF** NI Pump 1A failed to trip, **THEN** perform the following:

a) Ensure the following valves - OPEN:

- ___ • 1NI-115A (NI Pump 1A Miniflow Isol)
- ___ • 1NI-147B (NI Pump Miniflow Hdr To FWST Isol).

b) **WHEN** miniflow path aligned, **THEN** ensure the following valves - CLOSED:

- ___ • 1NI-121A (NI Pump 1A To H-Legs B&C)
- ___ • 1NI-118A (NI Pump 1A C-Leg Inj Isol).

___ c) Dispatch operator to locally trip 1ETA#11 (1A NI Pump Motor) (AB-577, AA-49, Rm 496).

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

27. (Continued)

2) **IF** NI Pump 1B failed to trip, **THEN** perform the following:

a) Ensure the following valves - OPEN:

- ___ • 1NI-144A (NI Pump 1B Miniflow Isol)
- ___ • 1NI-147B (NI Pump Miniflow Hdr To FWST Isol).

b) **WHEN** miniflow path aligned, **THEN** ensure the following valves - CLOSED:

- ___ • 1NI-150B (NI Pump 1B C-Leg Inj Isol)
- ___ • 1NI-152B (NI Pump 1B To H-Legs A&D).

___ c) Dispatch operator to locally trip 1ETB#11 (1B NI Pump Motor) (AB-560, AA-49, Rm 372).

___ b. Ensure only one NV pump - ON.

___ 28. **Verify VI pressure - GREATER THAN 50 PSIG.**

In subsequent steps, control room control is lost for the following valves and local operation will be required:

- ___ • 1NV-294 (NV Pmps A&B Disch Flow Ctrl)
- ___ • 1NV-309 (Seal Water Injection Flow).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

29. Isolate NV S/I flowpath as follows:

a. Verify the following valves - OPEN:

- ___ • 1NV-252A (NV Pumps Suct From FWST)
- ___ • 1NV-253B (NV Pumps Suct From FWST).

a. **IF** NV pump suctions are aligned for Cold Leg Recirc, **THEN**:

- ___ 1) Close 1NV-309 (Seal Water Injection Flow).
- ___ 2) **IF** control of 1NV-309 is lost from the control room, **THEN**:
 - ___ a) Place the controller for 1NV-309 in the 100% demand position.
 - ___ b) Dispatch operator with a radio to close 1NV-308 (Seal Wtr Inj Flow Ctrl Isol) (AB-554, JJ-54, Rm 233) (Ladder needed).
 - ___ c) Throttle 1NV-308 to control seal injection flow as required in subsequent steps.
- ___ 3) Open the following valves:
 - ___ • 1NV-312A (Chrg Line Cont Isol)
 - ___ • 1NV-314B (Chrg Line Cont Isol).
- ___ 4) **IF** 1NV-312A **AND** 1NV-314B cannot be opened, **THEN** dispatch operator to open the affected valve(s):
 - ___ • 1NV-312A (Chrg Line Cont Isol) (AB-553, HH-JJ, 52, Rm 217) (Ladder needed)
 - ___ • 1NV-314B (Chrg Line Cont Isol) (AB-553, GG-HH, 52-53, Rm 217) (Ladder needed).
- ___ 5) Do not continue in this procedure until 1NV-312A and 1NV-314B are open.
- ___ 6) **IF** NC pressure is greater than 1950 PSIG, **THEN** throttle 1NV-309 or 1NV-308 to 50% open.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

29. (Continued)

- ___ 7) Open 1NV-294 (NV Pmps A&B Disch Flow Ctrl).
- 8) **IF** control of 1NV-294 is lost from the control room, **THEN**:
 - ___ a) Place the controller for 1NV-294 in the 100% demand position.
 - ___ b) Dispatch operator with a radio to throttle 1NV-295 (NV Pmps A & B Disch Ctrl Isol) (AB-551, JJ-55, Rm 231) to control charging flow as required in subsequent steps.
- 9) Close the following valves:
 - ___ • 1NI-9A (NV Pmp C/L Inj Isol)
 - ___ • 1NI-10B (NV Pmp C/L Inj Isol).
- 10) **IF** 1NI-9A **AND** 1NI-10B cannot be closed, **THEN** dispatch operator to close affected valve(s):
 - ___ • 1NI-9A (NV Pmp C/L Inj Isol) (AB-570, JJ, 51-52, Rm 318A)
 - ___ • 1NI-10B (NV Pmp C/L Inj Isol) (AB-570, JJ, 51-52, Rm 318A).
- 11) Throttle charging and seal injection to maintain the following:
 - ___ • Charging line flow between 60 GPM and 180 GPM
 - ___ • NC pump seal injection flow.
- ___ 12) **GO TO** Step 31.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

29. (Continued)

b. Verify the following valves - OPEN:

- ___ • 1NV-203A (NV Pumps A&B Recirc Isol)
- ___ • 1NV-202B (NV Pmps A&B Recirc Isol).

b. Perform the following:

- ___ 1) Open affected valve(s).
- ___ 2) **IF** 1NV-203A **AND** 1NV-202B are open, **THEN GO TO** Step 29.c.
- 3) Dispatch operator to open affected valve(s):
 - ___ • 1NV-203A (NV Pumps A&B Recirc Isol) (AB-554, HH-JJ, 54-55, Rm 231) (Ladder needed)
 - ___ • 1NV-202B (NV Pmps A&B Recirc Isol) (AB-554, HH-JJ, 54-55, Rm 231) (Ladder needed).
- ___ 4) Close 1NV-309 (Seal Water Injection Flow).
- 5) **IF** control of 1NV-309 is lost from the control room, **THEN**:
 - ___ a) Place the controller for 1NV-309 in the 100% demand position.
 - ___ b) Dispatch operator with a radio to close 1NV-308 (Seal Wtr Inj Flow Ctrl Isol) (AB-554, JJ-54, Rm 233) (Ladder needed).
 - ___ c) Throttle 1NV-308 to control seal injection flow as required in subsequent steps.
- 6) Open the following valves:
 - ___ • 1NV-312A (Chrg Line Cont Isol)
 - ___ • 1NV-314B (Chrg Line Cont Isol).

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

29. (Continued)

- 7) **IF** 1NV-312A **AND** 1NV-314B cannot be opened, **THEN** dispatch operator to open the affected valve(s):
- • 1NV-312A (Chrg Line Cont Isol) (AB-553, HH-JJ, 52, Rm 217) (Ladder needed)
 - • 1NV-314B (Chrg Line Cont Isol) (AB-553, GG-HH, 52-53, Rm 217) (Ladder needed).
- 8) Do not continue in this procedure until 1NV-312A and 1NV-314B are open.
- 9) **IF** NC pressure is greater than 1950 PSIG, **THEN** throttle 1NV-309 or 1NV-308 to 50% open.
- 10) Open 1NV-294 (NV Pmps A&B Disch Flow Ctrl).
- 11) **IF** control of 1NV-294 is lost from the control room, **THEN**:
- a) Place the controller for 1NV-294 in the 100% demand position.
 - b) Dispatch operator with a radio to throttle 1NV-295 (NV Pmps A & B Disch Ctrl Isol) (AB-551, JJ-55, Rm 231) to control charging flow as required in subsequent steps.
- 12) Close the following valves:
- • 1NI-9A (NV Pmp C/L Inj Isol)
 - • 1NI-10B (NV Pmp C/L Inj Isol).

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

29. (Continued)

13) **IF** 1NI-9A **AND** 1NI-10B cannot be closed, **THEN** dispatch operator to close affected valve(s):

- ___ • 1NI-9A (NV Pmp C/L Inj Isol)
(AB-570, JJ, 51-52, Rm 318A)
- ___ • 1NI-10B (NV Pmp C/L Inj Isol)
(AB-570, JJ, 51-52, Rm 318A).

14) Throttle charging and seal injection to maintain the following:

- ___ • Charging line flow between
60 GPM and 180 GPM
- ___ • NC pump seal injection flow.

___ 15) **WHEN** 1NV-203A **AND** 1NV-202B are opened, **THEN** charging flow may be reduced below 60 GPM.

___ 16) **GO TO** Step 31.

c. Close the following valves:

- ___ • 1NI-9A (NV Pmp C/L Inj Isol)
- ___ • 1NI-10B (NV Pmp C/L Inj Isol).

c. Dispatch operator to close affected valve(s):

- ___ • 1NI-9A (NV Pmp C/L Inj Isol)
(AB-570, JJ, 51-52, Rm 318A)
- ___ • 1NI-10B (NV Pmp C/L Inj Isol)
(AB-570, JJ, 51-52, Rm 318A).

30. **Establish charging as follows:**

- ___ a. Throttle 1NV-294 (NV Pmps A&B Disch Flow Ctrl) for 32 GPM charging line flow.

a. Perform the following:

- ___ 1) Place the controller for 1NV-294 in the 100% demand position.
- ___ 2) Dispatch operator with a radio to throttle 1NV-295 (NV Pmps A & B Disch Ctrl Isol) (AB-551, JJ-55, Rm 231) for 32 GPM charging line flow.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

30. (Continued)

- | | |
|---|--|
| <p>___ b. Close 1NV-309 (Seal Water Injection Flow).</p> <p>c. Ensure one of the following valves - OPEN:</p> <p>___ • 1NV-32B (NV Supply To Loop A Isol)</p> <p>OR</p> <p>___ • 1NV-39A (NV Supply To Loop D Isol).</p> <p>d. Open the following valves:</p> <p>___ • 1NV-312A (Chrg Line Cont Isol)</p> <p>___ • 1NV-314B (Chrg Line Cont Isol).</p> <p>___ e. Verify 1NV-309 - ABLE TO BE OPERATED FROM THE CONTROL ROOM.</p> <p>___ f. Place 1NV-309 in "AUTO".</p> <p>___ g. Maintain charging flow less than 180 GPM.</p> | <p>___ 3) Throttle 1NV-295 to control charging flow as required in subsequent steps.</p> <p>b. Perform the following:</p> <p>___ 1) Place the controller for 1NV-309 in the 100% demand position.</p> <p>___ 2) Dispatch operator with a radio to throttle 1NV-308 (Seal Wtr Inj Flow Ctrl Isol) (AB-554, JJ-54, Rm 233) (Ladder needed) to maintain 32 GPM total seal water flow in subsequent steps.</p> <p>d. Dispatch operator to open the affected valve(s):</p> <p>___ • 1NV-312A (Chrg Line Cont Isol) (AB-553, HH-JJ, 52, Rm 217) (Ladder needed)</p> <p>___ • 1NV-314B (Chrg Line Cont Isol) (AB-553, GG-HH, 52-53, Rm 217) (Ladder needed).</p> <p>___ e. <u>GO TO</u> Step 30.g.</p> |
|---|--|

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

___ 31. Control charging flow to maintain Pzr level greater than 11% (20% ACC).

32. Verify S/I flow not required as follows:

___ a. NC subcooling based on core exit T/Cs
- GREATER THAN 0°F.

___ b. Pzr level - GREATER THAN 11%
(20% ACC).

a. Perform the following:

___ 1) Manually start S/I pumps and align valves as necessary to restore NC subcooling.

___ 2) **GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

b. Perform the following:

___ 1) Control charging flow to restore Pzr level to greater than 11% (20% ACC).

2) **IF** Pzr level cannot be maintained at greater than 11% (20% ACC),
THEN:

___ a) Manually start S/I pumps and align valves as necessary to restore Pzr level.

___ b) **GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

33. Verify proper NS pump operation as follows:

- ___ a. At least one NS pump - ON.
- ___ b. Verify the following valves - OPEN:
 - ___ • 1FW-27A (ND Pump 1A Suct From FWST)
 - ___ • 1FW-55B (ND Pump 1B Suct From FWST).
- ___ c. Containment pressure - LESS THAN 2.4 PSIG.
- ___ d. Reset NS.
- ___ e. Stop NS pumps.
- ___ f. Close the following valves:
 - ___ • 1NS-29A (NS Spray Hdr 1A Cont Isol)
 - ___ • 1NS-32A (NS Spray Hdr 1A Cont Isol)
 - ___ • 1NS-15B (NS Spray Hdr 1B Cont Isol)
 - ___ • 1NS-12B (NS Spray Hdr 1B Cont Isol).

- ___ a. **GO TO** Step 34.
- ___ b. Perform the following:
 - ___ 1) **WHEN** containment pressure is less than 1 PSIG, **THEN** perform Steps 33.d through 33.f.
 - ___ 2) **GO TO** Step 34.
- ___ c. Perform the following:
 - ___ 1) **WHEN** containment pressure is less than 2.4 PSIG, **THEN** perform Step 33.
 - ___ 2) **GO TO** Step 34.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

34. **Ensure proper operation of VCT Makeup Control System as follows:**

- ___ a. Determine the required shutdown boron concentration. **REFER TO** ROD Book, Section 5.11.
- b. **WHEN** the required shutdown boron concentration is determined, **THEN**:
 - ___ 1) Adjust VCT makeup controls for a boron concentration that is greater than or equal to the required shutdown boron concentration.
 - ___ 2) Ensure "NC MAKEUP MODE SELECT" - IN "AUTO".
 - ___ 3) Place the "NC MAKEUP CONTROL" switch momentarily to the "START" position.

35. **Establish normal letdown as follows:**

- ___ a. Verify VI pressure - GREATER THAN 35 PSIG.
- ___ b. Verify Pzr level - GREATER THAN 25% (34% ACC).
- c. Ensure the following valves - CLOSED:
 - ___ • 1KC-56A (KC To ND Hx 1A Sup Isol)
 - ___ • 1KC-81B (KC To ND Hx 1B Sup Isol).

a. Perform the following:

- ___ 1) **WHEN** VI pressure is greater than 35 PSIG, **THEN** perform Steps 35.b through 35.n.
- ___ 2) **GO TO** Step 36.

b. Perform the following:

- ___ 1) **WHEN** Pzr level increases to greater than 25% (34% ACC), **THEN** perform Steps 35.c through 35.n.
- ___ 2) **GO TO** Step 36.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

35. (Continued)

d. Verify the following EMF trip 1 lights - DARK:

- ___ • 1EMF-53A (Containment Trn A)
- ___ • 1EMF-53B (Containment Trn B).

e. Verify the following valves for the operating KC train(s) - OPEN:

• Train A:

- ___ • 1KC-1A (Aux Bldg Non-Ess Ret Hdr Isol)
- ___ • 1KC-50A (Aux Bldg Non-Ess Hdr Isol).

• Train B:

- ___ • 1KC-2B (Aux Bldg Non-Ess Ret Hdr Isol)
- ___ • 1KC-53B (Aux Bldg Non-Ess Hdr Isol).

___ f. While performing the following steps, adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure at 350 PSIG.

___ g. Ensure 1NV-849 (Letdn Flow Var Orif Ctrl) valve demand position - 0%.

d. Perform the following:

- ___ 1) Notify station management to evaluate restoring normal letdown with high NC System activity.
- ___ 2) Establish excess letdown. **REFER TO** Enclosure 4 (Establishing Excess Letdown).
- ___ 3) **WHEN** station management approval to establish normal letdown is obtained, **THEN** perform Steps 35.e through 35.n.
- ___ 4) **GO TO** Step 36.

___ e. Manually open valve(s).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

35. (Continued)

h. Open the following valves:

- ___ • 1NV-1A (NC Letdn To Regen Hx Isol)
- ___ • 1NV-2A (NC Letdn To Regen Hx Isol)
- ___ • 1NV-15B (Letdn Cont Isol).

h. Perform the following:

1) Ensure the following valves -
CLOSED:

- ___ • 1NV-1A (NC Letdn To Regen Hx Isol)
- ___ • 1NV-2A (NC Letdn To Regen Hx Isol)
- ___ • 1NV-15B (Letdn Cont Isol).

___ 2) Establish excess letdown. **REFER TO** Enclosure 4 (Establishing Excess Letdown).

___ 3) **GO TO** Step 36.

- ___ i. While performing the following steps, manually adjust charging flow to maintain letdown subcooled.
- ___ j. Open 1NV-10A (Letdn Orif 1B Otlr Cont Isol).
- ___ k. Throttle 1NV-849 (Letdn Flow Var Orif Ctrl) until valve demand position is 10% open.
- ___ l. Monitor letdown flow and letdown pressure.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

35. (Continued)

___ m. Verify letdown flow and letdown pressure - INCREASES.

m. Perform the following:

1) **IF** 1NV-849 valve demand position is 100% open, **THEN**:

a) Close the following valves:

___ • 1NV-849 (Letdn Flow Var Orif Ctrl)

___ • 1NV-10A (Letdn Orif 1B Otlt Cont Isol)

___ • 1NV-1A (NC Letdn To Regen Hx Isol)

___ • 1NV-2A (NC Letdn To Regen Hx Isol).

___ b) Establish excess letdown.
REFER TO Enclosure 4
(Establishing Excess Letdown).

___ c) **GO TO** Step 36.

2) Throttle open 1NV-849 until one of the following conditions are met:

___ • Letdown flow and letdown pressure increases

OR

___ • Valve demand position increases by 10%

OR

___ • Valve demand position is 100% open.

___ 3) **RETURN TO** Step 35.I.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

35. (Continued)

n. **WHEN** 5 minutes has passed, **THEN**:

___ 1) Adjust 1NV-849 (Letdn Flow Var Orif Ctrl) to attempt to increase letdown flow to greater than 30 GPM.

2) Open one of the following valves:

___ • 1NV-13A (Letdn Orif 1A Otlt Cont Isol)

OR

___ • 1NV-11A (Letdn Orif 1C Otlt Cont Isol).

___ 3) Close 1NV-10A (Letdn Orif 1B Otlt Cont Isol).

___ 4) Close 1NV-849 (Letdn Flow Var Orif Ctrl).

___ 5) Ensure 1NV-148 (Letdn Press Control) - IN "AUTO".

2) Perform the following:

a) Close the following valves:

___ • 1NV-849 (Letdn Flow Var Orif Ctrl)

___ • 1NV-10A (Letdn Orif 1B Otlt Cont Isol)

___ • 1NV-1A (NC Letdn To Regen Hx Isol)

___ • 1NV-2A (NC Letdn To Regen Hx Isol).

___ b) Establish excess letdown.
REFER TO Enclosure 4
(Establishing Excess Letdown).

___ c) **GO TO** Step 36.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

36. **Align NV pump suction to the VCT as follows:**

- a. Verify at least one of the following NV pump suction valves - OPEN:

___ • 1NV-252A (NV Pumps Suct From FWST)

OR

___ • 1NV-253B (NV Pumps Suct From FWST).

- b. Open the following valves:

___ • 1NV-188A (VCT Otlt Isol)
___ • 1NV-189B (VCT Otlt Isol).

- c. Close the following valves:

___ • 1NV-252A (NV Pumps Suct From FWST)
___ • 1NV-253B (NV Pumps Suct From FWST).

- a. Perform the following:

___ 1) Notify station management for guidance to restore NV pump suction to the VCT.

___ 2) **GO TO** Step 37.

NOTE Enclosure 5 (NC Pressure And Makeup Control to Minimize Leakage) shall remain in effect until subsequent procedures provide alternative NC pressure and makeup control guidance.

- ___ 37. **Control NC pressure and charging flow to minimize primary to secondary leakage. REFER TO Enclosure 5 (NC Pressure And Makeup Control to Minimize Leakage).**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

38. Verify conditions to stop operating D/Gs as follows:

- ___ a. At least one D/G - ON.
- ___ b. Verify 1ETA is energized by offsite power as follows:
 - ___ • "D/G 1A BKR TO ETA" - OPEN
 - ___ • 1ETA - ENERGIZED.
- ___ c. Dispatch operator to stop 1A D/G and place in standby readiness. **REFER TO** OP/1/A/6350/002 (Diesel Generator Operation).
- ___ d. Verify 1ETB is energized by offsite power as follows:
 - ___ • "D/G 1B BKR TO ETB" - OPEN
 - ___ • 1ETB - ENERGIZED.
- ___ e. Dispatch operator to stop 1B D/G and place in standby readiness. **REFER TO** OP/1/A/6350/002 (Diesel Generator Operation).

- ___ a. **GO TO** Step 39.
- ___ b. Perform the following:
 - ___ 1) Attempt to restore offsite power to affected switchgear. **REFER TO** AP/1/A/5500/07 (Loss Of Normal Power).
 - ___ 2) **GO TO** Step 38.d.
- ___ d. Perform the following:
 - ___ 1) Attempt to restore offsite power to affected switchgear. **REFER TO** AP/1/A/5500/07 (Loss Of Normal Power).
 - ___ 2) **GO TO** Step 39.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

39. **Minimize secondary system contamination as follows:**

a. Dispatch operators to perform the following:

- ___ 1) Inspect aux building and turbine building for leakage.
- ___ 2) Isolate or minimize leakage where possible but do not isolate S/I or charging paths to the NC System.
- ___ 3) Isolate or identify leakage into the turbine building sump. **REFER TO** PT/1/B/4150/001G (Turbine Building Sump Isolation).

___ b. Ensure the CM polishing demineralizers - IN SERVICE.

___ c. Align auxiliary systems to minimize secondary side contamination. **REFER TO** Enclosure 6 (Auxiliary System Alignment).

___ 40. **Operate Pzr heaters as necessary to saturate Pzr water at ruptured S/G(s) pressure.**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

41. **Verify NC pump cooling is aligned as follows:**

a. Verify all of the following KC valves - OPEN:

- ___ • 1KC-230A (Rx Bldg Non-Ess Hdr Isol)
- ___ • 1KC-3A (Rx Bldg Non-Ess Ret Hdr Isol)
- ___ • 1KC-394A (NC Pump 1A Therm Bar Otlt)
- ___ • 1KC-425A (NC Pumps Ret Hdr Cont Isol)
- ___ • 1KC-345A (NC Pump 1C Therm Bar Otlt)
- ___ • 1KC-228B (Rx Bldg Non-Ess Hdr Isol)
- ___ • 1KC-18B (Rx Bldg Non-Ess Ret Hdr Isol)
- ___ • 1KC-364B (NC Pump 1B Therm Bar Otlt)
- ___ • 1KC-338B (NC Pumps Sup Hdr Cont Isol)
- ___ • 1KC-424B (NC Pumps Ret Hdr Cont Isol)
- ___ • 1KC-413B (NC Pump 1D Therm Bar Otlt).

- ___ b. NC pump seal injection flow - GREATER THAN 6 GPM TO EACH NC PUMP.

a. Perform one of the following based on seal injection status:

- ___ • **IF** NC pump seal injection flow is greater than 6 GPM to each NC pump, **THEN** manually open the affected valve(s).
- ___ • **IF** NC pump seal injection flow is less than 6 GPM to any NC pump, **THEN**:
 - ___ 1) Ensure 1KC-425A (NC Pumps Ret Hdr Cont Isol) - CLOSED.
 - ___ 2) Manually open the other affected valve(s).
 - ___ 3) **WHEN** all other valves are open, **THEN** dispatch operator to slowly establish KC flow to NC pump thermal barriers by opening 1KC-425A (NC Pumps Ret Hdr Cont Isol) (AB-588, GG-52, Rm 419) (Ladder needed).

- ___ b. **WHEN** seal leakoff temperatures are less than 235°F, **THEN** slowly throttle 1NV-309 (Seal Water Injection Flow) or 1NV-308 (Seal Wtr Inj Flow Ctrl Isol) to establish 32 GPM total seal water flow.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

42. Establish NC pump seal return flow as follows:

___ a. Verify NC pump seal injection flow - GREATER THAN 6 GPM TO EACH NC PUMP.

___ b. Verify 1AD-7, D/1 "SEALWATER HX KC HI/LO FLOW" - DARK.

c. Verify the following EMF trip 1 lights - DARK:

- ___ • 1EMF-53A (Containment Trn A)
- ___ • 1EMF-53B (Containment Trn B).

a. Perform the following:

___ 1) **WHEN** NC pump seal injection is restored, **THEN** perform Steps 42.b through 42.g.

___ 2) **GO TO** Step 43.

b. Perform the following:

___ 1) Notify station management to evaluate restoring NC pump seal return flow.

___ 2) **WHEN** notified by station management **OR** 1AD-7, D/1 dark, **THEN** perform Steps 42.c through 42.g.

___ 3) **GO TO** Step 43.

c. Perform the following:

___ 1) Notify station management to evaluate restoring NC pump seal return with high NC System activity.

___ 2) **WHEN** station management approval to establish NC pump seal return is obtained, **THEN** perform Steps 42.d through 42.g.

___ 3) **GO TO** Step 43.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

42. (Continued)

___ d. Verify NCDT pressure - LESS THAN VCT PRESSURE.

d. Perform the following:

___ 1) Consult with station management to establish normal NCDT pressure.
REFER TO OP/1/A/6500/014
(Operations Controlled Liquid Waste Systems)

___ 2) **WHEN** NCDT pressure is less than VCT pressure, **THEN** perform Steps 42.e through 42.g.

___ 3) **GO TO** Step 43.

e. Open the following valves:

___ • 1NV-89A (NC Pmps Seal Ret Cont Isol)

___ • 1NV-91B (NC Pmps Seal Ret Cont Isol).

f. **IF AT ANY TIME** NCDT pressure is greater than VCT, **THEN** perform the following:

___ 1) Monitor NC Pump #1 seal ΔP .

___ 2) Verify excess letdown - ISOLATED.

3) Close the following valves:

___ • 1NV-89A (NC Pmps Seal Ret Cont Isol)

___ • 1NV-91B (NC Pmps Seal Ret Cont Isol).

___ g. Verify excess letdown - ISOLATED.

___ 2) Align 1NV-125B (Excess Letdn Hx Otlt Ctrl) to "NCDT".

___ g. Align 1NV-125B (Excess Letdn Hx Otlt Ctrl) to "VCT".

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE Preference should be given to running NC Pump 1B and then NC Pump 1A to provide Pzr spray capability.

43. Verify NC pump status as follows:

___ a. At least one NC pump - ON.

a. Perform the following:

___ 1) Attempt to start one NC pump.
REFER TO Enclosure 7 (NC Pump Start).

___ 2) Verify Natural Circulation until an NC pump can be started. **REFER TO** Enclosure 8 (Natural Circulation Monitoring Parameters).

___ 3) **GO TO** Step 44.

___ b. Ensure only one NC pump - ON.

___ c. Ensure the normal Pzr spray valve associated with secured NC pump is in manual and closed.

44. Determine status of N/Is as follows:

___ a. Verify I/R channels - LESS THAN 10^{-10} AMPS.

a. Perform the following:

___ 1) **WHEN** I/R channels are less than 10^{-10} Amps, **THEN** perform Steps 44.b and 44.c.

___ 2) **GO TO** Step 45.

___ b. Verify S/R channels - ENERGIZED.

___ b. Place S/R select switches in "RESET".

___ c. Transfer one channel of the "NIS RECORDER" to S/R instrumentation.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

45. **Shutdown unnecessary plant equipment as follows:**

- a. Ensure the following breakers and MODs - OPEN:

- ☐ • "GEN DE-EXC BKR" (relay)
- ☐ • "EXC FIELD BKR"
- ☐ • MOD 1BG and 1BT
- ☐ • MOD 1AG and 1AT
- ☐ • Generator Breakers 1A and 1B.

- ☐ • Notify Power Delivery.

- ☐ b. Verify "MAN/AUTO REG" select switch "MAN" mode light - LIT.

- ☐ b. Transfer to manual mode.

- ☐ c. Dispatch operator to secure NF chillers and pumps.

- ☐ d. Stop excess condensate booster pumps.

- ☐ e. Stop excess hotwell pumps.

- ☐ f. Stop C heater drain pumps.

- ☐ g. Stop excess RC pumps and cooling tower fans. **REFER TO** OP/1/B/6400/001A (Condenser Circulating Water).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

46. **Consult with station management to determine appropriate post-SGTR cooldown method:**

- • **GO TO** EP/1/A/5000/ES-3.1 (Post - SGTR Cooldown Using Backfill)

OR

- • **GO TO** EP/1/A/5000/ES-3.2 (Post - SGTR Cooldown Using Blowdown)

OR

- • **GO TO** EP/1/A/5000/ES-3.3 (Post - SGTR Cooldown Using Steam Dump).

END

1. NC Pump Trip Criteria:

- **IF** the following conditions are satisfied, **THEN** trip all NC pumps while maintaining seal injection flow:
 - At least one NV or NI pump - ON
 - NC subcooling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F.

2. Position Criteria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol):

- **IF** NC pressure is less than 1500 PSIG **AND** NV S/I flowpath is aligned, **THEN** close 1NV-202B and 1NV-203A.
- **IF** NC pressure is greater than 2000 PSIG, **THEN** open 1NV-202B and 1NV-203A.

3. S/I Reinitiation Criteria:

NOTE The following criteria is not applicable until after Step 27 is completed.

- **IF** NC subcooling based on core exit T/Cs is less than 0°F **OR** Pzr level cannot be maintained greater than 11% (20% ACC), **THEN**:
 - a. Manually start S/I pumps and align valves as necessary to restore subcooling and Pzr level.
 - b. **GO TO** EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

4. Secondary Integrity Criteria:

- **IF** pressure in any unisolated S/G is decreasing in an uncontrolled manner **OR** any unisolated S/G has completely depressurized, **THEN GO TO** EP/1/A/5000/E-2 (Faulted Steam Generator Isolation) unless needed for NC System cooldown.

5. Cold Leg Recirc Switchover Criterion:

- **IF** FWST level decreases to 37% (1AD-9, D/8 "FWST 2/4 LO LEVEL" lit), **THEN GO TO** EP/1/A/5000/ES-1.3 (Transfer To Cold Leg Recirculation).

6. CA Suction Source Switchover Criteria:

- **IF** either of the following annunciators are lit, **THEN REFER TO** AP/1/A/5500/06 (Loss Of S/G Feedwater).

- 1AD-5, H/4 "CACST LO LEVEL"

OR

- 1AD-8, B/1 "UST LO LEVEL"

7. Multiple Tube Rupture Criteria:

- **IF** level in any intact S/G increases in an uncontrolled manner **OR** any intact S/G indicates abnormal radiation, **THEN:**
 - a. Stop any operator controlled cooldown and depressurization in progress.
 - b. **RETURN TO** EP/1/A/5000/E-3 (Steam Generator Tube Rupture), Step 1.

- ___ 1. **Close 1SA-22 (Main Stm To CSAE) (TB-594, 1M-32).**
- ___ 2. **Close the following valves:**
 - ___ • 1SM-166 (Main Turb S/V #1 Continuous Drn Orif 0-34 Inlet) (TB-594, 1H-32)
 - ___ • 1SM-168 (Main Turb S/V #2 Continuous Drn Orif 0-35 Inlet) (TB-594, 1H-32)
 - ___ • 1SM-170 (Main Turb S/V #3 Continuous Drn Orif 0-36 Inlet) (TB-594, 1H-32)
 - ___ • 1SM-172 (Main Turb S/V #4 Continuous Drn Orif 0-37 Inlet) (TB-594, 1H-32)
 - ___ • 1SM-154 (Main Turb S/V #1 Auto Drn Vlv Inlet Isol) (TB-594, 1H-32)
 - ___ • 1SM-157 (Main Turb S/V #2 Auto Drn Vlv Inlet Isol) (TB-594, 1H-32)
 - ___ • 1SM-160 (Main Turb S/V #3 Auto Drn Vlv Inlet Isol) (TB-594, 1H-32)
 - ___ • 1SM-163 (Main Turb S/V #4 Auto Drn Vlv Inlet Isol) (TB-594, 1H-32)
 - ___ • 1SM-130 (SM Equalization Hdr Trap T-05 Inlet Isol) (TB-594, 1H-32)
 - ___ • 1SM-137 (SM Equalization Hdr To Trap T-06 Inlet Isol) (TB-594, 1H-32)
 - ___ • 1SB-32 (Main Stm Byp To Cond Hdr Stm Trap Inlet) (TB-594, 1G-29).
- ___ 3. **Close 1SP-34 (SM To CFPT 1A & 1B) (TB-603, 1G-32).**
- ___ 4. **Notify control room personnel of status.**

NOTE Emergency flashlights and Merlin-Gerins are available in the control room.

1. Obtain the following:

- ☐ • Flashlight
- ☐ • Merlin-Gerin.

NOTE The following are the preferred routes to the doghouses:

- Outside doghouse (1A and 1D S/G) - Through southeast door of Unit 1 turbine building
- Inside doghouse (1B and 1C S/G) - Through southeast control room exit to the auxiliary building.

2. Establish communications with the control room as follows:

a. Obtain sound powered phones from storage on 594' elevation.

- ☐ • Outside doghouse (DH-594, EE-44, Rm 591)
- ☐ • Inside doghouse (DH-594, EE-52, Rm 572).

b. Establish communications from the nearest phone jack at the selected S/G PORV(s):

- ☐ • Outside doghouse (DH-635, FF-43, Rm 591)
- ☐ • Inside doghouse (DH-625, FF-53, Rm 572).

CAUTION Severe damage to the actuator assembly can result if operated with the clevis engaged to the actuator shaft and the equalizing valve closed.

NOTE 1SV-1 and 1SV-19 turn counter clockwise to open. 1SV-7 and 1SV-13 turn clockwise to open.

3. **Place S/G PORV(s) in local operation as follows:**

a. Select desired PORV(s):

- ☐ • 1SV-19 (S/G 1A PORV Manual Ctrl) (DH-635, FF-GG, 43-44, Rm 591)
- ☐ • 1SV-13 (S/G 1B PORV Manual Ctrl) (DH-635, FF, 53-54, Rm 572)
- ☐ • 1SV-7 (S/G 1C PORV Manual Ctrl) (DH-635, FF, 52-53, Rm 572)
- ☐ • 1SV-1 (S/G 1D PORV Manual Ctrl) (DH-635, FF-GG, 44-45, Rm 591).

☐ b. Unscrew clevis from manual override shaft.

☐ c. Turn handwheel in the "close" direction to expose actuator shaft below manual override shaft.

☐ d. Open equalizing valve on side of PORV actuator.

☐ e. Slide clevis onto actuator shaft.

☐ f. Turn handwheel to position valve as desired.

4. **WHEN directed by the control room, THEN restore S/G PORV(s) to control room control as follows:**

☐ a. Notify the control room to transmit a closed actuating signal from MCB to the valve positioner.

☐ b. Turn handwheel until the PORV is in the "closed" position and pressure is relieved from the clevis and actuator shaft.

☐ c. Remove clevis from actuator shaft.

☐ d. Turn handwheel until manual override shaft is fully extended.

☐ e. Screw clevis onto manual override shaft.

☐ f. Close equalizing valve on side of PORV actuator.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. **Align KC to excess letdown heat exchanger by opening the following valves:**

- ___ • 1KC-230A (Rx Bldg Non-Ess Hdr Isol)
- ___ • 1KC-3A (Rx Bldg Non-Ess Ret Hdr Isol)
- ___ • 1KC-228B (Rx Bldg Non-Ess Hdr Isol)
- ___ • 1KC-18B (Rx Bldg Non-Ess Ret Hdr Isol)
- ___ • 1KC-305B (Exs Letdn Hx Supply Cont Isol)
- ___ • 1KC-315B (Exs Letdn Hx Ret Cont Isol).

2. **Establish NC pump seal return flow as follows:**

a. Verify the following EMF trip 1 lights - DARK:

- ___ • 1EMF-53A (Containment Trn A)
- ___ • 1EMF-53B (Containment Trn B).

___ b. Verify NC pump seal injection flow - GREATER THAN 6 GPM TO EACH NC PUMP.

a. Perform the following:

- ___ 1) Notify station management to evaluate restoring NC pump seal return and excess letdown outside containment with high NC System activity.
- ___ 2) **WHEN** station management approval is obtained, **THEN RETURN TO** Step 2.b.
- ___ 3) **GO TO** Step 9.

b. Perform the following:

- ___ 1) **WHEN** NC pump seal injection is restored, **THEN RETURN TO** Step 2.b.
- ___ 2) **GO TO** Step 9.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

2. (Continued)

___ c. Verify 1AD-7, D/1 "SEALWATER HX
KC HI/LO FLOW" - DARK.

___ d. Verify NCDT pressure - LESS THAN
VCT PRESSURE.

e. Open the following valves:

___ • 1NV-89A (NC Pmps Seal Ret Cont
Isol)

___ • 1NV-91B (NC Pmps Seal Ret Cont
Isol).

f. **IF AT ANY TIME** NCDT pressure is
greater than VCT pressure, **THEN**
perform the following:

___ 1) Monitor NC Pump #1 seal ΔP .

___ 2) Verify excess letdown - ISOLATED.

3) Close the following valves:

___ • 1NV-89A (NC Pmps Seal Ret
Cont Isol)

___ • 1NV-91B (NC Pmps Seal Ret
Cont Isol).

___ 4) **GO TO** Step 9.

c. Perform the following:

___ 1) Notify station management to
evaluate restoring NC pump seal
return flow.

___ 2) **WHEN** notified by station
management **OR** 1AD-7, D/1 dark,
THEN RETURN TO Step 2.d.

___ 3) **GO TO** Step 9.

d. Perform the following:

___ 1) **WHEN** NCDT pressure is less than
VCT pressure, **THEN RETURN TO**
Step 2.d.

___ 2) **GO TO** Step 9.

___ 2) Ensure the manual loader for
1NV-124B (Excess Letdn Press
Ctrl) is adjusted to 0%.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

3. **Notify Primary Chemistry of the following:**

- ___ • Excess Letdown will be placed in service.
- ___ • VCT pressure will be reduced to 25 PSIG.

___ 4. **Dispatch operator to adjust the VCT hydrogen pressure to 25 PSIG. Refer to OP/1/A/6200/001 (Chemical and Volume Control System).**

___ 5. **Ensure the manual loader for 1NV-124B (Excess Letdn Press Ctrl) is adjusted to 0%.**

6. **Verify the following conditions:**

- ___ • VCT pressure - BETWEEN 25 PSIG AND 30 PSIG.
- ___ • The following valves - OPEN:
 - ___ • 1NV-188A (VCT Otlt Isol)
 - ___ • 1NV-189B (VCT Otlt Isol).

___ 7. **Place 1NV-125B (Excess Letdn Hx Otlt Ctrl) in the "VCT" position.**

___ 8. **GO TO Step 14.**

9. **Verify the following EMF trip 1 lights - DARK:**

- ___ • 1EMF-53A (Containment Trn A)
- ___ • 1EMF-53B (Containment Trn B).

Perform the following:

- ___ a. Place 1NV-125B (Excess Letdn Hx Otlt Ctrl) in the "NCDT" position.
- ___ b. **WHEN conditions met, THEN RETURN TO Step 5.**
- ___ c. **GO TO Step 9.**

___ **GO TO Step 13.**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

10. **Align KC to the NCDT heat exchanger by opening the following valves:**

- ☐ • 1KC-320A (NCDT Hx Cool Supply Cont Isol)
- ☐ • 1KC-333A (NCDT Hx Cool Ret Cont Isol)
- ☐ • 1KC-332B (NCDT Hx Cool Ret Cont Isol).

☐ 11. **Ensure at least one NCDT pump - ON.**

12. **Open the following valves:**

- ☐ • 1WL-805A (NCDT Pump Disch Cont Isol)
- ☐ • 1WL-807B (NCDT Pumps Disch Cont Isol).

☐ 13. **Place 1NV-125B (Excess Letdn HX Otlt Ctrl) in the "NCDT" position.**

14. **Open the following valves:**

- ☐ • 1NV-122B (Loop C To Exs Letdn Hx Isol)
- ☐ • 1NV-123B (Loop C To Exs Letdn Hx Isol).

☐ 15. **Select "OPEN" on 1NV-124B.**

☐ 16. **Slowly adjust the manual loader for 1NV-124B to 6% open.**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

17. **Manually throttle 1NV-124B until the required excess letdown flow is achieved and within the following parameters:**

- • Excess letdown Hx outlet temperature -
LESS THAN 170°F
- • Excess letdown Hx outlet pressure -
LESS THAN OR EQUAL TO 45 PSIG.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. **Depressurize NC System to prevent ruptured S/G(s) PORV from lifting as follows:**

- ___ a. Verify NC pressure - LESS THAN 1125 PSIG.

a. Perform the following:

- ___ 1) **IF** normal Pzr spray flow is available, **THEN** depressurize NC System to less than 1125 PSIG using normal Pzr spray.
- 2) **IF** normal Pzr spray is not available, **THEN** perform the following:
- a) **IF** letdown is in service, **THEN** establish NV aux spray as follows:
- (1) Ensure the following valves - CLOSED:
- ___ • 1NC-27 (Pzr Spray Ctrl Frm Loop A)
- ___ • 1NC-29 (Pzr Spray Ctrl Frm Loop B)
- ___ • 1NV-39A (NV Supply To Loop D Isol)
- ___ • 1NV-32B (NV Supply To Loop A Isol).
- ___ (2) Maintain charging flow less than 180 GPM.
- ___ (3) Throttle 1NV-37A (NV Supply To Pzr Aux Spray) and charging flow to depressurize NC System to less than 1125 PSIG.
- ___ b) **IF** letdown is not in service **OR** NV aux spray is not available, **THEN** use one Pzr PORV to depressurize NC System to less than 1125 PSIG.

- ___ b. Maintain NC System pressure less than 1125 PSIG.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

2. Control NC pressure and charging flow to minimize primary to secondary leakage as follows:

- a. Perform appropriate action(s) from the table below to equalize NC and ruptured S/G pressure:

PZR LEVEL	HIGHEST RUPTURED S/G N/R LEVEL		
	INCREASING	DECREASING	OFFSCALE HIGH
LESS THAN 25% (34% ACC)	<ul style="list-style-type: none"> • Increase charging flow • Depressurize NC System using Step 2.b 	Increase charging flow	<ul style="list-style-type: none"> • Increase charging flow • Maintain NC and ruptured S/G(s) pressures equal
BETWEEN 25% (34% ACC) AND 50%	Depressurize NC System using Step 2.b	Turn on Pzr heaters	Maintain NC and ruptured S/G(s) pressures equal
BETWEEN 50% AND 76% (73% ACC)	<ul style="list-style-type: none"> • Depressurize NC System using Step 2.b • Decrease charging flow 	Turn on Pzr heaters	Maintain NC and ruptured S/G(s) pressures equal
GREATER THAN 76%(73% ACC)	Decrease charging flow	Turn on Pzr heaters	Maintain NC and ruptured S/G(s) pressures equal

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

2. (Continued)

b. Depressurize NC System as required by table above as follows:

___ 1) Verify normal Pzr spray flow - AVAILABLE.

1) Perform the following:

a) **IF** letdown is in service, **THEN** establish NV aux spray as follows:

(1) Ensure the following valves - CLOSED:

- ___ • 1NC-27 (Pzr Spray Ctrl Frm Loop A)
- ___ • 1NC-29 (Pzr Spray Ctrl Frm Loop B)
- ___ • 1NV-39A (NV Supply To Loop D Isol)
- ___ • 1NV-32B (NV Supply To Loop A Isol).

___ (2) Maintain charging flow less than 180 GPM.

___ (3) Throttle 1NV-37A (NV Supply To Pzr Aux Spray) and charging flow as required to depressurize NC System.

___ b) **IF** letdown is not in service **OR** NV aux spray is not available, **THEN** use one Pzr PORV to depressurize NC System.

___ 2) Use normal Pzr spray to depressurize NC System.

1. Transfer turbine steam seal supply to AS as follows:

- ☐ a. Open 1TL-8 (Aux Stm To Stm Seal Reg).
- ☐ b. Close 1TL-2 (Main Stm To Stm Seal Reg).

___ 2. Align AEB feedwater supply and recirc to Unit 2. REFER TO OP/1/B/6250/007B (Auxiliary Electric Boilers).

3. IF Unit 2 is available to supply Unit 1 AS, THEN dispatch operator to align Unit 2 AS as follows:

- ☐ a. Ensure 1AS-33 (Unit 1 AS Hdr Isol) (TB-590, 1M-26) - OPEN.
- ☐ b. Open 1AS-59 (Unit 2 AS Hdr Isol) (TB-584, 2N-26).

___ 4. IF Unit 2 is not available to supply Unit 1 AS, THEN align AEB to Unit 1 AS. REFER TO OP/1/B/6250/007B (Auxiliary Electric Boilers).

5. Dispatch operator to align NB and WL evaporator condensate to Unit 2 CST as follows:

- ☐ a. Open 1CS-118 (NB & WL Waste Evap Cond Ret To Unit 2 CST) (AB-553, JJ-53, Rm 217) (Ladder needed).
- ☐ b. Close 1CS-117 (NB & WL Waste Evap Cond Ret To Unit 1 CST) (AB-553, JJ-53, Rm 217).

6. Dispatch operator to align CSAEs to the AS header as follows:

- ☐ a. Ensure 1SA-27 (Aux Stm To CSAE) (TB-594, 1M-27) - OPEN.
- ☐ b. Close 1SA-22 (Main Stm To CSAE) (TB-594, 1M-32).

7. Align AS to CFPTs as follows:

- ☐ a. Ensure 1AS-12 (AS To CFPT Isol) (TB-605, 1M-27) - OPEN.
- ☐ b. Dispatch operator to ensure 1SP-3 (SC To CFPT 1A & 1B) (TB-640, 1G-24) - CLOSED.

8. **IF Unit 2 condensate is available to supply CA storage tank AND station management approves, THEN dispatch operator to perform the following:**
 - ___ a. Ensure 2CM-383 (CA CST Inlet) (TB-614, 2K-22) - OPEN.
 - ___ b. Close 1CM-383 (CA CST Inlet) (TB-614, 1K-22).
 - ___ c. Ensure 1CS-74 (CA CST Drn To Unit 2 CST) (SB-619, T-25) - OPEN.
 - ___ d. Close 1CS-73 (CA CST Drn To Unit 1 CST) (SB-619, T-25).
- ___ 9. **IF Unit 1 CST overflow is imminent OR Unit 2 CST has low level, THEN coordinate with RP to pump to Unit 2. REFER TO OP/1/A/6250/001 (Condensate and Feedwater System).**
- ___ 10. **Coordinate with RP and determine if the WP System should be aligned to receive contaminated drains. REFER TO PT/1/B/4150/001G (Turbine Building Sump Isolation).**
- ___ 11. **IF WP sump is contaminated, THEN transfer sump to Monitor Tank Bldg. REFER TO OP/1/B/6500/013 (Turbine Building Sump System).**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. Verify NC pump seal cooling has been maintained from one of the following:

___ • Seal injection flow

OR

___ • KC flow to thermal barrier.

- ___ 2. Verify Pzr level - LESS THAN OR EQUAL TO 92%.

- ___ 3. Place normal Pzr spray valves in manual and closed.

- ___ 4. Ensure Phase B Containment Isolation - RESET.

Perform the following:

- ___ a. **IF** NC pump seal cooling has not been maintained, **THEN** notify station management to perform a status evaluation prior to starting an NC pump.
- ___ b. **WHEN** the status evaluation has been completed, **THEN GO TO** Step 2.
- ___ c. Do not continue in this enclosure.

- ___ **IF** the NC System is intact, **THEN** ensure a steam bubble exists in the Pzr prior to starting an NC pump.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

5. **Verify all of the following KC valves - OPEN:**

- ___ • 1KC-230A (Rx Bldg Non-Ess Hdr Isol)
- ___ • 1KC-3A (Rx Bldg Non-Ess Ret Hdr Isol)
- ___ • 1KC-394A (NC Pump 1A Therm Bar Otlit)
- ___ • 1KC-425A (NC Pumps Ret Hdr Cont Isol)
- ___ • 1KC-345A (NC Pump 1C Therm Bar Otlit)
- ___ • 1KC-228B (Rx Bldg Non-Ess Hdr Isol)
- ___ • 1KC-18B (Rx Bldg Non-Ess Ret Hdr Isol)
- ___ • 1KC-364B (NC Pump 1B Therm Bar Otlit)
- ___ • 1KC-338B (NC Pumps Sup Hdr Cont Isol)
- ___ • 1KC-424B (NC Pumps Ret Hdr Cont Isol)
- ___ • 1KC-413B (NC Pump 1D Therm Bar Otlit).

6. **Establish NC pump motor cooling as follows:**

a. Ensure the following valves - OPEN:

- ___ • 1RN-484A (Lower Cont Vent Unit Ret)
- ___ • 1RN-487B (Lower Cont Vent Unit Ret)
- ___ • 1RN-437B (Lower Cont Vent Unit Sup).

Perform the following:

- ___ a. Manually open affected valve(s).
- ___ b. **IF** KC cooling cannot be established from one operating KC train to the NC pumps, **THEN** return this enclosure to the Control Room SRO.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

6. (Continued)

- ___ b. Verify "YV OPERABLE" light (rear of 1MC-7) - LIT.

- b. Perform the following:

- ___ 1) Dispatch operator to restore YV System to normal. **REFER TO** OP/1/A/6450/020 (Containment Chill Water System).
- 2) **IF** YV System cannot be restored to normal, **THEN**:
- ___ a) Select "RN" on "YV/RN COOL WATER MODE".
- b) Ensure the following valves - OPEN:
- ___ • 1RN-49A (Non-Ess Supply Hdr Isol)
- ___ • 1RN-50B (Non-Ess Supply Hdr Isol)
- ___ • 1RN-51A (Non-Ess Ret Hdr Isol)
- ___ • 1RN-52B (Non-Ess Ret Hdr Isol).
- c) Ensure at least one of the following valves - OPEN:
- ___ • 1RN-48B (RN Supply X-Over Isol)
- ___ • 1RN-47A (RN Supply X-Over Isol).
- ___ 3) **IF** NC pump motor cooling cannot be established, **THEN** return this enclosure to the Control Room SRO.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

7. **Verify the following conditions are satisfied for the NC pump to be started:**

— **Return this enclosure to the Control Room SRO.**

- • #1 seal ΔP - GREATER THAN OR EQUAL TO 200 PSID
- KC flow to NC pump thermal barrier between 35 GPM and 60 GPM by one of the following methods:
 - • NC pump thermal barrier KC outlet Hi/Lo flow alarm (1AD-6) - DARK
 - OR
 - • OAC NC pump graphic
 - OR
 - • Dispatch operator to locally verify adequate KC cooling to NC pump thermal barrier (AB-543, FF-54, Rm 200).
- KC flow to NC pump motor upper bearing between 153 GPM and 200 GPM by one of the following methods:
 - • NC pump motor upper bearing KC outlet Hi/Lo flow alarm (1AD-6) - DARK
 - OR
 - • OAC NC pump graphic
 - OR
 - • Dispatch operator to locally verify adequate KC cooling to NC pump motor upper bearing (AB-543, FF-54, Rm 200).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

7. (Continued)

- KC flow to NC pump motor lower bearing between 4 GPM and 9.5 GPM by one of the following methods:
 - • NC pump motor lower bearing KC outlet Hi/Lo flow alarm (1AD-6) - DARK
 - OR
 - • OAC NC pump graphic
 - OR
 - • Dispatch operator to locally verify adequate KC cooling to NC pump motor lower bearing (AB-543, FF-54, Rm 200).
- • NC pump upper/lower oil reservoir Lo level alarm (1AD-6) - DARK
- • NC pump seal injection flow - GREATER THAN 6 GPM
- • NC pump seal leakoff flow - WITHIN LIMITS OF UNIT 1 REVISED DATA BOOK FIGURE 26.
- • 1AD-11, K/6 "230 KV SWITCHYARD VOLTAGE LO" - DARK.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

- ___ 8. **Verify "REACTOR VESSEL UR LEVEL" - GREATER THAN OR EQUAL TO 100%.**

IF at least one NCP is available to start, THEN perform the following:

- ___ a. Increase Pzr level to greater than 90%.
- ___ b. Increase NC subcooling based on core exit T/Cs to greater than 36°F.
- ___ c. Operate Pzr heaters as necessary to maintain Pzr saturated.
- ___ d. **WHEN the following conditions met, THEN GO TO Step 9.**
 - ___ • Pzr level - GREATER THAN 90%.
 - ___ • NC subcooling based on core exit T/Cs - GREATER THAN 36°F.
 - ___ • Pzr - SATURATED
- ___ e. Do not continue in this enclosure.

- ___ 9. **Start one NC pump oil lift pump on the NC pump to be started.**

- ___ 10. **WHEN 2 minutes has elapsed, THEN start the NC pump.**

- ___ 11. **WHEN 3 minutes has elapsed after NC pump reaches full speed, THEN ensure the NC pump oil lift pump stops.**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

12. **Verify the following conditions satisfied for the NC pump that was started:**

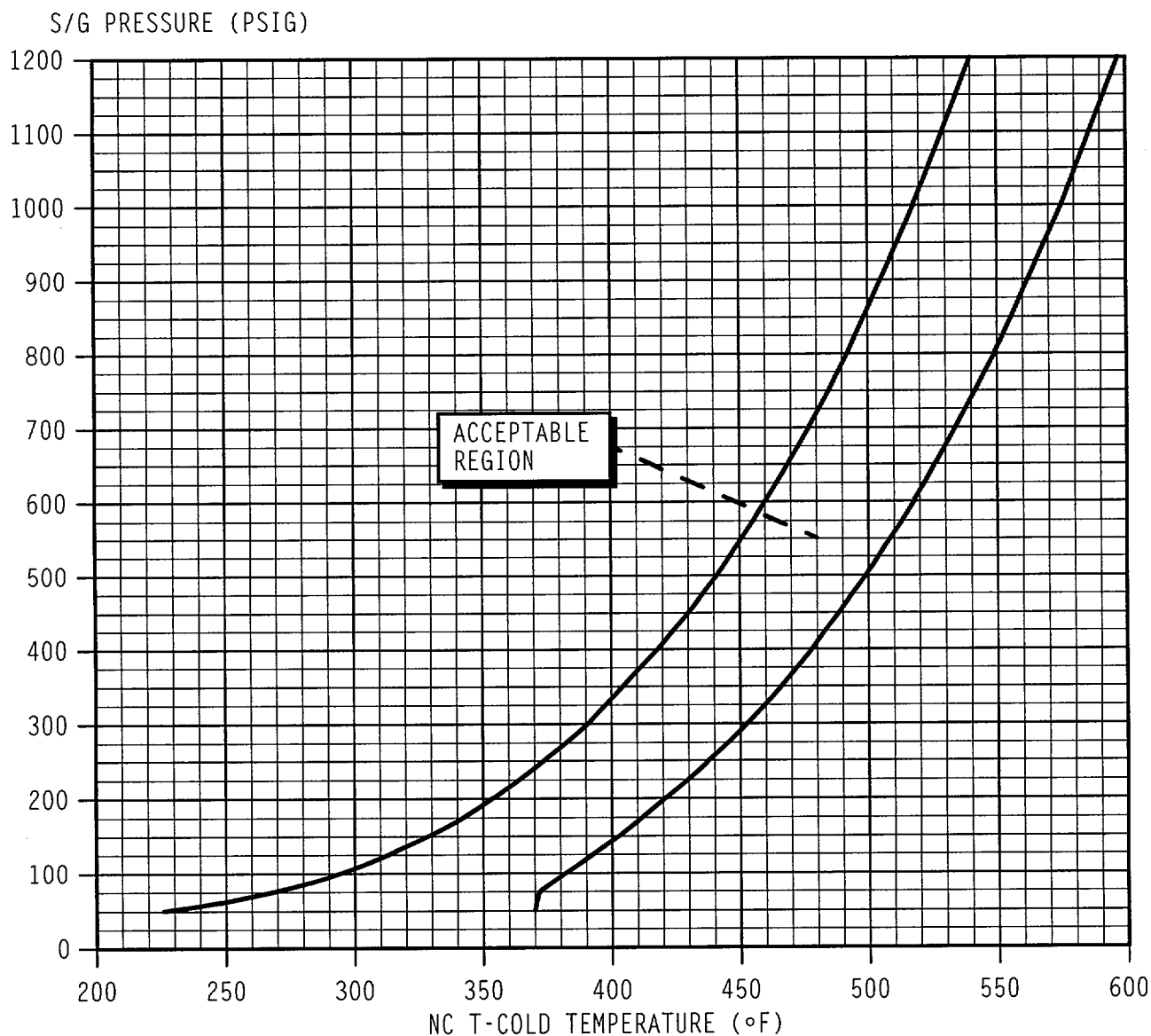
- • #1 seal ΔP - GREATER THAN OR EQUAL TO 200 PSID
- • #1 seal outlet temperature - LESS THAN 235°F
- • NC pump lower bearing temperature - LESS THAN 225°F
- • NC pump seal injection flow - GREATER THAN 6 GPM
- • NC pump seal leakoff flow - WITHIN LIMITS OF UNIT 1 REVISED DATA BOOK FIGURE 26.
- • NC pump shaft vibration - LESS THAN 20 MILS
- • NC pump motor frame vibration - LESS THAN 5 MILS
- • **IF** OAC is available, **THEN** verify the following:
 - • Stator winding temperature - LESS THAN 311°F
 - • Motor bearing temperature - LESS THAN 195°F.

Perform the following:

- a. Stop the affected NC pump.
- b. Return this enclosure to the Control Room SRO.

1. The following conditions support or indicate natural circulation flow:

- o NC subcooling - GREATER THAN 0°F
- o S/G pressures - STABLE OR DECREASING
- o NC T-Hots - STABLE OR DECREASING
- o Core exit T/Cs - STABLE OR DECREASING
- o NC T-Colds - AT SATURATION TEMPERATURE FOR S/G PRESSURE
(WITHIN THE LIMITS OF THE GRAPH BELOW).



2. IF Natural Circulation flow is not established, THEN increase dumping steam to establish Natural Circulation flow.