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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*

M. S. Tuckman

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).

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

2) Verify the following blowdown isolation valves - CLOSED:

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

\_\_\_ a) Manually close valve.

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

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

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 N<sub>2</sub> 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).

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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) <b><u>RETURN TO</u></b> Step 23.b.</p> <p>___ b. Observe Caution prior to Step 26 and <b><u>GO TO</u></b> Step 26.</p> <p>___ d. <b><u>GO TO</u></b> Step 24.h.</p> <p>___ e. <b><u>GO TO</u></b> Step 24.h.</p> <p>___ f. <b><u>RETURN TO</u></b> 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).

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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. <b><u>GO TO</u></b> 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  $\Delta P$ .

\_\_\_ 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  $\Delta P$ .

\_\_\_ 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"> <li>• Increase charging flow</li> <li>• Depressurize NC System using Step 2.b</li> </ul>	Increase charging flow	<ul style="list-style-type: none"> <li>• Increase charging flow</li> <li>• Maintain NC and ruptured S/G(s) pressures equal</li> </ul>
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"> <li>• Depressurize NC System using Step 2.b</li> <li>• Decrease charging flow</li> </ul>	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  $\Delta P$  - 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:**

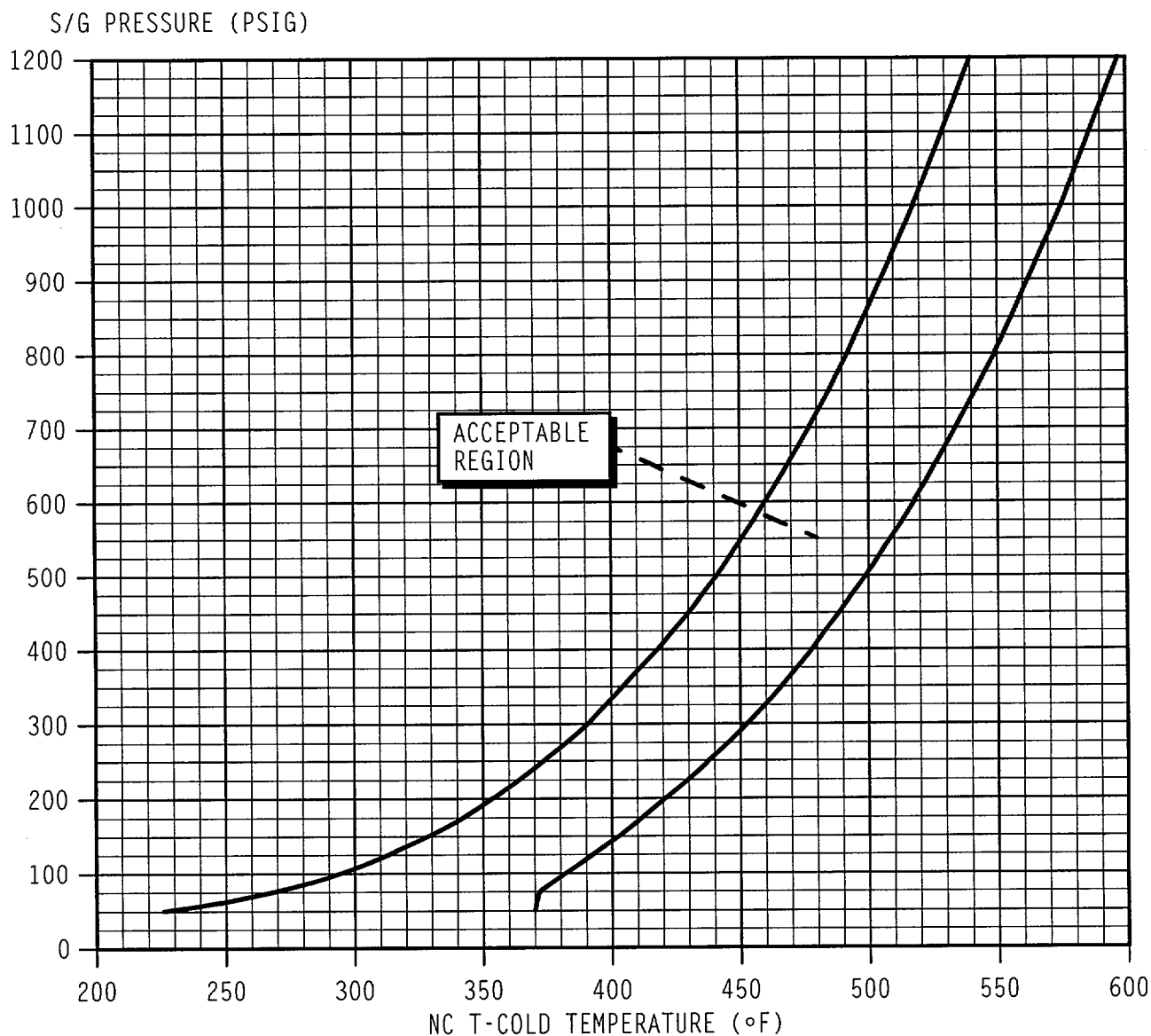
- • #1 seal  $\Delta P$  - GREATER THAN OR EQUAL TO 200 PSID
- • #1 seal outlet temperature - LESS THAN 235°F
- • NC pump lower bearing temperature - LESS THAN 225°F
- • NC pump seal injection flow - GREATER THAN 6 GPM
- • NC pump seal leakoff flow - WITHIN LIMITS OF UNIT 1 REVISED DATA BOOK FIGURE 26.
- • 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.