Final Submittal

MCGUIRE JUNE 2003 EXAM
50-369/2003-301 AND
50-370/2003-301

JUNE 16 - 30, 2003

1. Final RO/SRO Written Examination References

SRO

REFERENCE

UNIT 1

OP/1/A/6100/22
Enclosure 4.3
Curve 1.6 b

Heatup and Cooldown Limits for LTOP

Valid Thru Cycle 16 and with a Maximum of One NI or One NV Pump Capable of Injection

Heatup and cooldown instantaneous rate (P1246 - P1249) and rate of change over the last hour of operation should be reviewed for compliance **prior to changing temperature ranges**, and at least every 30 minutes during heatup and cooldown.

Table 1: With All NCPs OFF (Note 1)

Temperature Range (°F)	Indicating Temperature	Cooldown Rate (°F/hr)	Heatup Rate (°F/hr)
less than 89	Lowest of:	> 2.75 sq. inch vent	
89 - 119	• ND Hx Outlet Temp	40	50
119 - 149	• Lowest WR T-cold	60	50
> 149		75	50
Note 1: Minimum temperature to operate pressurized is 89°F. If indicating temperatures fall below 89°F, restore to > 89°F within 15 minutes or immediately depressurize by adjustment of charging and letdown and open 1 PORV.			

Table 2: With One or Two NCPs Running (Note 2)

Temperature Range (°F)	Indicating Temperature	Cooldown Rate (°F/hr)	Heatup Rate (°F/hr)
89 - 119	Lowest of:	40	50
119 - 149	• ND Hx Outlet Temp	60	50
> 149	• Lowest WR T-cold	75	50
Note 2: Minimum temperature required to operate RCPs is 89°F. If indicating temperatures fall below 89°F, restore to > 89°F within 15 minutes or immediately depressurize by adjustment of charging and letdown and open 1 PORV.			

Table 3: With Three or Four NCPs Running (Note 3)

Temperature Range (°F)	Indicating Temperature	Cooldown Rate (°F/hr)	Heatup Rate (°F/hr)
91 - 114	• Lowest WR T-cold	20	50
114 - 139		40	50
139 - 164		60	50
> 164		75	50
Note 3: Minimum temperature required to operate 3rd RCP is 91°F. Minimum temperature required to operate 4th RCP is 140°F. If lowest WR Tcold falls below these temperature limits, stop at least one pump and comply with next lower tier of requirements.			

UNIT 1

McGuire 1 Cycle 16 Core Operating Limits Report

2.10 Accumulators (TS 3.5.1)

2.10.1 Boron concentration limits during modes 1 and 2, and mode 3 with RCS pressure >1000 psi:

Parameter	Limit
Cold Leg Accumulator minimum boron concentration.	2,475 ppm
Cold Leg Accumulator maximum boron concentration.	2,875 ppm

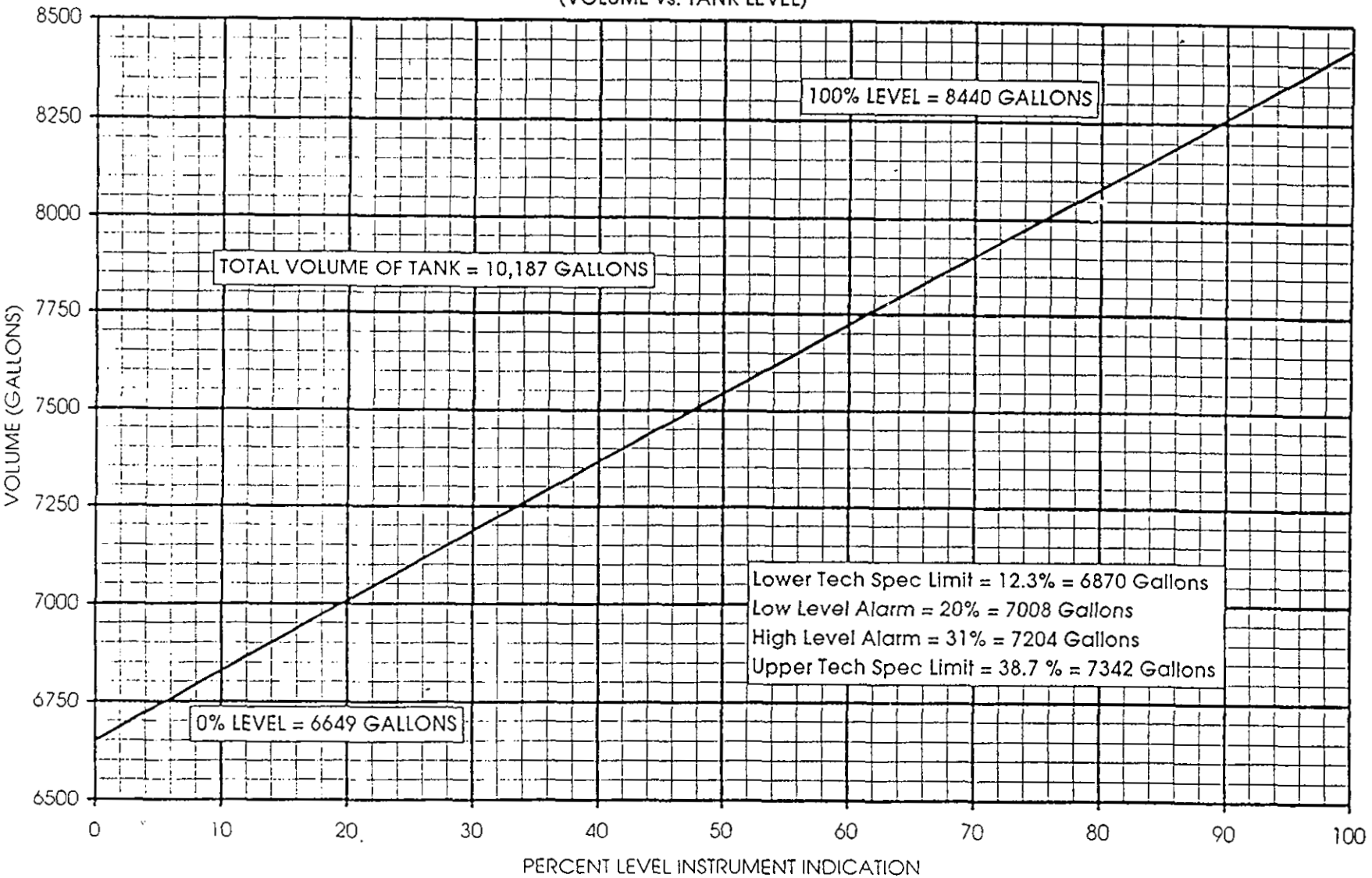
2.11 Refueling Water Storage Tank - RWST (TS 3.5.4)

2.11.1 Boron concentration limits during modes 1, 2, 3, and 4:

Parameter	Limit
Refueling Water Storage Tank minimum boron concentration.	2,675 ppm
Refueling Water Storage Tank maximum boron concentration.	2,875 ppm

UNIT 1

OP/1/A/6100/22
ENCLOSURE 4.3
CURVE 7.4
COLD LEG ACCUMULATOR
(VOLUME vs. TANK LEVEL)



This data is also available on the OAC. .

UNIT 1

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

LCO 3.5.1 Four ECCS accumulators shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS pressure > 1000 psig.

ACTIONS

CONDITION		REQUIRED ACTION		COMPLETION TIME
A.	One accumulator inoperable due to boron concentration not within limits.	A.1	Restore boron concentration to within limits.	72 hours
B.	One accumulator inoperable for reasons other than Condition A.	B.1	Restore accumulator to OPERABLE status.	1 hour
C.	Required Action and associated Completion Time of Condition A or B not met.	C.1	Be in MODE 3.	6 hours
		AND		
		C.2	Reduce RCS pressure to ≤ 1000 psig.	12 hours
D.	Two or more accumulators inoperable.	D.1	Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.5.1.1	Verify each accumulator isolation valve is fully open.	12 hours
SR 3.5.1.2	Verify borated water volume in each accumulator is $\geq$ 6870 gallons and $\leq$ 7342 gallons.	12 hours
SR 3.5.1.3	Verify nitrogen cover pressure in each accumulator is $\geq$ 585 psig and $\leq$ 639 psig.	12 hours
SR 3.5.1.4	Verify boron concentration in each accumulator is within the limits specified in the COLR.	31 days AND -------NOTE-------- Only required to be performed for affected accumulators ---------- Once within 6 hours after each solution volume increase of $\geq$ 1% of tank volume that is not the result of addition from the refueling water storage tank
SR 3.5.1.5	Verify power is removed from each accumulator isolation valve operator when RCS pressure is > 1000 psig.	31 days

3.6 CONTAINMENT SYSTEMS

3.6.1 Containment

LCO 3.6.1 Containment shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Containment inoperable.	A.1 Restore containment to OPERABLE status.	1 hour
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.6.1.1 ----------NOTES---------- 1. The space between each dual ply bellows assembly on penetrations between the containment building and annulus shall be vented to the annulus during Type A tests. 2. Following each Type A test, the space between each dual-ply bellows assembly shall be subjected to a low pressure test at 3 to 5 psig to verify no detectable leakage, or the assembly shall be subjected to a leak test with the pressure on the containment side of the assembly at P_a. 3. Type C tests on penetrations M372 and M373 may be performed without draining the glycol-water mixture from the seats of their diaphragm valves if meeting a zero indicated leakage rate (not including instrument error). ---------- Perform required visual examinations and leakage rate testing except for containment airlock testing, in accordance with the Containment Leakage Rate Testing Program.	In accordance with the Containment Leakage Rate Testing Program

B 3.6 CONTAINMENT SYSTEMS

B 3.6.1 Containment

BASES

BACKGROUND

The containment is a free standing steel pressure vessel surrounded by a reinforced concrete reactor building. The containment vessel, including all its penetrations, is a low leakage steel shell designed to contain the radioactive material that may be released from the reactor core following a design basis Loss of Coolant Accident (LOCA). Additionally, the containment vessel and reactor building provide shielding from the fission products that may be present in the containment atmosphere following accident conditions.

The containment vessel is a vertical cylindrical steel pressure vessel with hemispherical dome and a flat circular base. It is completely enclosed by a reinforced concrete reactor building. An annular space exists between the walls and domes of the steel containment vessel and the concrete reactor building to provide for the collection, mixing, holdup, and controlled release of containment out leakage. Ice condenser containments utilize an outer concrete building for shielding and an inner steel containment for leak tightness.

Containment piping penetration assemblies provide for the passage of process, service, sampling, and instrumentation pipelines into the containment vessel while maintaining containment integrity. The reactor building provides shielding and allows controlled release of the annulus atmosphere under accident conditions, as well as environmental missile protection for the containment vessel and Nuclear Steam Supply System.

The inner steel containment and its penetrations establish the leakage limiting boundary of the containment. Maintaining the containment OPERABLE limits the leakage of fission product radioactivity from the containment to the environment. SR 3.6.1.1 leakage rate requirements comply with 10 CFR 50, Appendix J, Option B (Ref. 1), as modified by approved as above exemptions.

The isolation devices for the penetrations in the containment boundary are a part of the containment leak tight barrier. To maintain this leak tight barrier:

a All penetrations required to be closed during accident conditions are either:

BASES

BACKGROUND (continued)

1. capable of being closed by an OPERABLE automatic containment isolation system, or

2. closed by manual valves, blind flanges, or de-activated automatic valves secured in their closed positions, except as provided in LCO 3.6.3, "Containment Isolation Valves";

b. Each air lock is OPERABLE, except as provided in LCO 3.6.2, "Containment Air Locks";

c. All equipment hatches are closed and sealed; and

d. The sealing mechanism associated with a penetration (e.g., welds, bellows, or O-rings) is OPERABLE.

APPLICABLE SAFETY ANALYSES

The safety design basis for the containment is that the containment must withstand the pressures and temperatures of the limiting Design Basis Accident (DBA) without exceeding the design leakage rates.

The DBAs that result in a challenge to containment OPERABILITY from high pressures and temperatures are a loss of coolant accident (LOCA) and a steam line break (Ref. 2). In addition, release of significant fission product radioactivity within containment can occur from a LOCA. In the DBA analyses, it is assumed that the containment is OPERABLE such that, for the DBAs involving release of fission product radioactivity, release to the environment is controlled by the rate of containment leakage. The containment was designed with an allowable leakage rate of 0.3% of containment air weight per day (Ref. 3). This leakage rate, used in the evaluation of offsite doses resulting from accidents, is defined in 10 CFR 50, Appendix J, Option B (Ref. 1), as L_a: the maximum allowable containment leakage rate at the calculated peak containment internal pressure (P_a) resulting from the limiting design basis LOCA. The allowable leakage rate represented by L_a forms the basis for the acceptance criteria imposed on all containment leakage rate testing. L_a is assumed to be 0.3% per day in the safety analysis at P_a = 14.8 psig (Ref. 3). Satisfactory leakage rate test results are a requirement for the establishment of containment OPERABILITY.

The containment satisfies Criterion 3 of 10 CFR 50.36 (Ref. 4).

BASES

LCO

Containment OPERABILITY is maintained by limiting leakage to $\leq 1.0\ L_a$, except prior to the first startup after performing a required Containment Leakage Rate Testing Program leakage test. At this time, the applicable leakage limits must be met.

Compliance with this LCO will ensure a containment configuration, including equipment hatches, that is structurally sound and that will limit leakage to those leakage rates assumed in the safety analysis.

Individual leakage rates specified for the containment air lock (LCO 3.6.2), purge valves with resilient seals, and reactor building bypass leakage (LCO 3.6.3) are not specifically part of the acceptance criteria of 10 CFR 50, Appendix J. Therefore, leakage rates exceeding these individual limits only result in the containment being inoperable when the leakage results in exceeding the overall acceptance criteria of $1.0\ L_a$.

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material into containment. In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, containment is not required to be OPERABLE in MODE 5 to prevent leakage of radioactive material from containment. The requirements for containment during MODE 6 are addressed in LCO 3.9.4, "Containment Penetrations."

ACTIONS

A.1

In the event containment is inoperable, containment must be restored to OPERABLE status within 1 hour. The 1 hour Completion Time provides a period of time to correct the problem commensurate with the importance of maintaining containment OPERABLE during MODES 1, 2, 3, and 4. This time period also ensures that the probability of an accident (requiring containment OPERABILITY) occurring during periods when containment is inoperable is minimal.

B.1 and B.2

If containment cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within

BASES

ACTIONS (continued)

36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.6.1.1

Maintaining the containment OPERABLE requires compliance with the visual examinations and leakage rate test requirements of the Containment Leakage Rate Testing Program. Failure to meet specific leakage limits for the air lock, secondary containment bypass leakage path, and purge valve with resilient seals (as specified in LCO 3.6.2 and LCO 3.6.3) does not invalidate the acceptability of the overall containment leakage determinations unless the specific leakage contribution to overall Type A, B, and C leakage causes one of these overall leakage limits to be exceeded. As left leakage prior to the first startup after performing a required Containment Leakage Rate Testing Program leakage test is required to be $< 0.6\ L_a$ for combined Type B and C leakage, and $\leq 0.75\ L_a$ for Option B for overall Type A leakage. At all other times between required leakage rate tests, the acceptance criteria is based on an overall Type A leakage limit of $\leq 1.0\ L_a$. At $\leq 1.0\ L_a$ the offsite dose consequences are bounded by the assumptions of the safety analysis. SR Frequencies are as required by the Containment Leakage Rate Testing Program. These periodic testing requirements verify that the containment leakage rate does not exceed the leakage rate assumed in the safety analysis.

The Surveillance is modified by three Notes.

Note 1 requires that the space between each duel-ply bellows assembly on containment penetrations between the containment building and the annulus be vented to the annulus during each Type A test.

Note 2 requires that following each Type A test, the space between each dual-ply bellows assembly be subjected to a low pressure leak test with no detectable leakage. Otherwise, the assembly must be tested with the containment side of the bellows assembly pressurized to P_a and meet the requirements of SR 3.6.3.8 (bypass leakage requirements).

Note 3 allows penetrations M372 and M373 to be tested without draining the glycol-water mixture from the associated diaphragm valves (NF-288A, NF-233B and NF-234A) as long as not leakage is indicated. This test may be used in lieu of 10 CFR 50, Appendix J, Option B as defined

BASES

SURVEILLANCE REQUIREMENTS (continued)

in ANSI/ANS 56.8-1994 Section 3.3.5 (Test Medium). The required test pressure and interval are not changed.

All test leakage rates shall be calculated using observed data converted to absolute values. Error analysis shall also be performed to select a balanced integrated leakage measurement system.

REFERENCES

1. 10 CFR 50, Appendix J, Option B.
2. UFSAR, Chapter 15.
3. UFSAR, Section 6.2.
4. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).

3.6 CONTAINMENT SYSTEMS

3.6.5 Containment Air Temperature

LCO 3.6.5 Containment average air temperature shall be:

a. ≥ 75°F and ≤ 100°F for the containment upper compartment, and

b. ≥ 100°F and ≤ 120°F for the containment lower compartment.

---NOTES---

1. The minimum containment average air temperature in MODES 2, 3, and 4 may be reduced to 60°F.

2. Containment lower compartment temperature may be between 120°F and 125°F for up to 90 cumulative days per calendar year provided lower compartment temperature average over the previous 365 days is less than 120°F. Within this 90 cumulative day period, lower compartment temperature may be between 125°F and 135°F for 72 cumulative hours.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Containment average air temperature not within limits.	A.1 Restore containment average air temperature to within limits.	8 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.5.1	Verify containment upper compartment average air temperature is within limits.	24 hours
SR 3.6.5.2	Verify containment lower compartment average air temperature is within limits.	24 hours

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 1. **Check VI - AVAILABLE.**	__ GO TO **Enclosure 18 (Startup of ND Pumps Without VI Available) to start ND pump.**
NOTE 1ND-35 (ND To FWST Isol) may be assumed to be closed, unless known to be open.	
__ 2. **Check 1ND-35 (ND To FWST Isol) - CLOSED.**	NOTE 1ND-35 will be closed later in this enclosure, prior to starting ND pump. __ **Dispatch operator to stand by 1ND-35 (ND To FWST Isol) (aux bldg, 750+7, KK-52, just outside 1B ND/NS Hx room).**
3. **Check if ND letdown valves should be closed:**	
__ a. Check Pzr level - LESS THAN 96%.	a. Perform the following: __ 1) IF letdown flow indicates zero, THEN GO TO Step 3.b. __ 2) IF any NC system opening known to exist, THEN GO TO Step 3.b. __ 3) GO TO Step 4.
__ b. Close 1NV-121 (ND Letdown Control).	
c. Close the following: __ • 1ND-32 (A ND Hx To Letdown Hx) __ • 1ND-17 (B ND Hx To Letdown Hx).	c. Dispatch operator to close affected valve(s). __ • 1ND-32 (aux bldg, 733+6, 1A ND Hx Room, 3 feet from west wall and 1 foot from south wall) __ • 1ND-17 (aux bldg, 733+12, 1B ND Hx Room, 3 feet from west wall and 10 feet from south wall).
__ d. GO TO Step 5.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. **Align ND letdown per one of the following:**	
• IF desired to place 1A ND pump in service, THEN perform the following:	
__ a. Open 1ND-32 (A ND Hx To Letdown Hx).	__ a. Dispatch operator to open 1ND-32 (aux bldg, 733+6, 1A ND Hx Room, 3 feet from west wall and 1 foot from south wall).
__ b. Close 1ND-17 (B ND Hx To Letdown Hx).	__ b. Dispatch operator to close 1ND-17 (aux bldg, 733+12, 1B ND Hx Room, 3 feet from west wall and 10 feet from south wall).
• IF desired to place 1B ND pump in service, THEN perform the following:	
__ a. Open 1ND-17 (B ND Hx To Letdown Hx).	__ a. Dispatch operator to open 1ND-17 (aux bldg, 733+12, 1B ND Hx Room, 3 feet from west wall and 10 feet from south wall).
__ b. Close 1ND-32 (A ND Hx To Letdown Hx).	__ b. Dispatch operator to close 1ND-32 (aux bldg, 733+6, 1A ND Hx Room, 3 feet from west wall and 1 foot from south wall).
__ 5. Check S/I - HAS OCCURRED.	__ GO TO Step 7.
6. Reset the following:	
__ a. S/I.	
__ b. Sequencers.	
__ c. Reset modulating valves using reset buttons on RN control board.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

7. **Start desired ND pump PER one of the following:**

   __ • IF 1A ND Pump is to be started, THEN GO TO Step 8.

   OR

   __ • IF 1B ND Pump is to be started, THEN GO TO Step 48.

8. **Dispatch 2 operators to perform the following on 1ND-24 (A ND Pump Discharge Isol) (aux bldg, 695+12, GG-54, room 501, ND Pump room 1A on east wall):**

   __ a. Unlock valve.

   __ b. Close valve.

   __ c. Open valve 2 turns.

__ 9. **Dispatch operator to open breaker 1EMXA - F12B (1A ND Pump & Hx Miniflow Isol Motor (1ND-68A)) (aux bldg, 750, FF-54-55).**

__ 10. Check 1A RN Pump - AVAILABLE. __ GO TO Step 13.

__ 11. Start 1A RN Pump.

12. Start 1A KC pumps as follows:

   __ a. Select "AUTO" on 1KC-51A (Train A Recirc Isol).

   __ b. Start 1A1 and 1A2 KC pumps.

__ 13. Ensure RN flow established to KC Hx in operation.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14. **Establish KC flow to 1A ND Hx as follows:**	
__ a. Close 1KC-81B (KC To B ND Hx).	__ a. IF AT ANY TIME adequate KC flow to 1A ND Hx cannot be established, THEN dispatch operator to close 1KC-81B (aux bldg, 750+10, LL-53, above UHI nitrogen heaters).
b. IF AT ANY TIME adequate KC flow to 1A ND Hx cannot be established, THEN throttle closed the following valves as required: __ • 1KC-149 (A KF Hx Outlet Flow) OR __ • 1KC-156 (B KF Hx Outlet Flow).	
__ c. Throttle open 1KC-56A (KC To A ND Hx) to establish 2000 GPM to 5000 GPM KC flow to 1A ND Hx, while limiting each KC pump flow to 4000 GPM.	c. Evaluate opening KC cross-tie valves to establish flow from other train as follows: 1) Open: __ • 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol) __ • 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol). 2) Open: __ • 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol) __ • 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 15. **Check 1ND-35 (ND To FWST Isol) - CLOSED.**	**Perform the following:** __ a. Do not continue until Steps 8 through 14 are completed. CAUTION **If 1ND-35 is being used for feed and bleed, NC temperature may rise after valve is closed. Subsequent steps to start ND pump should be performed without delay to avoid excessive heatup.** __ b. Notify dispatched operator to close and lock 1ND-35 (ND To FWST Isol). __ c. Do not continue until 1ND-35 is closed.
16. **Check the following valves:**	
__ a. 1ND-1B (C NC Loop to ND Pumps) - OPEN.	__ a. GO TO Step 18.
__ b. 1ND-2AC (C NC Loop To ND Pumps) - OPEN.	__ b. GO TO Step 18.
__ c. 1ND-19A (A ND Pump Suct From FWST or NC) - OPEN.	__ c. GO TO Step 19.
__ 17. GO TO Step 20.	
__ 18. **Check 1FW-27A (FWST Supply To ND) - CLOSED.**	NOTE Closing 1FW-27A meets interlock to allow opening 1ND-1B (C NC Loop to ND Pumps) and 1ND-2AC (C NC Loop To ND Pumps). __ **Close 1FW-27A.**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

19. **Realign NC to ND valves as follows:**

__ a. Check 1A ND Pump discharge pressure - WITHIN 200 PSIG OF NC PRESSURE.

a. Perform the following:

__ 1) IF NC pressure is greater than ND pump discharge pressure, THEN GO TO Enclosure 1 (Equalizing Pressure Between NC and ND).

2) IF ND pump discharge pressure is greater than NC pressure, THEN contact station management for guidance to perform the following:

__ a) Ensure ND System remains subcooled when depressurizing ND.

__ b) Equalize pressure between ND and NC systems.

b. Open the following valves:

__ • 1ND-1B (C NC Loop to ND Pumps)

__ • 1ND-2AC (C NC Loop To ND Pumps)

__ • 1ND-19A (A ND Pump Suct From FWST or NC).

20. **Close the following valves:**

__ • 1ND-29 (A ND Hx Outlet)

__ • 1ND-18 (B ND Hx Bypass)

__ • 1ND-15B (Train B ND To Hot Leg Isol)

__ • 1NI-183B (ND To B & C Hot Legs Isol).

Dispatch operator to close affected valve(s):

__ • 1ND-18 (aux bldg, 733+8, LL-52, room 732, ND heat exchanger room 1B)

__ • 1ND-15B (aux bldg, 733+8, LL-51, room 732, ND Hx room 1B)

__ • 1NI-183B (aux bldg, 733+10, FF-52, room 602, midget hole, enter from electrical penetration room, 4 ft from reactor bldg wall, 3 ft from ceiling).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21. **Open the following valves:** __ • 1NI-173A (Train A ND To A & B CL) __ • 1ND-30A (Train A ND To Hot Leg Isol) __ • 1ND-33 (A ND Hx Bypass) __ • 1ND-34 (A & B ND Hx Bypass).	**Dispatch operator to open affected valve(s):** __ • 1NI-173A (aux bldg, 716+21, GG-52, room 602, midget hole near reactor bldg wall above ledge, 4 ft south of GG-52 near VCT area) __ • 1ND-30A (aux bldg, 733+4, LL-52, room 733, ND heat exchanger room 1A, 1 ft from east, 8 ft from south) __ • 1ND-33 (aux bldg, 733+8, LL-52, room 732, ND heat exchanger room 1B).
22. **Check if either of the following are believed to have occurred:** __ • Air entrainment in ND System OR __ • Voiding of NC System.	**Perform the following:** NOTE Makeup options using 1ND-35 (ND To FWST Isol) cannot be used, since it must be closed prior to starting ND pump. __ a. IF AT ANY TIME NC level drops when ND pump is started, THEN makeup as required PER Enclosure 3 (NC System Makeup During Loss of ND). __ b. GO TO Step 25.

NOTE Makeup options using 1ND-35 (ND To FWST Isol) cannot be used, since it must be closed prior to starting ND pump.

__ 23. Initiate makeup PER Enclosure 3 (NC System Makeup During Loss of ND) prior to starting ND pump, to avoid losing level when pump is started.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 24. IF voiding has occurred, THEN restore cooling slowly in next steps, to avoid rapid loss of level due to void collapse.	
__ 25. Check core exit T/Cs - AVAILABLE.	__ GO TO Step 27.
__ 26. Check subcooling based on core exit T/Cs - GREATER THAN 0° F.	Perform the following: __ a. IF core exit T/Cs indicate less than 200° F, THEN GO TO Step 27. __ b. Raise makeup flow rate. __ c. IF makeup flow inadequate, THEN use different or multiple makeup flowpaths in Enclosure 3 (NC System Makeup During Loss of ND). __ d. IF 1ND-35 (ND To FWST Isol) is used for makeup, THEN ensure 1ND-35 is closed prior to starting ND pump. __ e. Attempt to restore subcooling based on core exit T/Cs to greater than 0° F. __ f. IF subcooling restored, THEN GO TO Step 27. __ g. IF FWST level less than 20 inches, THEN GO TO Step 27. h. IF subcooling cannot be restored, THEN perform the following: __ 1) Open 1FW-27A (FWST Supply To ND). __ 2) IF 1FW-27A will not open, THEN dispatch operator to open and standby 1FW-27A (aux bldg, 695 pipechase, GG-52, 5 ft from north wall). __ 3) GO TO Step 28.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 27. Check 1FW-27A (FWST Supply To ND) - CLOSED.	__ Ensure 1FW-27A closed prior to starting ND pump.
__ 28. Do not continue until 1ND-24 (A ND Pump Discharge Isol) throttled 2 turns open.	
__ 29. Establish communications with operators at 1ND-24 (A ND Pump Discharge Isol).	
__ 30. Check NC level - GREATER THAN 10 INCHES.	__ Attempt to raise level.
__ 31. Check 1ND-32 (A ND Hx To Letdown Hx) - CLOSED.	IF ND letdown in service, THEN: __ • Anticipate a step rise in letdown flow when ND pump is started in next step. __ • WHEN ND pump is started, THEN immediately throttle letdown flow as required to maintain stable NC pressure and level.

CAUTION Starting an ND pump may result in a level drop due to shrink or the release of trapped air.

__ 32. Start 1A ND Pump.

__ 33. Have operators slowly open 1ND-24 (A ND Pump Discharge Isol) until ND flow is 1000 GPM to 1500 GPM.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 34. **Check 1FW-27A (FWST Supply To ND) - CLOSED.**	**Perform the following:** __ a. IF control room operation of 1FW-27A is unavailable, THEN locally operate 1FW-27A in next steps. __ b. IF AT ANY TIME FWST level goes below 20 inches, THEN close 1FW-27A. NOTE 1FW-27A (FWST Supply To ND) can be throttled in the open direction only (seals in on closed direction). c. IF core exit T/Cs available, THEN: __ • WHEN subcooling based on core exit T/Cs is greater than 0° F, THEN throttle or close 1FW-27A while ensuring NC level is maintained. __ d. IF core exit T/Cs unavailable, THEN throttle or close 1FW-27A while ensuring NC level is maintained.
__ 35. **Check NC level - GREATER THAN 4 INCHES.**	**Perform the following:** __ a. Stop ND pump. __ b. Evaluate need to vent ND pump suction PER Enclosure 2 (Venting of ND Pumps and Suction Piping). __ c. Makeup to the NC System PER Enclosure 3 (NC System Makeup During Loss of ND) until NC level is greater than 10 inches. __ d. WHEN conditions established to start ND pump, THEN RETURN TO Step 1. __ e. RETURN TO Step in effect in body of this procedure.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 36. **Slowly throttle close 1ND-34 (A & B ND Hx Bypass) until a drop in ND flow is observed.**	
__ 37. **Have operators open, backseat, and lock 1ND-24 (A ND Pump Discharge Isol).**	
38. **Throttle the following as necessary to maintain stable NC temperature:** __ • 1ND-29 (A ND Hx Outlet) __ • 1ND-34 (A & B ND Hx Bypass).	
__ 39. **Check NC temperature based on core exit T/C's - LESS THAN 200° F.**	__ GO TO Step 41.
__ 40. **Reduce KC flow to 1A ND HX as required to control NC temperature.**	
__ 41. IF AT ANY TIME cooldown is required, THEN REFER TO Unit 1 Data Book Curve 1.6 b (Heatup and Cooldown Limits for LTOP).	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

42. **Check feed and bleed cooling - INITIATED.**

    __ **GO TO Step 43.**

    __ a. Initiate cooldown to 200° F on core exit T/C's.

    b. WHEN NC temperature is less than 200° F on core exit T/C's, THEN perform the following:

    CAUTION **Failure to stop makeup to NC System prior to closing Pzr PORVs may cause low temperature over pressure concern.**

    __ 1) Stop or reduce makeup to NC System.

    2) IF PORV (s) not required open as vent path, AND makeup to NC System stopped, THEN:

    __ a) Close PZR PORVs.

    __ b) Place closed Pzr PORVs in "AUTO".

    __ 3) Control ND flow to maintain NC System subcooled.

__ 43. **Ensure ND flow greater than 1500 GPM.**

__ 44. **Dispatch operator to reclose breaker 1EMXA - F12B (1A ND Pump & Hx Miniflow Isol Motor (1ND-68A)).**

__ 45. **Ensure 1ND-68A (A ND Pump & A Hx Miniflow) remains closed.**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

46. **IF air entrainment may have occurred on the idle train, THEN:**

    __ a. Remove noncondensible gases from idle ND Hx PER Enclosure 15 (Idle ND Train Hx Flush).

    __ b. Ensure idle train vented PER Enclosure 2 (Venting of ND Pumps and Suction Piping).

__ 47. **RETURN TO step in effect in body of this procedure.**

48. **Dispatch 2 operators to perform the following on 1ND-9 (B ND Pump Discharge Isol) (aux bldg, 695+12, FF-54, room 500, ND Pump room 1B on north wall):**

    __ a. Unlock valve.

    __ b. Close valve.

    __ c. Open valve 2 turns.

__ 49. **Dispatch operator to open breaker 1EMXB1 - 2C (1B ND Pump & Hx Miniflow Isol Motor (1ND-67B)) (aux bldg, 733, GG-55-56).**

__ 50. Check 1B RN Pump - AVAILABLE. — __ GO TO Step 53.

__ 51. **Start 1B RN Pump.**

52. Start KC pumps as follows:

    __ a. Select "AUTO" on 1KC-54B (Train B Recirc Isol).

    __ b. Start 1B1 and 1B2 KC Pumps.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 53. **Ensure RN flow established to KC Hx in operation.**

54. **Establish KC flow to 1B ND Hx as follows:**

__ a. Close 1KC-56A (KC To A ND Hx).

__ a. IF AT ANY TIME adequate KC flow to 1B ND Hx cannot be established, THEN dispatch operator to close 1KC-56A (aux bldg, 750+9, MM-54, room 811, above cation demineralizer hatch).

b. IF AT ANY TIME adequate KC flow to 1B ND Hx cannot be established, THEN throttle closed the following valves as required:

__ • 1KC-149 (A KF Hx Outlet Flow)

OR

__ • 1KC-156 (B KF Hx Outlet Flow).

__ c. Throttle open 1KC-81B (KC To B ND Hx) to establish 2000 GPM to 5000 GPM KC flow to 1B ND Hx, while limiting each KC pump flow to 4000 GPM.

c. Evaluate opening KC cross-tie valves to establish flow from other train as follows:

1) Open:

__ • 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol)

__ • 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol).

2) Open:

__ • 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol)

__ • 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 55. **Check 1ND-35 (ND To FWST Isol) - CLOSED.**	**Perform the following:** __ a. Do not continue until Steps 48 through 54 are completed. CAUTION **If 1ND-35 is being used for feed and bleed, NC temperature may rise after valve is closed. Subsequent steps to start ND pump should be performed without delay to avoid excessive heatup.** __ b. Notify dispatched operator to close and lock 1ND-35 (ND To FWST Isol). __ c. Do not continue until 1ND-35 is closed.
56. **Check the following valves:**	
__ a. 1ND-1B (C NC Loop to ND Pumps) - OPEN.	__ a. GO TO Step 57.
__ b. 1ND-2AC (C NC Loop To ND Pumps) - OPEN.	__ b. GO TO Step 57.
__ c. 1ND-4B (B ND Pump Suct From FWST or NC) - OPEN.	__ c. GO TO Step 58.
__ d. GO TO Step 59.	
__ 57. Check 1FW-27A (FWST Supply To ND) - CLOSED.	NOTE Closing 1FW-27A meets interlock to allow opening 1ND-1B (C NC Loop to ND Pumps) and 1ND-2AC (C NC Loop To ND Pumps). __ Close 1FW-27A.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

58. **Realign NC to ND valves as follows:**

__ a. Check 1B ND Pump discharge pressure - WITHIN 200 PSIG OF NC PRESSURE.

a. Perform the following:

__ 1) IF NC pressure is greater than ND pump discharge pressure, THEN GO TO Enclosure 1 (Equalizing Pressure Between NC and ND).

2) IF ND pump discharge pressure is greater than NC pressure, THEN contact station management for guidance to perform the following:

__ a) Ensure ND System remains subcooled when depressurizing ND.

__ b) Equalize pressure between ND and NC systems.

b. Open the following valves:

__ • 1ND-1B (C NC Loop to ND Pumps)

__ • 1ND-2AC (C NC Loop To ND Pumps)

__ • 1ND-4B (B ND Pump Suct From FWST or NC).

59. Close the following:

__ • 1ND-30A (Train A ND To Hot Leg Isol)

__ • 1ND-33 (A ND Hx Bypass)

__ • 1ND-14 (B ND Hx Outlet)

__ • 1NI-183B (ND To B & C Hot Legs Isol).

Dispatch operator to close affected valve(s):

__ • 1ND-30A (aux bldg, 733+4, LL-52, room 733, ND heat exchanger room 1A, 1 ft from east, 8 ft from south)

__ • 1ND-33 (aux bldg, 733+8, LL-52, room 732, ND heat exchanger room 1B)

__ • 1NI-183B (aux bldg, 733+10, FF-52, room 602, midget hole, enter from electrical penetration room, 4 ft from reactor bldg wall, 3 ft from ceiling).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
60. **Open the following:** __ • 1ND-18 (B ND Hx Bypass) __ • 1ND-34 (A & B ND Hx Bypass) __ • 1NI-178B (Train B ND To C & D CL) __ • 1ND-15B (Train B ND To Hot Leg Isol).	**Dispatch operator to open affected valve(s):** __ • 1ND-18 (aux bldg, 733+8, LL-52, room 732, ND heat exchanger room 1B) __ • 1NI-178B (aux bldg, 733+6, HH-52, room 730, BIT room 6 ft west of HH-52, 3 ft from reactor bldg wall) __ • 1ND-15B (aux bldg, 733+8, LL-51, room 732, ND Hx room 1B).
61. **Check if either of the following are believed to have occurred:** __ • Air entrainment in ND System OR __ • Voiding of NC System.	**Perform the following:** NOTE Makeup options using 1ND-35 (ND To FWST Isol) cannot be used, since it must be closed prior to starting ND pump. __ a. IF AT ANY TIME NC level drops when ND pump is started, THEN makeup as required PER Enclosure 3 (NC System Makeup During Loss of ND). __ b. GO TO Step 64.

NOTE Makeup options using 1ND-35 (ND To FWST Isol) cannot be used, since it must be closed prior to starting ND pump.

__ 62. Initiate makeup PER Enclosure 3 (NC System Makeup During Loss of ND) prior to starting ND pump, to avoid losing level when pump is started.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 63. **IF voiding has occurred, THEN restore cooling slowly in next steps, to avoid rapid loss of level due to void collapse.**	
__ 64. **Check core exit T/Cs - AVAILABLE.**	__ **GO TO Step 66.**
__ 65. **Check subcooling based on core exit T/Cs- GREATER THAN 0° F.**	**Perform the following:** __ a. IF core exit T/Cs indicate less than 200° F, THEN GO TO Step 66. __ b. Raise makeup flow rate. __ c. IF makeup flow inadequate, THEN use different or multiple makeup flowpaths in Enclosure 3 (NC System Makeup During Loss of ND). __ d. IF 1ND-35 (ND To FWST Isol) is used for makeup, THEN ensure 1ND-35 is closed prior to starting ND pump. __ e. Attempt to restore subcooling based on core exit T/Cs to greater than 0° F. __ f. IF subcooling restored, THEN GO TO Step 66. __ g. IF FWST level less than 20 inches, THEN GO TO Step 66. h. IF subcooling cannot be restored, THEN perform the following: __ 1) Open 1FW-27A (FWST Supply To ND). __ 2) IF 1FW-27A will not open, THEN dispatch operator to open and standby 1FW-27A (aux bldg, 695 pipechase, GG-52, 5 ft from north wall). __ 3) GO TO Step 67.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 66. Check 1FW-27A (FWST Supply To ND) - CLOSED.	__ Ensure 1FW-27A closed prior to starting ND pump.
__ 67. Do not continue until 1ND-9 (B ND Pump Discharge Isol) throttled 2 turns open.	
__ 68. Establish communications with operators at 1ND-9 (B ND Pump Discharge Isol).	
__ 69. Check NC level - GREATER THAN 10 INCHES.	__ Attempt to raise level.
__ 70. Check 1ND-17 (B ND Hx To Letdown Hx) - CLOSED.	IF ND letdown in service, THEN: __ • Anticipate a step rise in letdown flow when ND pump is started in next step. __ • WHEN ND pump is started, THEN immediately throttle letdown flow as required to maintain stable NC pressure and level.

CAUTION Starting an ND pump may result in a level drop due to shrink or the release of trapped air.

__ 71. Start 1B ND Pump.

__ 72. Have operators slowly open 1ND-9 (B ND Pump Discharge Isol) until ND flow is 1000 GPM - 1500 GPM.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 73. **Check 1FW-27A (FWST Supply To ND) - CLOSED.**	**Perform the following:** __ a. IF control room operation of 1FW-27A is unavailable, THEN locally operate 1FW-27A in next steps. __ b. IF AT ANY TIME FWST level goes below 20 inches, THEN close 1FW-27A. NOTE 1FW-27A (FWST Supply To ND) can be throttled in the open direction only (seals in on closed direction). c. IF core exit T/Cs available, THEN: __ • WHEN subcooling based on core exit T/Cs is greater than 0° F, THEN throttle or close 1FW-27A while ensuring NC level is maintained. __ d. IF core exit T/Cs unavailable, THEN throttle or close 1FW-27A while ensuring NC level is maintained.
__ 74. Check NC level - GREATER THAN 4 INCHES.	**Perform the following:** __ a. Stop ND pump. __ b. Evaluate need to vent ND pump suction PER Enclosure 2 (Venting of ND Pumps and Suction Piping). __ c. Makeup to the NC System PER Enclosure 3 (NC System Makeup During Loss of ND) until NC level is greater than 10 inches. __ d. WHEN conditions established to start ND pump, THEN RETURN TO Step 1. __ e. RETURN TO Step in effect in body of this procedure.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 75. Slowly throttle close 1ND-34 (A & B ND Hx Bypass) until a drop in ND flow is observed.

__ 76. Have operators open, backseat, and lock 1ND-9 (B ND Pump Discharge Isol).

77. Throttle the following as necessary to maintain stable NC temperature:

__ • 1ND-14 (B ND Hx Outlet)

__ • 1ND-34 (A & B ND Hx Bypass).

__ 78. Check NC temperature based on core exit T/C's - LESS THAN 200° F.

__ GO TO Step 80.

__ 79. Reduce KC flow to 1B ND HX as required to control NC temperature.

__ 80. IF AT ANY TIME cooldown is required, THEN REFER TO Unit 1 Data Book Curve 1.6 b (Heatup and Cooldown Limits for LTOP).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

81. **Check feed and bleed cooling - INITIATED.**

__ GO TO Step 82.

__ a. Initiate cooldown to 200° F on core exit T/C's.

b. WHEN NC temperature is less than 200° F on core exit T/C's, THEN perform the following:

CAUTION **Failure to stop makeup to NC System prior to closing Pzr PORVs may cause low temperature over pressure concern.**

__ 1) Stop or reduce makeup to NC System.

2) IF PORV (s) not required open as vent path, AND makeup to NC System stopped, THEN:

__ a) Close PZR PORVs.

__ b) Place closed Pzr PORVs in "AUTO".

__ 3) Control ND flow to maintain NC System subcooled.

__ 82. Ensure ND flow greater than 1500 GPM.

__ 83. Dispatch operator to reclose breaker 1EMXB1 - 2C (1B ND Pump & Hx Miniflow Isol Motor (1ND-67B)).

__ 84. Ensure 1ND-67B (B ND Pump & B Hx Miniflow) remains closed.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

85. **IF air entrainment may have occurred on the idle train, THEN:**

__ a. Remove noncondensible gases from idle ND Hx PER Enclosure 15 (Idle ND Train Hx Flush).

__ b. Ensure idle train vented PER Enclosure 2 (Venting of ND Pumps and Suction Piping).

__ 86. **RETURN TO step in effect in body of this procedure.**

RO

REFERENCE

16.11 RADIOLOGICAL EFFLUENT CONTROLS

16.11.2 Radioactive Liquid Effluent Monitoring Instrumentation

COMMITMENT The radioactive liquid effluent monitoring instrumentation channels shown in Table 16.11.2-1 shall be OPERABLE with their Alarm/Trip Setpoints set to ensure that the limits of SLC 16.11.1 are not exceeded.

AND

The Alarm/Trip Setpoints of these channels shall be determined and adjusted in accordance with the methodology and parameters in the OFFSITE DOSE CALCULATION MANUAL (ODCM).

APPLICABILITY At all times.

REMEDIAL ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each Function.

CONDITION		REQUIRED ACTION		COMPLETION TIME
A.	One or more radioactive liquid effluent monitoring channels Alarm/Trip setpoint less conservative than required.	A.1	Suspend the release of radioactive liquid effluents monitored by the affected channel.	Immediately
		OR		
		A.2	Declare the channel inoperable.	Immediately
		OR		
		A.3	Adjust setpoint to within limit.	Immediately
B.	One or more radioactive liquid effluent monitoring instrument channels inoperable.	B.1	Enter the Remedial Action specified in Table 16.11.2-1 for the channel(s).	Immediately

(continued)

REMEDIAL ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One channel inoperable.	C.1.1 Analyze two independent samples per TR 16.11.1.1.	Prior to initiating a release
	AND	
	C.1.2 Perform independent verification of the discharge line valving.	Prior to initiating a release
	AND	
	C.1.3.1 Perform independent verification of manual portion of the computer input for the release rate calculations performed by computer.	Prior to initiating a release
	OR	
	C.1.3.2 Perform independent verification of entire release rate calculations for calculations performed manually.	Prior to initiating a release
	AND	
	C.1.4 Restore channel to OPERABLE status.	14 days
	OR	
	C.2 Suspend the release of radioactive effluents via this pathway.	Immediately

(continued)

REMEDIAL ACTIONS (continued)

CONDITION		REQUIRED ACTION		COMPLETION TIME
D.	One channel inoperable.	D.1	Perform an analysis of grab samples for radioactivity at a lower limit of detection per Table 16.11.1-1.	Once per 12 hours during releases when secondary specific activity is > 0.01 μCi/gm DOSE EQUIVALENT I-131 AND Once per 24 hours during releases when secondary specific activity is ≤ 0.01 μCi/gm DOSE EQUIVALENT I-131
		AND		
		D.2	Restore the channel to OPERABLE status.	30 days
E.	One or more channels inoperable.	E.1	Perform an analysis of grab samples for radioactivity at a lower limit of detection per Table 16.11.1-1.	Once per 12 hours during releases
		AND		
		E.2	Restore the channel to OPERABLE status.	30 days

(continued)

REMEDIAL ACTIONS (continued)

CONDITION		REQUIRED ACTION		COMPLETION TIME
F.	One or more flow rate measurement channels inoperable.	F.1	----------NOTE---------- Pump performance curves generated in place may be used to estimate flow. ---------- Estimate the flow rate of the release.	Once per 4 hours during releases
		AND		
		F.2	Restore the channel to OPERABLE status.	30 days
G.	RC minimum flow interlock inoperable.	G.1	Verify that the number of pumps providing dilution is greater than or equal to the number of pumps required.	Once per 4 hours during releases
		AND		
		G.2	Restore the channel to OPERABLE status.	30 days
H.	Required Action and associated Completion Time of Condition C, D, E, F, or G not met.	H.1	Explain why the inoperability was not corrected within the specified Completion Time in the Annual Radioactive Effluent Release Report.	In the next scheduled Annual Radioactive Effluent Release Report

TESTING REQUIREMENTS

----------NOTE----------

Refer to Table 16.11.2-1 to determine which TRs apply for each Radioactive Liquid Effluent Monitoring channel.

TEST	FREQUENCY
TR 16.11.2.1 Perform CHANNEL CHECK.	24 hours
TR 16.11.2.2 ----------NOTE---------- The CHANNEL CHECK shall consist of verifying indication of flow. ---------- Perform CHANNEL CHECK.	Every 24 hours during periods of release
TR 16.11.2.3 Perform SOURCE CHECK.	Prior to each release
TR 16.11.2.4 Perform SOURCE CHECK.	31 days
TR 16.11.2.5 ----------NOTES---------- 1. For Instrument 1, the COT shall also demonstrate that automatic isolation of the pathway occurs if the instrument indicates measured levels above the Alarm/Trip Setpoint. 2. For Instruments 1 and 2, the COT shall also demonstrate that control room alarm annunciation occurs if the instrument indicates measured levels above the Alarm/Trip Setpoint; circuit failure and, a downscale failure. ---------- Perform CHANNEL OPERATIONAL TEST.	92 days
TR 16.11.2.6 Perform a CHANNEL CALIBRATION.	18 months

(continued)

TESTING REQUIREMENTS (continued)

TEST	FREQUENCY
TR 16.11.2.7 ----------NOTE---------- The initial CHANNEL CALIBRATION shall be performed using standards certified by the National Institute of Standards and Technology (NIST) or using standards obtained from suppliers that participate in measurement assurance activities with NIST. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used. ---------- Perform a CHANNEL CALIBRATION.	24 months

TABLE 16.11.2-1

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	REMEDIAL ACTION	TESTING REQUIREMENTS
1. Radioactivity Monitors Providing Alarm And Automatic Termination of Release			
a. Waste Liquid Effluent Line (EMF-49)	1 per station	A, C, H	TR 16.11.2.1 TR 16.11.2.3 TR 16.11.2.5 TR 16.11.2.7
b. EMF-49 Minimum Flow Device	1 per station	C, H	TR 16.11.2.5 TR 16.11.2.7
c. Containment Ventilation Unit Condensate Line (EMF-44)	1	A, E, H	TR 16.11.2.1 TR 16.11.2.4 TR 16.11.2.5 TR 16.11.2.7
d. EMF-44 Minimum Flow Device	1	E, H	TR 16.11.2.5 TR 16.11.2.7
2. Radioactivity Monitors Providing Alarm But Not Automatic Termination of Release			
a. Conventional Waste Water Treatment Line or Turbine Building Sump to RC (EMF-31)	1	A, D, H	TR 16.11.2.1 TR 16.11.2.4 TR 16.11.2.5 TR 16.11.2.7
b. EMF-31 Minimum Flow Device	1	D, H	TR 16.11.2.5 TR 16.11.2.7
3. Continuous Composite Samplers			
a. Containment Ventilation Unit Condensate Line	1	E, H	TR 16.11.2.2 TR 16.11.2.5 TR 16.11.2.6
b. Conventional Waste Water Treatment Line	1 per station	E, H	TR 16.11.2.2 TR 16.11.2.5 TR 16.11.2.6
c. Turbine Building Sump to RC	1	E, H	TR 16.11.2.2 TR 16.11.2.6

(Continued)

4. Flow Rate Measurement Devices			
a. Waste Liquid Effluent Line	1 per station	F, H	TR 16.11.2.2 TR 16.11.2.5 TR 16.11.2.6
b. Containment Ventilation Unit Condensate Line	1	F, H	TR 16.11.2.2 TR 16.11.2.5 TR 16.11.2.6
c. Conventional Waste Water Treatment Line	1 per station	F, H	TR 16.11.2.2 TR 16.11.2.5 TR 16.11.2.6
d. Turbine Building Sump to RC	1	F, H	TR 16.11.2.2 TR 16.11.2.6
5. RC Minimum Flow Interlock (1)	1 per station	G, H	TR 16.11.2.5

NOTES:
1. Minimum flow dilution is assured by an interlock which terminates waste liquid release if the number of RC pumps running falls below the number of pumps required for dilution. The required number of RC pumps for dilution is determined per station procedures.

BASES

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The Alarm/Trip Setpoints of these instruments shall be calculated and adjusted in accordance with the methodology and parameters in the ODCM to ensure that the Alarm/Trip will occur prior to exceeding the limits stated in SLC 16.11.1. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50. The Turbine Building Sump to RC Discharge Flow Measurement and Sampler Devices are for monitoring only and do not alarm or have any controls that require a quarterly COT.

REFERENCES

1. McGuire Nuclear Station Offsite Dose Calculation Manual (ODCM)

2. 10 CFR Part 50, Appendix A

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 1. *Check steam dump valves - CLOSED.	**Close steam dump valves as follows:** __ a. Place "STEAM DUMP SELECT" in steam pressure mode. __ b. IF steam dumps still open, THEN place "STM PRESS CONTROLLER" in manual and close. c. IF steam dumps still open, THEN select "OFF RESET" on the following switches: __ • "STEAM DUMP INTLK BYPASS CHANNEL A" __ • "STEAM DUMP INTLK BYPASS CHANNEL B".
__ 2. Check all SM PORV(s) - CLOSED.	**Perform the following:** __ a. Close affected SM PORV manual loader. b. IF SM PORV can not be closed, THEN: __ 1) Close its isolation valve. __ 2) IF SM PORV isolation valve can not be closed, THEN dispatch operator to close SM PORV isolation valve.
__ 3. Check MSR "RESET" light - LIT.	**Perform the following on MSR controls:** __ a. Depress "SYSTEM MANUAL". __ b. Depress "RESET".

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 4. Check any NC pump - ON.	Perform the following: __ a. IF any NC T-Cold is still going down, THEN GO TO Step 6. __ b. IF cooldown stopped, THEN exit this enclosure.
__ 5. Check NC T-Ave - GOING DOWN.	__ IF cooldown stopped, THEN exit this enclosure.
6. Control feed flow as follows: a. IF S/G N/R level is less than 11% (32% ACC) in all S/Gs, THEN throttle feed flow to achieve the following: __ • Minimize cooldown __ • Maintain total feed flow greater than 450 GPM. b. WHEN N/R level is greater than 11% (32% ACC) in at least one S/G, THEN throttle feed flow further to: __ • Minimize cooldown __ • Maintain at least one S/G N/R level greater than 11% (32% ACC).	
__ 7. Check MSIVs - ANY OPEN.	Perform the following: __ a. Close MSIV bypass valves. __ b. Exit this enclosure.
__ 8. Close 1SM-15 (SM To 2nd Stage MSR).	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 9. Check any NC pump - ON.	Perform the following: __ a. IF any NC T-Cold is still going down, THEN GO TO Step 11. __ b. IF cooldown stopped, THEN exit this enclosure.
__ 10. Check NC T-Ave - GOING DOWN.	__ IF cooldown stopped, THEN exit this enclosure.
__ 11. Notify Control room SRO that cooldown is continuing.	
12. IF cooldown continues, THEN close: __ • All MSIVs __ • All MSIV bypass valves.	

(R04-01)

Duke Power Company
PROCEDURE PROCESS RECORD

(1) ID No. EP/1/A/5000/ES-1.1
Revision No. 016

INFORMATION ONLY

PREPARATION

(2) Station McGuire Nuclear Station

(3) Procedure Title Safety Injection Termination

(4) Prepared By Weiner,Michael R Mike Weiner Date September 20, 2002

(5) Requires NSD 228 Applicability Determination? If Applicability Determination is required, attach NSD 228 documentation.
- [X] Yes (New procedure or revision with major changes)
- [ ] No (Revision with minor changes)
- [ ] No (To incorporate previously approved changes)

(6) Reviewed By S Hartney (QR) Date 9/23/02

Cross-Disciplinary Review By _____ (QR) NA JSH Date 9/23/02

Reactivity Mgmt. Review By _____ (QR) NA JSH Date 9/23/02

Mgmt. Involvement Review By _____ (OPS Supt.) NA JSH Date 9/23/02

(7) Additional Reviews

Reviewed By _____ Date _____

Reviewed By _____ Date _____

(8) Temporary Approval (*if necessary*)

By _____ (OSM/QR) Date _____

By _____ (QR) Date _____

(9) Approved By _____ Date 9/24/02

PERFORMANCE (*Compare with Control Copy every 14 calendar days while work is being performed.*)

(10) Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

(11) Date(s) Performed _____

Work Order Number (WO#) _____

COMPLETION

(12) Procedure Completion Verification

- [ ] Yes [ ] NA Check lists and/or blanks initialed, signed, dated, or filled in NA, as appropriate?
- [ ] Yes [ ] NA Required enclosures attached?
- [ ] Yes [ ] NA Data sheets attached, completed, dated and signed?
- [ ] Yes [ ] NA Charts, graphs, etc. attached, dated, identified, and marked?
- [ ] Yes [ ] NA Procedure requirements met?

Verified By _____ Date _____

(13) Procedure Completion Approved _____ Date _____

(14) Remarks (*Attach additional pages, if necessary.*)

A. Purpose

This procedure provides the necessary instructions to terminate safety injection and stabilize plant conditions.

B. Symptoms or Entry Conditions

This procedure is entered from:

- EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection), Step 35, EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant), Step 7, and EP/1/A/5000/E-2 (Faulted Steam Generator Isolation), Step 12 when specified termination criteria are satisfied.
- EP/1/A/5000/FR-H.1 (Response To Loss Of Secondary Heat Sink), Step 50, after secondary heat sink has been reestablished and S/I has been terminated.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

C. Operator Actions

__ 1. **Monitor foldout page.**

2. **Reset the following:**

__ a. S/I.

a. Perform the following:

__ 1) Dispatch operator to open reactor trip breakers.

__ 2) Reset S/I.

__ b. Sequencers.

b. Dispatch operator to open breaker for affected sequencer DC control power:

__ • A Train - 1EVDA Breaker 6

__ • B Train - 1EVDD Breaker 8.

__ c. Phase A Isolation

__ d. Phase B Isolation.

__ 3. IF AT ANY TIME a B/O signal occurs, THEN restart S/I equipment previously on.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4. **Establish VI to containment:**

   a. Open the following:

   __ • 1VI-129B (A Ess Hdr Cont Outside Isol)

   __ • 1VI-160B (B Ess Hdr Cont Outside Isol)

   __ • 1VI-150B (Lwr Cont Non Ess Cont Outside Isol).

__ b. Check VI header pressure - GREATER THAN 85 PSIG.

b. Perform the following:

1) Align N_2 to all PORVs by opening:

__ • 1NI-430A (Emerg N2 From CLA To 1NC-34A)

__ • 1NI-431B (Emerg N2 From CLA To 1NC-32B & 36B).

__ 2) Restore VI PER AP/1/A/5500/22 (Loss Of VI).

__ 5. Stop all but one NV pump.

__ 6. Check NC pressure - STABLE OR GOING UP.

Perform the following:

__ a. Ensure Pzr spray valves are closed.

__ b. IF NC pressure is still going down, THEN GO TO EP/1/A/5000/ES-1.2 (Post LOCA Cooldown And Depressurization).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

7. **Isolate NV S/I flowpath:**

__ a. Check NV pump - SUCTION ALIGNED TO FWST.

a. IF suction aligned to discharge of ND pumps in S/I Recirc mode, THEN:

__ 1) Realign charging PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 18 (Aligning Normal Charging With NV Recirc Path Isolated).

__ 2) GO TO Step 9.

b. Check NV pumps miniflow valves - OPEN:

__ • 1NV-150B (NV Pumps Recirculation)

__ • 1NV-151A (NV Pumps Recirculation).

b. Perform the following:

__ 1) Open valves.

__ 2) IF both valves open, THEN GO TO Step 7.c.

3) IF either valve closed, THEN:

a) Dispatch operator to open valve(s):

__ • 1NV-150B (aux bldg, 716+8, HH-55, room 627, NV pump room 1A, west of pump motor)

__ • 1NV-151A (aux bldg, 716+9, HH-55, room 627, NV pump room 1A, west of pump motor).

__ b) Realign charging PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 18 (Aligning Normal Charging With NV Recirc Path Isolated).

__ c) WHEN both 1NV-150B and 1NV-151A open, THEN charging flow may be throttled to less than 60 GPM.

__ d) GO TO Step 9.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

7. (Continued)

c. Close the following valves:

__ • 1NI-9A (NC Cold Leg Inj From NV)

__ • 1NI-10B (NC Cold Leg Inj From NV).

c. Dispatch operator to close valve(s):

__ • 1NI-9A (aux bldg, 733+12, JJ-52, room 730, VCT hallway 1 ft south of JJ-52)

__ • 1NI-10B (aux bldg, 733+4, JJ-51, room 730, VCT hallway 1 ft south of JJ-51).

8. **Establish charging:**

__ a. Check VI header pressure - GREATER THAN 60 PSIG.

a. Perform the following:

1) Dispatch operators to perform the following and standby:

__ • Loosen lock nut and throttle handwheel on 1NV-238 (Charging Line Flow Control) (aux bldg, 716+3, HH-54, room 629, PD Pump room) to maintain 6-10 GPM seal injection flow to each NC pump.

__ • Loosen lock nut and close handwheel on 1NV-241 (Seal Inj Flow Control) (aux bldg, 716+9, HH-52, room 603, above BW pumps).

(RNO continued on next page)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

8. (Continued)

2) WHEN 1NV-241 is locally closed, AND 1NV-238 is locally throttled, THEN:

a) Open the following:

__ • 1NV-244A (Charging Line Cont Outside Isol)
__ • 1NV-245B (Charging Line Cont Outside Isol).

b) IF 1NV-244A or 1NV-245B closed, THEN dispatch operator to open valve(s):

__ • 1NV-244A (aux bldg, 716+10, HH-52, room 603, above BW pumps)
__ • 1NV-245B (aux bldg, 716+11, HH-52, room 603, west of BW pumps).

__ c) Place 1NV-238 (Charging Line Flow Control) controller in manual and fully open.

__ d) Place 1NV-241 (Seal Inj Flow Control) manual loader fully open.

3) IF AT ANY TIME charging flow is required to be controlled in subsequent steps, THEN have dispatched operators locally adjust flow rate as follows:

__ • Slowly throttle handwheel on 1NV-241.
__ • Throttle handwheel on 1NV-238 while maintaining NC pump seal injection flow.
__ • Maintain charging flow less than 175 GPM.

__ 4) GO TO Step 9.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

8. (Continued)

__ b. Throttle 1NV-238 (Charging Line Flow Control) to maintain 6-10 GPM seal injection flow to each NC pump.

__ c. Close 1NV-241 (Seal Inj Flow Control).

d. Open the following valves:

__ • 1NV-244A (Charging Line Cont Outside Isol)

__ • 1NV-245B (Charging Line Cont Outside Isol).

d. Dispatch operator to open valve(s):

__ • 1NV-244A (aux bldg, 716+10, HH-52, room 603, above BW pumps)

__ • 1NV-245B (aux bldg, 716+11, HH-52, room 603, west of BW pumps).

e. IF AT ANY TIME charging flow is required to be controlled in subsequent steps, THEN:

__ • Slowly throttle 1NV-241.

__ • Throttle 1NV-238 while maintaining NC pump seal injection flow.

__ • Maintain charging flow less than 175 GPM.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 9. **Control charging flow as required to maintain stable Pzr level.**	**Perform the following:** __ a. Attempt to stabilize Pzr level by raising charging flow (maximum 175 GPM). __ b. IF Pzr level stabilizes or is going up, THEN GO TO Step 10. c. IF Pzr level continues to go down, THEN: 1) Open the following: __ • 1NI-9A (NC Cold Leg Inj From NV) __ • 1NI-10B (NC Cold Leg Inj From NV). 2) Close the following: __ • 1NV-244A (Charging Line Cont Outside Isol) __ • 1NV-245B (Charging Line Cont Outside Isol). __ 3) GO TO EP/1/A/5000/ES-1.2 (Post LOCA Cooldown And Depressurization).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

10. **Check if NI pumps should be stopped:**

a. Check NC pressure -

__ • STABLE OR GOING UP

__ • GREATER THAN 1600 PSIG.

a. Perform the following:

__ 1) IF Pzr level is going down, THEN attempt to stabilize Pzr level by raising charging flow (maximum 175 GPM).

__ 2) IF T-Ave less than 350° F prior to event, AND NC pressure stable or going up, THEN GO TO Step 10.b.

__ 3) GO TO Step 10.d.

__ b. Stop NI pumps.

__ c. GO TO Step 11.

__ d. Check Pzr spray valves - CLOSED.

d. Perform the following:

__ 1) Close Pzr spray valves.

__ 2) IF NC pressure is stable or going up, THEN RETURN TO Step 10.a.

e. Check if main steamlines intact:

__ • All S/G pressures - STABLE OR GOING UP

__ • All S/Gs - PRESSURIZED.

__ e. IF any S/G is faulted, THEN do not continue until faulted S/G depressurization stops or NC pressure starts going up.

NOTE If Pzr heaters are off, NC pressure may go down slowly due to ambient losses and Pzr spray bypass flow. This may be considered "stable" pressure.

__ f. Check NC pressure - STABLE OR GOING UP.

__ f. GO TO EP/1/A/5000/ES-1.2 (Post LOCA Cooldown And Depressurization).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

10. (Continued)

__ g. Check NC pressure - GREATER THAN 1600 PSIG.

g. Perform the following:

NOTE The intent of the next step is to see if NC pressure will recover to above the shutoff head of the NI pumps (1600 PSIG). If pressure is recovering, this step will wait to see if SI termination should be completed in this EP.

1) Do not continue until one of the following is met:

__ • NC pressure goes above 1600 PSIG.

OR

__ • NC pressure stabilizes below 1600 PSIG.

OR

__ • NC pressure starts going down.

__ 2) IF NC pressure goes above 1600 PSIG, THEN GO TO Step 10.h.

__ 3) IF NC pressure remains below 1600 PSIG, THEN GO TO EP/1/A/5000/ES-1.2 (Post LOCA Cooldown And Depressurization).

__ h. Stop NI pumps.

11. Check if ND pumps should be stopped:

__ a. Check ND pumps suction - ALIGNED TO FWST.

__ a. GO TO Step 12.

__ b. Stop ND pumps.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

12. **Check S/I flow not required:**

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

a. Perform the following:

1) Raise S/I flow to restore subcooling as follows:

__ • Start one or more S/I pumps.

• IF necessary, THEN realign NV S/I flow path:

__ a) IF suction aligned to VCT, THEN realign to FWST or to discharge of ND pumps in S/I Recirc mode.

b) Realign discharge as follows:

(1) Open the following:

__ • 1NI-9A (NC Cold Leg Inj From NV)

__ • 1NI-10B (NC Cold Leg Inj From NV).

(2) Close the following:

__ • 1NV-244A (Charging Line Cont Outside Isol)

__ • 1NV-245B (Charging Line Cont Outside Isol).

__ 2) GO TO EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

12. (Continued)

__ b. Pzr level - GREATER THAN 11% (29% ACC).

b. Perform the following:

__ 1) Control charging flow to maintain Pzr level.

__ 2) IF Pzr level can be maintained with normal charging, THEN GO TO Step 13.

3) Raise S/I flow to restore level as follows:

__ • Start one or more S/I pumps.

• IF necessary, THEN realign NV S/I flow path:

__ a) IF suction aligned to VCT, THEN realign to FWST or to discharge of ND pumps in S/I Recirc mode.

b) Realign discharge as follows:

(1) Open the following:

__ • 1NI-9A (NC Cold Leg Inj From NV)

__ • 1NI-10B (NC Cold Leg Inj From NV).

(2) Close the following:

__ • 1NV-244A (Charging Line Cont Outside Isol)

__ • 1NV-245B (Charging Line Cont Outside Isol).

__ 4) GO TO EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

13. **Check if NS pumps should be stopped:**

__ a. Any NS pump - ON.

a. Perform the following:

__ 1) IF AT ANY TIME while in this procedure an NS pump starts, THEN perform Step 13.

__ 2) GO TO Step 14.

__ b. Containment pressure - LESS THAN 2 PSIG.

b. Perform the following:

__ 1) IF NS pump suction has been aligned for Cold Leg Recirc, THEN GO TO Step 14.

__ 2) IF AT ANY TIME containment pressure is less than 2 PSIG, AND NS pump suction is still aligned to FWST, THEN perform Step 13.

__ 3) GO TO Step 14.

__ c. Check operating NS pump(s) suction - ALIGNED TO FWST.

__ c. GO TO Step 14.

__ d. Check operating NS pump(s) - HAVE REMAINED RUNNING SINCE INITIAL PHASE B SIGNAL.

__ d. IF NS pump(s) had been previously been stopped and restarted, THEN GO TO Step 14.

__ e. Reset Containment Spray.

__ f. Stop NS pumps.

g. Close the following:

__ • 1NS-29A (A NS Pump Disch Cont Outside Isol)

__ • 1NS-32A (A NS Pump Disch Cont Outside Isol)

__ • 1NS-15B (B NS Pump Disch Cont Outside Isol)

__ • 1NS-12B (B NS Pump Disch Cont Outside Isol).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

14. **Check steam dumps as follows:**

a. Check condenser available:

__ • "C-9 COND AVAILABLE FOR STEAM DUMP" status light (1SI-18) - LIT.

__ • MSIVs on intact S/Gs - OPEN.

a. Perform the following:

__ 1) IF SM PORV Reset lights are lit, THEN GO TO Step 14.g.

2) IF any S/G pressure is less than 775 PSIG, OR is faulted, THEN:

__ a) Ensure NC System depressurized to less than 1955 PSIG.

__ b) Ensure Low Pressure Steamline Isolation signal is blocked.

__ c) Maintain NC pressure less than 1955 PSIG.

__ 3) Reset Main Steam Isolation.

__ 4) Close SM PORV manual loaders.

__ 5) Select "MANUAL" on "SM PORV MODE SELECT".

__ 6) Reset SM PORVs.

__ 7) Request STA to assist in monitoring NC pressure and temperature.

CAUTION **If Pzr is solid, lowering intact S/G pressures too rapidly can cause a loss of NC subcooling.**

NOTE Quickly stabilizing NC temperature will help prevent overfilling Pzr.

__ 8) Manually operate intact S/G(s) SM PORVs as required to stabilize NC T-Hots.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

14. (Continued)

9) IF NC pressure starts dropping, THEN perform the following as required to maintain stable NC pressure:

__ • Raise charging flow.

__ • Operate Pzr heaters.

10) IF AT ANY TIME all of the following conditions are met:

__ • All intact S/G pressures are at 1100 PSIG.
__ • NC T-Hots are stable
__ • Pzr steam bubble exists.

THEN SM PORVs may be selected to auto as follows:

__ a) Place "SM PORV MODE SELECT SWITCH" to "AUTO".

__ b) Slowly throttle intact S/G SM PORV manual loaders fully open.

__ 11) GO TO Step 14.g.

b. Perform the following to place steam dumps in steam pressure mode:

__ 1) Place "STM PRESS CONTROLLER" in manual.

__ 2) Adjust "STM PRESS CONTROLLER" output to equal "STEAM DUMP DEMAND" signal.

__ 3) Place "STEAM DUMP SELECT" in steam pressure mode.

__ c. Check "P-12 LO-LO TAVG" status light (1SI-18) - DARK.

__ c. Place steam dumps in bypass interlock.

__ d. Control steam dumps to maintain NC T-Hots - STABLE.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

14. (Continued)

e. IF AT ANY TIME "STEAM HEADER PRESSURE" is at 1092 PSIG AND auto control desired, THEN perform the following:

__ 1) Ensure "STM PRESS CONTROLLER" setpoint at 1092 PSIG (pot setting of 8.4).

__ 2) Place "STM PRESS CONTROLLER" in auto.

__ 3) Ensure steam dumps open as required to control "STEAM HEADER PRESSURE" at 1092 PSIG.

__ f. GO TO Step 15.

__ g. Place "STM PRESS CONTROLLER" in manual and close.

__ h. Place "STEAM DUMP SELECT" in steam pressure mode.

__ 15. Check NC T-Hots - STABLE.

__ Control steam flow and total feed flow as required to stabilize NC T-Hots.

16. Check if letdown can be established:

__ a. Pzr level - GREATER THAN 25% (50% ACC).

a. Perform the following:

__ 1) WHEN Pzr level goes above 25% (50% ACC), THEN perform Step 16.

__ 2) Observe Note prior to Step 17 and GO TO Step 17.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

16. (Continued)

__ b. Check ND pumps - OFF.

b. Perform the following:

1) IF VI pressure is greater than 60 PSIG, THEN:

a) Close one of the following valves:

__ • 1KC-149 (A KF Hx Outlet Flow)

OR

__ • 1KC-156 (B KF Hx Outlet Flow).

__ b) WHEN aligning KC in next steps, THEN throttle KC flow to ND Hx to 2000 GPM instead of isolating flow to ND Hx.

__ c) GO TO Step 16.c.

2) IF VI pressure is less than 60 PSIG, THEN:

__ a) IF AT ANY TIME while in this procedure, VI pressure is restored, THEN perform Step 16.

__ b) Observe Note prior to Step 17 and GO TO Step 17.

c. Open the following:

__ • 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol)

__ • 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol).

d. Monitor the following while aligning KC to aux bldg non essential header:

__ • KC surge tank levels

__ • KC System flow.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

16. (Continued)

e. Place the following in "AUTO" for the operating KC train(s):

__ • 1KC-51A (Train A Recirc Isol)

__ • 1KC-54B (Train B Recirc Isol).

__ f. Check 1KC-1A - OPEN.

f. IF 1KC-1A will not open, THEN perform the following:

__ 1) Close 1KC-56A (KC To A ND Hx).

__ 2) GO TO Step 16.h.

g. Perform the following concurrently:

__ • Close 1KC-56A (KC To A ND Hx).

__ • As flow goes down, open 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol).

__ h. Check 1KC-2B - OPEN.

h. IF 1KC-2B will not open, THEN perform the following:

__ 1) Close 1KC-81B (KC To B ND Hx).

__ 2) GO TO Step 16.j.

i. Perform the following concurrently:

__ • Close 1KC-81B (KC To B ND Hx).

__ • As flow goes down, open 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol).

__ j. Reset modulating valves using reset buttons on RN control board.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

16. (Continued)

k. Check:

__ • 1EMF-51A (Containment Train A (Hi Range)) - LESS THAN 25 R/HR

__ • 1EMF-51B (Containment Train B (Hi Range)) - LESS THAN 25 R/HR.

k. Perform the following:

__ 1) Establish excess letdown to NCDT PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 2 (Establishing Excess Letdown).

__ 2) Notify station management to evaluate performing Step 16 l with high activity levels in the NC System.

__ 3) Observe Note prior to Step 17 and GO TO Step 17.

__ l. Establish letdown PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 1 (Establishing Normal Letdown).

__ l. Establish excess letdown PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 2 (Establishing Excess Letdown).

NOTE A boric acid flow control pot setting of 6.5 ensures VCT makeup is greater than cold shutdown boron concentration.

17. Check VCT makeup control system:

__ a. Ensure makeup set for greater than NC shutdown boron concentration.

__ b. Ensure NC System makeup controller in "AUTO".

__ c. Place NC System makeup switch to "START".

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

18. **Align NV pump suction to VCT:**

__ a. Check NV pump - SUCTION ALIGNED TO FWST.

a. Perform the following:

__ 1) Notify station management to evaluate proper VCT alignment.

__ 2) GO TO Step 19.

b. Open the following:

__ • 1NV-141A (VCT Outlet Isol)

__ • 1NV-142B (VCT Outlet Isol).

c. Close the following:

__ • 1NV-221A (NV Pumps Suct From FWST)

__ • 1NV-222B (NV Pumps Suct From FWST).

__ 19. **Maintain Pzr pressure stable using Pzr heaters and normal Pzr spray.**

IF normal spray not available, THEN stabilize Pzr pressure as follows:

__ a. IF letdown in service, THEN use NV aux spray PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 3 (Establishing NV Aux Spray).

__ b. IF letdown isolated OR NV aux spray not effective, THEN use one Pzr PORV.

20. **Control intact S/G levels:**

__ a. Check N/R level in any intact S/G - GREATER THAN 11% (32% ACC).

__ a. Maintain total feed flow greater than 450 GPM until at least one intact S/G N/R level greater than 11% (32% ACC).

__ b. Throttle feed flow to maintain all intact S/G N/R levels between 11% (32% ACC) and 50%.

__ b. IF N/R level in any intact S/G continues to go up in an uncontrolled manner, THEN stop feed flow to that S/G.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

21. **Check NC pump cooling:**

a. Check KC aligned to reactor bldg non essential header from one of the following trains:

- A train:

__ • 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol) - OPEN

__ • 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol) - OPEN

__ • A train KC pumps - ON.

OR

- B train:

__ • 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol) - OPEN

__ • 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol) - OPEN

__ • B train KC pumps - ON.

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

- IF NC pump seal injection established, THEN:

__ 1) Align KC PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 14 (Reestablishing KC To Thermal Barriers).

__ 2) GO TO Step 22.

OR

- IF NC pump seal injection has also been lost, THEN:

NOTE NC pump seal cooldown will occur as the entire NC System is cooled down.

__ 1) Maintain NC pump seal injection and thermal barrier cooling isolated.

__ 2) GO TO Step 22.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

21. (Continued)

b. Check following valves - OPEN:

__ • 1KC-394A (A NC Pump Therm Bar Otlt)

__ • 1KC-345A (C NC Pump Therm Bar Otlt)

__ • 1KC-425A (NC Pumps Ret Hdr Cont Outside Isol)

__ • 1KC-364B (B NC Pump Therm Bar Otlt)

__ • 1KC-413B (D NC Pump Therm Bar Otlt)

__ • 1KC-338B (NC Pump Sup Hdr Cont Outside Isol)

__ • 1KC-424B (NC Pumps Ret Hdr Cont Inside Isol).

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

• IF NC pump seal injection established, THEN:

__ 1) Align KC PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 14 (Reestablishing KC To Thermal Barriers).

__ 2) GO TO Step 22.

OR

• IF NC pump seal injection has also been lost, THEN:

NOTE NC pump seal cooldown will occur as the entire NC System is cooled down.

__ 1) Maintain NC pump seal injection and thermal barrier cooling isolated.

__ 2) GO TO Step 22.

__ c. Check NC pump seal injection flow - GREATER THAN 6 GPM.

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

__ • IF seal injection flow exists, THEN throttle 1NV-241 (Seal Inj Flow Control) and 1NV-238 (Charging Line Flow Control) to establish normal flow rates.

OR

__ • IF seal injection flow has been lost, THEN reestablish PER AP/1/A/5500/12 (Loss of Letdown, Charging or Seal Injection).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

22. **Check if NC pump seal return flow should be established:**

__ a. Check NC pump seal injection flow - GREATER THAN 6 GPM.

a. Perform the following:

__ 1) WHEN seal injection established, THEN complete Step 22.

__ 2) GO TO Step 23.

b. Check:

__ • 1EMF-51A (Containment Train A (Hi Range)) - LESS THAN 25 R/HR

__ • 1EMF-51B (Containment Train B (Hi Range)) - LESS THAN 25 R/HR.

b. Perform the following:

__ 1) Notify station management to evaluate performing Steps 22.c through 22.d with high activity levels in the NC System.

__ 2) GO TO Step 23.

c. Check KC aux bldg non essential header valves- OPEN:

__ • 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol)

__ • 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol)

__ • 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol)

__ • 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol).

c. Perform the following:

__ 1) Notify station management to evaluate performing Step 22.d without KC to seal water HX.

__ 2) GO TO Step 23.

d. Open the following:

__ • 1NV-94AC (NC Pumps Seal Ret Cont Inside Isol)

__ • 1NV-95B (NC Pumps Seal Ret Cont Outside Isol).

__ 23. Check 1ETA and 1ETB - ENERGIZED BY OFFSITE POWER.

__ REFER TO AP/1/A/5500/07 (Loss Of Electrical Power) while continuing with this procedure.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 24. **Check NC pump status - AT LEAST ONE ON.**	**Perform the following:** a. Check if NC pump seal cooling has been maintained: __ • Seal injection flow OR __ • KC flow to thermal barrier. __ b. IF NC pump seal cooling has not been maintained, THEN notify station management to perform a status evaluation prior to starting an NC pump. c. IF "REACTOR VESSEL UR LEVEL" is less than 100%, AND any NC pump is available to start, THEN perform the following prior to starting an NC pump: __ • Raise Pzr level to greater than 90% __ • Raise NC subcooling based on core exit T/Cs to greater than 36° F. __ • Use Pzr heaters as necessary to saturate Pzr water. NOTE Preference should be given to running 1B NC Pump first, then 1A NC Pump to provide Pzr spray capability. __ d. Start one NC pump PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 6 (NC Pump Startup). __ e. Ensure Natural Circulation flow PER Enclosure 2 (Natural Circulation Parameters) until an NC pump can be started.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

25. **Check if S/R detectors should be energized:**

__ a. Check I/R channels - LESS THAN 10^{-10} AMPS.

a. *Perform the following:*

__ 1) WHEN I/R is less than 10^{-10} *amps,* THEN *perform Steps* 25.b and 25.c.

__ 2) GO TO Step 26.

__ b. Check S/R channels - ENERGIZED.

b. *Perform the following:*

__ • Place S/R select switches to "RESET".

__ • Notify station management that S/R *had to be manually energized.* (I/R compensation may require adjustment during next unit startup.)

__ c. Transfer one "NIS RECORDER" selector switch to a S/R channel and the other to an I/R channel.

26. **Check if D/Gs should be stopped:**

__ a. Check any D/G - ON.

__ a. GO TO Step 27.

__ b. Check 1ETA and 1ETB - ENERGIZED BY OFFSITE POWER.

__ b. REFER TO AP/1/A/5500/07 (Loss Of Electrical Power) while continuing with this procedure.

c. Dispatch operator to stop unloaded D/G(s) and place in standby readiness PER OP/1/A/6350/002 (Diesel Generator):

__ • Enclosure 4.3 (1A D/G Shutdown)

__ • Enclosure 4.4 (1B D/G Shutdown).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

27. **Align non-essential plant equipment PER:**

__ • EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 8 (Nonessential Plant Equipment)

__ • EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 21 (CA Storage Tank (Water Tower) Makeup).

28. **Maintain plant conditions - STABLE:**

__ • Pzr pressure

__ • Pzr level

__ • NC Temperatures

__ • Intact S/G levels.

__ 29. **Check MSIVs on intact S/Gs - OPEN.**

WHEN it is desired to establish condenser steam dumps, THEN perform the following:

__ a. IF intact S/G MSIVs required closed to isolate leak, THEN GO TO Step 30.

b. IF any S/G pressure is less than 775 PSIG, THEN:

__ 1) Ensure NC System depressurized to less than 1955 PSIG.

__ 2) Ensure Low Pressure Steamline Isolation signal is blocked.

__ 3) Maintain NC pressure less than 1955 PSIG.

__ c. Reset Main Steam Isolation.

__ d. Reset MSIV Bypass Valves.

__ e. Place "STEAM DUMP SELECT" in steam pressure mode.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

29. (Continued)

__ f. Place "STM PRESS CONTROLLER" in manual and close.

__ g. Slowly throttle open MSIV bypass valves on intact S/Gs to equalize pressure across MSIVs, while ensuring NC T-Hots are maintained stable.

h. WHEN pressure equalized, THEN:

__ 1) Open all MSIVs on intact S/Gs.

__ 2) Close all MSIV bypass valves.

__ 3) IF "P-12 LO-LO TAVG" status light (1SI-18) is lit, THEN place steam dumps in bypass interlock.

__ 4) Control steam dumps to maintain NC T-Hots - STABLE.

5) IF AT ANY TIME "STEAM HEADER PRESSURE" is at 1092 PSIG AND auto control desired, THEN perform the following:

__ a) Ensure "STM PRESS CONTROLLER" setpoint at 1092 PSIG (pot setting of 8.4).

__ b) Place "STM PRESS CONTROLLER" in auto.

__ c) Ensure steam dumps open as required to control "STEAM HEADER PRESSURE" at 1092 PSIG.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

30. **Check S/I flow not required:**

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

a. Perform the following:

1) Raise S/I flow to restore subcooling as follows:

__ • Start one or more S/I pumps.

• IF necessary, THEN realign NV S/I flow path:

__ a) IF suction aligned to VCT, THEN realign to FWST or to discharge of ND pumps in S/I Recirc mode.

b) Realign discharge as follows:

(1) Open the following:

__ • 1NI-9A (NC Cold Leg Inj From NV)

__ • 1NI-10B (NC Cold Leg Inj From NV).

(2) Close the following:

__ • 1NV-244A (Charging Line Cont Outside Isol)

__ • 1NV-245B (Charging Line Cont Outside Isol).

__ 2) GO TO EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

30. (Continued)

__ b. Pzr level - GREATER THAN 11% (29% ACC).

b. Perform the following:

__ 1) Control charging flow to maintain Pzr level.

__ 2) IF Pzr level can be maintained with normal charging, THEN GO TO Step 31.

3) Raise S/I flow to restore level as follows:

__ • Start one or more S/I pumps.

• IF necessary, THEN realign NV S/I flow path:

__ a) IF suction aligned to VCT, THEN realign to FWST or to discharge of ND pumps in S/I Recirc mode.

b) Realign discharge as follows:

(1) Open the following:

__ • 1NI-9A (NC Cold Leg Inj From NV)

__ • 1NI-10B (NC Cold Leg Inj From NV).

(2) Close the following:

__ • 1NV-244A (Charging Line Cont Outside Isol)

__ • 1NV-245B (Charging Line Cont Outside Isol).

__ 4) GO TO EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

31. **Check if S/G sampling required:**

__ a. EP/1/A/5000/E-2 (Faulted Steam Generator Isolation) - HAS BEEN IMPLEMENTED.

__ a. GO TO Step 32.

__ b. Periodically sample all S/Gs for activity PER EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 9 (S/G Sampling With S/I Signal).

__ c. WHEN sample results available, THEN check activity normal.

c. Perform the following:

__ 1) Contact station management to evaluate sample results.

2) IF sample indicates SGTR, THEN:

__ a) Ensure at least one NI pump on or NV S/I flow path aligned (suction, discharge, isolate normal charging).

__ b) GO TO EP/1/A/5000/E-3 (Steam Generator Tube Rupture).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

32. **Determine required plant recovery procedure:**

__ a. REFER TO Enclosure 3 (Plant Realignment After S/I Termination) and perform actions at station management direction.

__ b. Check plant cooldown - REQUIRED.

b. Perform the following:

__ 1) Perform applicable steps of OP/1/A/6100/003 (Controlling Procedure For Unit Operation), Enclosure 4.2 (Power Reduction).

__ 2) GO TO OP/1/A/6100/003 (Controlling Procedure For Unit Operation), Enclosure 4.1 (Power Increase).

__ c. Perform applicable steps of OP/1/A/6100/003 (Controlling Procedure For Unit Operation), Enclosure 4.2 (Power Reduction).

__ d. Check all NC pumps - OFF.

__ d. GO TO OP/1/A/6100/002 (Controlling Procedure For Unit Shutdown).

__ e. GO TO EP/1/A/5000/ES-0.2 (Natural Circulation Cooldown).

END

1. **S/I Reinitiation Criteria (Applies after Step 11 in body of this procedure):**

   - IF NC subcooling based on core exit T/Cs is less than 0° F OR Pzr level can not be maintained greater than 11% (29% ACC), THEN:

     a. Start S/I pumps and realign NV S/I flow path (suction, discharge, isolate normal charging) as necessary to restore subcooling and level.

     b. GO TO EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant).

2. Secondary Integrity Criteria:

   - IF any unisolated S/G pressure is going down in an uncontrolled manner, OR has completely depressurized, THEN GO TO EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).

3. SGTR Transition Criteria:

   - IF any S/G level goes up in an uncontrolled manner, OR any S/G has abnormal radiation, THEN:

     a. Ensure at least one NI pump on or NV S/I flow path aligned (suction, discharge, isolate normal charging).

     b. GO TO EP/1/A/5000/E-3 (Steam Generator Tube Rupture).

4. Cold Leg Recirc Switchover Criteria:

   - IF FWST level reaches 180 inches ("FWST LEVEL LO" alarm), THEN GO TO EP/1/A/5000/ES-1.3 (Transfer To Cold Leg Recirc).

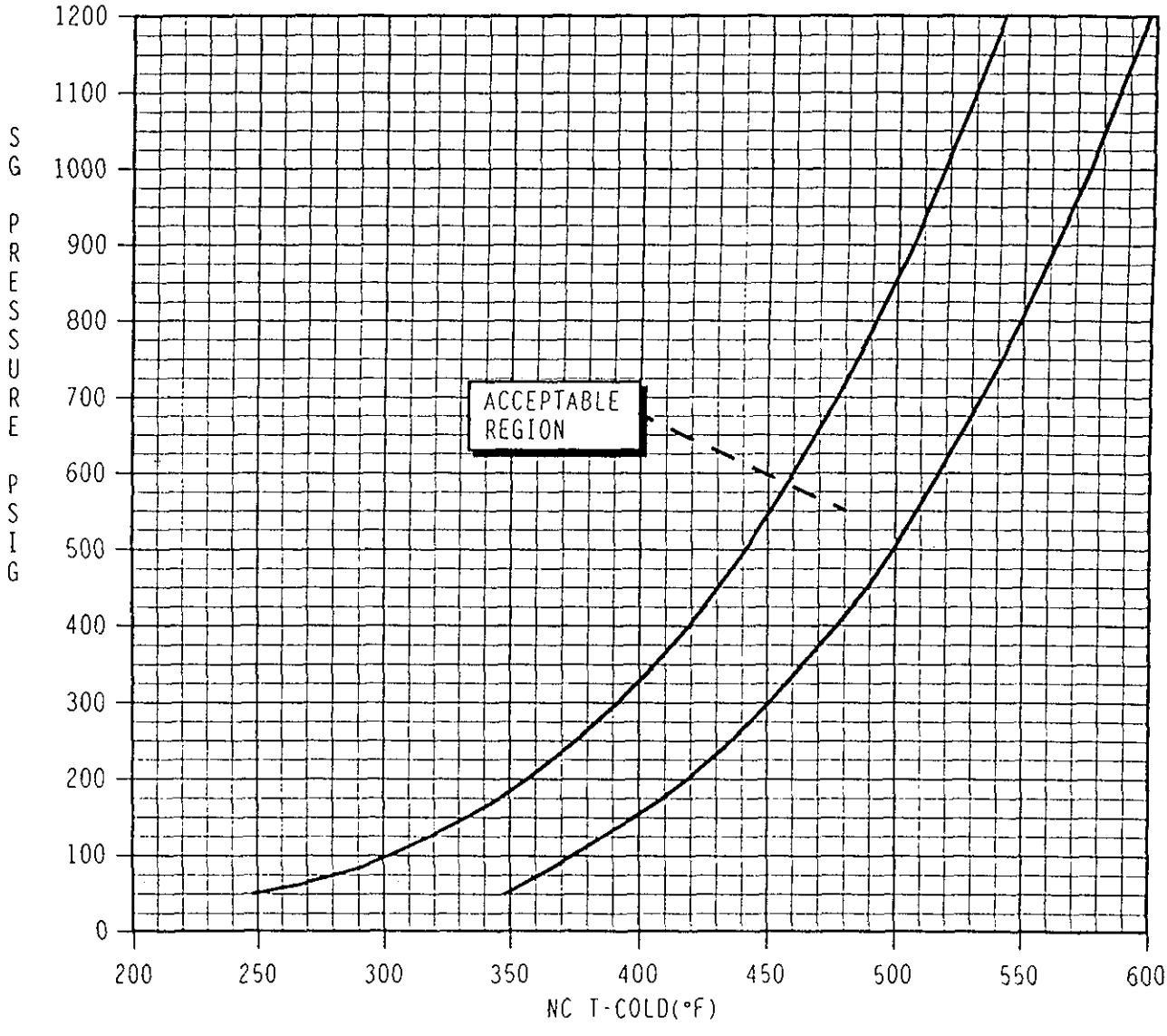
5. CA Suction Sources:

   - IF CA Storage Tank (water tower) goes below 1.5 ft, THEN perform EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 20 (CA Suction Source Realignment).

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

   - NC subcooling - GREATER THAN 0° F
   - S/G pressures - STABLE OR GOING DOWN
   - NC T-Hots - STABLE OR GOING DOWN
   - Core exit T/Cs - STABLE OR GOING DOWN
   - 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 raise dumping steam to establish Natural Circulation flow.



NOTE
- The following steps restore the plant to a normal operating condition and each step shall only be performed at the discretion of station management.
- For spurious S/I actuation, the ESF automatic actuation logic should be made operable by performing Step 12 or Mode 4 entered within 13 hours of resetting S/I (Tech Spec 3.3.2 and 3.0.3).
- This enclosure does not address systems aligned in Cold Leg Recirc.
- This enclosure does not address any EMFs in trip condition.
- Step order may be changed at station management direction.

1. **Establish non-essential VI to containment by opening:**

__ • 1IA-508A (VI to Upper Pers Airlock Isol)

__ • 1IA-516A (VI to Lower Pers Airlock Isol)

__ • 1VI-362A (VI To Annulus Vent Cont Isol)

__ • 1VI-148B (Upp Cont Non Ess Cont Outside Isol).

2. **Restore Pzr heaters:**

__ a. Place A and B heaters in manual.

__ b. Close A and B heater group supply breakers.

__ 3. **Reset Containment Ventilation Isolation signal.**

4. **Reopen the following containment sump and drain valves:**

__ • 1WL-64A (RB Sump Pumps Disch Cont Inside Isol)

__ • 1WL-321A (Cont Vent Unit Drn Cont Inside Isol)

__ • 1WL-322B (Cont Vent Unit Drn Cont Outside Isol).

5. **Realign RN headers to normal:**

NOTE Swapping B train RN suction to the LLI may reduce NPSH available to all RN pumps.

a. IF VI header pressure is less than 60 PSIG, AND all 4 unit 1 and unit 2 RN pumps are on, THEN:

__ 1) Contact station management to evaluate NPSH concerns prior to making alignments in Step 5.

__ 2) GO TO Step 6.

b. Throttle the following valves to minimum for existing plant conditions:

__ • 1RN-89A (RN to A KC Hx Control)

__ • 1RN-190B (RN To B KC Hx Control).

c. Notify Unit 2 to throttle the following valves to minimum for existing plant conditions:

__ • 2RN-89A (RN to A KC Hx Control)

__ • 2RN-190B (RN To B KC Hx Control).

d. Open the following:

__ • 0RN-10AC (Train 1B & 2B LLI Supply)

__ • 0RN-11B (Train 1B & 2B LLI Supply).

__ e. Close 0RN-9B (Train 1B & 2B SNSWP Supply).

f. Open the following:

__ • 0RN-283AC (Train 1B & 2B Disch To RC)

__ • 0RN-284B (Train 1B & 2B Disch To RC).

__ g. Close 0RN-152B (Train 1B & 2B Disch to SNSWP).

h. Open the following:

__ • 1RN-41B (Train B To Non Ess Hdr Isol)

__ • 1RN-43A (Train B To Non Ess Hdr Isol).

5. (Continued)

i. Notify Unit 2 RO to open the following:

__ • 2RN-41B (Train B To Non Ess Hdr Isol)

__ • 2RN-43A (Train B To Non Ess Hdr Isol).

__ j. Open 0RN-4AC (Train 1B & 2B RC Supply).

k. Open the following RN nonessential header valves:

__ • 1RN-42A (AB Non Ess Supply Isol)

__ • 1RN-63B (AB Non Ess Return Isol)

__ • 1RN-279B (AB Vent Sys Return Isol)

__ • 1RN-299A (AB Vent Sys Return Isol).

6. **Realign KC for normal operation:**

   a. Open the following:

   __ • 1KC-430A (Rx Bldg Drain Hdr Cont Outside Isol)

   __ • 1KC-429B (Rx Bldg Drain Hdr Cont Inside Isol).

   b. IF NCDT temperature is less than or equal to 220° F, THEN open the following:

   __ • 1KC-320A (NCDT Hx Sup Hdr Cont Outside Isol)

   __ • 1KC-333A (NCDT Hx Ret Hdr Cont Outside Isol)

   __ • 1KC-332B (NCDT Hx Ret Hdr Cont Inside Isol).

   c. IF NCDT temperature greater than 220° F, THEN perform the following:

   CAUTION **Establishing KC flow rapidly to NCDT HX may cause water hammer due to steam voiding of KC water in HX.**

   1) Dispatch operator to close the following valves and standby: .

   __ • 1KC-335 (NCDT Hx Ret Isol) (aux bldg, 733+14, JJ-51, room 730, 20 ft southwest of BIT, 2 ft from shield wall, above 230° mark, 1 ft from ceiling)

   __ • 1KC-318 (NCDT Hx Sup Isol) (aux bldg, 733+9, JJ-50, room 730, outside door to VCT).

   2) WHEN 1KC-335 and 1KC-318 are closed, THEN open the following:

   __ • 1KC-320A (NCDT Hx Sup Hdr Cont Outside Isol)

   __ • 1KC-333A (NCDT Hx Ret Hdr Cont Outside Isol)

   __ • 1KC-332B (NCDT Hx Ret Hdr Cont Inside Isol).

   __ 3) WHEN valves in Step 6.c.2) are opened, THEN notify dispatched operator to slowly reopen 1KC-318.

   __ 4) WHEN 1KC-318 is open, THEN notify dispatched operator to slowly reopen 1KC-335.

7. **Realign NCDT:**

   a. Open the following:

   __ • 1WL-2A (NCDT Pumps Disch Cont Inside Isol)

   __ • 1WL-39A (NCDT Vent Cont Inside Isol)

   __ • 1WL-1B (NCDT Pumps Disch Cont Outside Isol)

   __ • 1WL-41B (NCDT Vent Cont Outside Isol).

   __ b. Place in normal operation PER OP/1/A/6500/001 (Liquid Waste System), Enclosure 4.1 (NCDT Operation).

8. IF desired, THEN secure KC pumps not needed as follows:

   a. IF desired to secure A Train KC pumps, THEN:

      1) Open:

      __ a) 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).

      __ b) 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).

      2) Close:

      __ a) 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).

      __ b) 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).

      __ 3) Place 1KC-51A (Train A Recirc Isol) in "CLOSE".

      __ 4) Ensure 1KC-51A is closed.

      5) Stop the following:

      __ • 1A1 KC Pump

      __ • 1A2 KC Pump.

8. (Continued)

b. IF desired to secure B Train KC pumps, THEN:

1) Open:

__ a) 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).

__ b) 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).

2) Close:

__ a) 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).

__ b) 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).

__ 3) Place 1KC-54B (Train B Recirc Isol) in "CLOSE".

__ 4) Ensure 1KC-54B is closed.

5) Stop the following:

__ • 1B1 KC Pump

__ • 1B2 KC Pump.

9. **Depress "SS RESET" for the following valves:**

__ • 1NI-185A (RB Sump To Train A ND & NS)

__ • 1NI-184B (RB Sump To Train B ND & NS).

10. Realign FWST:

a. Open the following:

__ • 1FW-33A (FWST To Recirc Pumps)

__ • 1FW-49B (FWST To Recirc Pumps).

__ b. IF FWST Recirc Pump is required for recirc, THEN start pump.

11. **IF PRT intact, THEN realign as follows:**

    a. Open the following:

    __ • 1NC-54A (N2 To PRT Cont Inside Isol)

    __ • 1NC-56B (PRT Spray Cont Outside Isol)

    __ • 1NC-53B (N2 To PRT Cont Outside Isol).

    __ b. Establish normal conditions PER OP/1/A/6150/004 (Pressurizer Relief Tank), Enclosure 4.1 (Establishing PRT Normal Operation Conditions).

12. **Restore ESF Automatic Actuation Logic to operable (Tech Spec 3.3.2):**

__ a. Ensure all S/G N/R levels less than 83% (P14).

b. Dispatch operator to shutdown both M/G sets as follows:

__ 1) Open both "GENERATOR CIRCUIT BREAKER CONTROL" switches.

__ 2) Open both "MOTOR CIRCUIT BREAKER CONTROL" switches.

c. Ensure all S/I signals cleared (just having S/I reset is not adequate):

__ • High containment pressure

__ • Pzr low pressure

__ • Any inadvertent S/I signal.

__ d. IF possible, THEN ensure all Reactor Trip signals cleared (first out alarms dark).

e. Reset P-4 logic as follows:

__ 1) Close 1A Reactor Trip breaker.

__ 2) Open 1A Reactor Trip breaker.

__ 3) Close 1B Reactor Trip breaker.

__ 4) Open 1B Reactor Trip breaker.

__ f. Ensure "AUTO SI BLOCKED" status light (1SI-18) - DARK.

g. Return OAC Monitor Light Programs to normal as follows:

__ 1) Enter turn on code "MONL".

__ 2) Select "UNLATCH" for "SAFETY INJECTION TRAIN LATCH".

__ 3) Select "UNLATCH" for "CONTAINMENT SPRAY TRAIN LATCH".

13. **Establish CF to S/Gs as follows:**

__ a. **IF** a Feedwater Isolation signal has occurred due to high high doghouse level **OR** P-14, **THEN** ensure condition is clear prior to performing Step 13.

__ b. Ensure Step 12 completed.

__ c. Ensure aux steam is being supplied by Unit 2 or Aux Boiler per EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 8 (Nonessential Plant Equipment).

__ d. **IF** all condensate booster pumps are off, **THEN** establish CM and CF flow **PER** OP/1/A/6250/001 (Condensate And Feedwater System), Enclosure 4.2 (CM System Hot Restart).

__ e. **IF** any condensate booster pump is on, **THEN** establish CF flow **PER** OP/1/A/6250/001 (Condensate And Feedwater System), Enclosure 4.17 (CF Pump Startup).

14. **WHEN CA no longer required, THEN stop CA pumps and return to normal PER OP/1/A/6250/002 (Auxiliary Feedwater System):**

__ • Enclosure 4.2 (Manual Operation of 1A / 1B CA Pumps)

__ • Enclosure 4.4 (Manual Operation of #1 TD CA Pump).

15. **Reestablish NC sample as follows:**

__ a. Notify Primary Chemistry that NC sample valves will be reopened.

b. Open the following:

__ • 1NM-22A (A NC Loop Cont Inside Isol)

__ • 1NM-26B (NC Loop Sample Cont Outside Isol).

c. Request Primary Chemistry to perform the following:

__ 1) Obtain NC System sample.

__ 2) Determine NC boron concentration.

__ 3) Perform isotopic analysis **PER** Station Chemistry Manual requirements.

16. **Establish N/R containment pressure indication:**

__ a. Open 1NSSV5551 (Unit 1 Cont NR Press Outside Isol).

__ b. Open 1NSSV5550 (Unit 1 Cont NR Press Inside Isol).

17. **Establish containment radiation monitor sampling:**

a. Open the following:

__ • 1MISV-5580 (EMF 38,39,40 Inlet Cont Outside Isol)

__ • 1MISV-5582 (EMF 38,39,40 Outlet Cont Outside Isol)

__ • 1MISV-5581 (EMF 38,39,40 Inlet Cont Inside Isol)

__ • 1MISV-5583 (EMF 38,39,40 Outlet Cont Inside Isol).

__ b. Start EMF -38,39,40 sample blower.

__ 18. **Return Containment Ventilation Systems to normal PER OP/1/A/6450/001 (Containment Ventilation System), Enclosure 4.5 (Realignment of Containment Ventilation Systems Following SI).**

__ 19. **Evaluate restoring VQ capability PER OP/1/A/6450/017 (Containment Air Release And Addition System).**

__ 20. **Return VC/YC to normal operation PER OP/0/A/6450/011 (Control Area Ventilation/Chilled Water System), Enclosure 4.7 (Realignment of VC/YC After a B/O or SI).**

21. **Return VA to normal as follows:**

    a. Dispatch operator to local VA Filtered Exhaust panels to return VA to pre-S/I status by resetting:

    __ • ABFXF 1A

    __ • ABFXF 1B

    __ • ABFXF 2A

    __ • ABFXF 2B.

    __ b. Return VA to normal operation **PER** OP/0/A/6450/003 (Auxiliary Building Ventilation System), Enclosure 4.1 (Aux Building Ventilation Fans and Counting Room Filter Unit Startup and Normal Operation).

22. **Return TSC and Computer Room ventilation to normal operation as follows:**

    __ a. Dispatch operator to close 1EMXA-R10E (OTSC Normal Supply To MCC-SMXE).

    b. **WHEN** breaker is closed, **THEN** notify Maintenance to return the following to normal:

    __ • TSC ventilation

    __ • Computer Room ventilation.

23. **Dispatch operator to reset and close the following breakers:**

    __ • 1EMXB-7B (NI Trace Heating Pnlbd 1ETHB)

    __ • 1EMXC-5B (Emergency AC Lighting Pnlbd No. ELA-1)

    __ • 1EMXD-5B (Emergency AC Lighting Pnlbd No. ELB-1).

24. **WHEN CA pumps stopped per Step 14, THEN establish S/G sample and blowdown as follows:**

CAUTION **Establishing blowdown with NC pumps off may cause uncontrolled cooldown.**

a. IF all NC pumps off, THEN perform the following:

__ 1) Contact station management to evaluate need to establish blowdown.

__ 2) WHEN blowdown is required OR any NC pump is started, THEN complete Step 24.b.

__ 3) GO TO Step 25.

__ b. WHEN S/G blowdown and sample are desired, THEN align PER OP/1/A/6250/008 (Steam Generator Blowdown), Enclosure 4.1 (Establishing BB).

__ 25. **IF FWST level is low, THEN refill PER OP/1/A/6200/014 (Refueling Water System), Enclosure 4.2 (FWST Makeup Using Reactor Makeup Blender During Modes 1-5 or While Defueled).**

__ 26. **Return KF to normal operation PER OP/1/A/6200/005 (Spent Fuel Cooling System), Enclosure 4.1 (KF Pumps Operation).**

27. **Realign vital battery chargers as follows:**

__ a. Determine which battery chargers are actually being powered from Unit 2.

b. Open battery charger M contactors as follows:

__ • IF vital battery charger EVCA is being powered from Unit 2, THEN depress "STOP" on associated Unit 1 "EVCA BATT CHARGER".

__ • IF vital battery charger EVCB is being powered from Unit 2, THEN depress "STOP" on associated Unit 1 "EVCB BATT CHARGER".

__ • IF vital battery charger EVCC is being powered from Unit 2, THEN depress "STOP" on associated Unit 1 "EVCC BATT CHARGER".

__ • IF vital battery charger EVCD is being powered from Unit 2, THEN depress "STOP" on associated Unit 1 "EVCD BATT CHARGER".

28. **IF "POSITIVE RATE TRIP" bistable light on PR drawers is lit, THEN reset N/I channels as follows:**

__ a. On PR drawers, turn and hold "RATE MODE" switches to "RESET".

__ b. Check "POSITIVE RATE TRIP" bistable lights - DARK.

__ c. Release switches to "NORMAL".

__ 29. **Reset steam dumps C7A logic.**

__ 30. **IF H2 Igniters are off, THEN GO TO Step 32.**

31. **Turn off H2 Igniters as follows:**

__ a. Contact station management to determine if adequate core cooling has existed for this entire event.

b. **IF** adequate core cooling has existed for this entire event,**THEN**:

__ • **WHEN** containment pressure is less that 0.25 PSIG,**THEN** turn H2 Igniters off.

__ c. **IF** inadequate core cooling has existed during this event,**THEN** turn H2 Igniters off 24 hours after adequate core cooling established.

32. **WHEN H2 Igniters are off, THEN realign NF:**

a. Open the following:

__ • 1NF-228A (RB Glycol Supply Cont Outside Isol)

__ • 1NF-234A (RB Glycol Return Cont Outside Isol)

__ • 1NF-233B (RB Glycol Return Cont Inside Isol).

__ b. Restart pumps and chiller units **PER** OP/1/A/6200/008 A (Ice Condenser Refrigeration System), Enclosure 4.1 (NF System Startup).

33. **IF a Phase B Isolation has occurred, THEN perform the following:**

__ a. Ensure Containment Spray reset.

__ b. Ensure Phase B Isolation reset.

CAUTION **If NS pumps have been off for more than 12 hours, restarting NS pump prior to draining NS header in next step, may result in NS piping failure in reactor bldg annulus (water hammer concern).**

__ c. Restore NS System operability PER OP/1/A/6200/007 (Containment Spray System), Enclosure 4.5 (NS System Operability Restoration).

__ d. Realign Phase B valves listed in EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 12 (Phase B Valve Checklist) to normal.

e. Align VX equipment as follows:

__ 1) Reset VX System resets.

__ 2) Stop H_2 Skimmer fans.

__ 3) Stop Containment Air Return fans.

4) Close the following dampers:

__ • 1VX-2B (1B H2 Skimmer Fan Isol Test A)

__ • 1VX-1A (1A H2 Skimmer Fan Isol Test A)

__ • 1RAF-D-4 (1B Cont Air Ret Fan To Lwr Cont Test A)

__ • 1RAF-D-2 (1A Cont Air Ret Fan To Lwr Cont Test A).

33. (Continued)

5) Restore VX D/P switches to service as follows:

__ a) Obtain HVAC test switch key #189 from key locker.

NOTE VX test switches used in following steps should only be operated in clockwise direction. Key switches are in "OFF" when notched section of the switch is in the twelve o'clock position.

__ b) Place "UNIT 1 VX SYSTEM TEST SELECT TRAIN A" switch to "1VX1A" position.

__ c) Depress "UNIT 1 VX SYS TRAIN A RESET" pushbutton.

__ d) Return "UNIT 1 VX SYSTEM TEST SELECT TRAIN A" switch to "OFF".

__ e) Place "UNIT 1 VX SYSTEM TEST SELECT TRAIN B" switch to "1VX2B" position.

__ f) Depress "UNIT 1 VX SYS TRAIN B RESET" pushbutton.

__ g) Return "UNIT 1 VX SYSTEM TEST SELECT TRAIN B" switch to "OFF".

6) Dispatch operator to shutdown both H2 Recombiners as follows:

__ a) Reduce KW output to zero.

__ b) Turn power off.

__ f. Shutdown VE System PER OP/1/A/6450/002 (Annulus Ventilation System), Enclosure 4.2 (VE Startup For Recirculation and Shutdown).

34. **IF both trains RN are running, AND it is desired to stop one train of RN, THEN secure as follows:**

a. Check if conditions allow stopping one train of RN:

__ • All CA pumps - OFF

__ • CA pumps are no longer required to maintain S/G level

__ • Train related KC pumps - OFF

__ • Train related D/G - OFF

__ • Train related NS pump - OFF

__ • Cooling to operating VC train from RN - CAN BE MAINTAINED

__ • Cooling to other operating RN loads - CAN BE MAINTAINED

__ • Station management concurs that RN pump may be stopped.

__ b. Do not continue until all conditions above are met to secure one train of RN.

c. Stop desired train of RN as follows:

• IF desire to stop 1A RN pump, THEN stop as follows:

__ 1) Place control switch for 1RN-86A (A KC Hx Inlet Isol) in "MAN".

2) Perform the following concurrently:

__ • Close 1RN-86A.

__ • Prior to 1RN-86A going full closed, stop 1A RN Pump.

__ 3) Place control switch for 1RN-86A in "AUTO".

OR

• IF desire to stop 1B RN pump, THEN stop as follows:

__ 1) Place control switch for 1RN-187B (B KC Hx Inlet Isol) in "MAN".

2) Perform the following concurrently:

__ • Close 1RN-187B.

__ • Prior to 1RN-187B going full closed, stop 1B RN Pump.

__ 3) Place control switch for 1RN-187B in "AUTO".

(R06-97)

Duke Power Company
PROCEDURE PROCESS RECORD

(1) ID No. AP/1/A/5500/21
Revision No. 7

INFORMATION ONLY

PREPARATION

(2) Station McGuire Nuclear Station

(3) Procedure Title Loss Of KC Or KC System Leakage

(4) Prepared By Philip A. Thompson Date September 7, 1999

(5) Requires 10CFR50.59 evaluation?
- ☒ Yes (New procedure or revision with major changes)
- ☐ No (Revision with minor changes)
- ☐ No (To incorporate previously approved changes)

(6) Reviewed By S. Hackney (QR) Date 9/9/99

Cross-Disciplinary Review By _____ (QR) NA JSH Date 9/9/99

Reactivity Mgmt. Review By _____ (QR) NA JSH Date 9/9/99

(7) Additional Reviews

Reviewed By _____ Date _____

Reviewed By _____ Date _____

(8) Temporary Approval (*if necessary*)

By _____ (SRO/QR) Date _____

By _____ (QR) Date _____

(9) Approved By Kitty J Schwenger Date 9-10-99

PERFORMANCE (Compare with Control Copy every 14 calendar days while work is being performed.)

(10) Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

(11) Date(s) Performed _____

Work Order Number (WO#) _____

COMPLETION

(12) Procedure Completion Verification

- ☒ Yes ☐ N/A Check lists and/or blanks initialed, signed, dated, or filled in NA, as appropriate?
- ☐ Yes ☐ N/A Listed enclosures attached?
- ☐ Yes ☐ N/A Data sheets attached, completed, dated and signed?
- ☒ Yes ☐ N/A Charts, graphs, etc. attached, dated, identified, and marked?
- ☐ Yes ☐ N/A Procedure requirements met?

Verified By _____ Date _____

(13) Procedure Completion Approved _____ Date _____

(14) Remarks (*attach additional pages, if necessary.*)

A. Purpose

The purpose of this procedure is to identify actions required in the event of a loss of KC, or leakage on the KC System.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

B. Symptoms

- "LO KC HX A INLET FLOW" computer alarm
- "LO KC HX B INLET FLOW" computer alarm
- Low flow alarms on components supplied by KC
- High temperature alarms on components supplied by KC
- Low level or level going down in KC Surge Tank
- Abnormal KC Pump Flow
- "LO KC SURGE TANK COMPARTMENT A LEVEL" computer alarm
- "LO KC SURGE TANK COMPARTMENT B LEVEL" computer alarm
- "KC SURGE TANK ABNORMAL LEVEL" alarm.

C. Operator Actions

__ 1. Monitor foldout page.

__ 2. Check any KC pump - ON.

Isolate all letdown:

__ • Normal letdown

__ • Excess letdown

__ • ND letdown.

__ 3. Announce occurrence on paging system.

__ 4. Secure any dilution in progress.

__ 5. Check both train's KC Surge Tank level - STABLE OR GOING UP.

__ IF Surge Tank level trend indicates a KC System leak, THEN GO TO Step 8.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

6. **Start standby KC train:**

__ a. Check standby KC Surge Tank Level - GREATER THAN 2 FT.

a. Perform the following:

1) Initiate YM makeup to KC Surge Tank as follows:

a) Dispatch operator to open the following valves as required to maintain KC Surge Tank level:

__ • To makeup to 1A KC Surge tank, open: 1KC-107 (YM Makeup to 1A KC Surge Tank) (aux bldg, 767+2, JJ-57, under grating, between KC surge tanks)

__ • To makeup to 1B KC Surge Tank, open: 1KC-111 (YM Makeup to 1B KC Surge Tank) (aux bldg, 767+2, JJ-58, under grating, between KC surge tanks).

__ b) Adjust makeup rate as required to prevent overflow of KC Surge Tank (approximately 8.5 ft).

__ 2) IF AT ANY TIME it is determined that YM makeup is inadequate, THEN align RN Makeup to KC PER Enclosure 3 (Aligning RN Makeup to KC Surge Tank) as required.

__ 3) Do not continue until surge tank level is greater than 2 ft.

b. Start standby KC train PER one of the following:

__ • To start A Train , GO TO Enclosure 4 (Startup of 1A KC Train)

OR

__ • To start B Train , GO TO Enclosure 5 (Startup of 1B KC Train).

__ 7. GO TO Step 38.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 8. Dispatch operators to locate leak.

9. Initiate YM makeup to KC Surge Tank as follows:

a. Immediately dispatch operator to open the following valves as required to maintain KC Surge Tank level:

__ • To makeup 1A KC Surge tank, open: 1KC-107 (YM Makeup to 1A KC Surge Tank) (aux bldg, 767+2, JJ-57, under grating, between KC surge tanks)

__ • To makeup 1B KC Surge tank, open: 1KC-111 (YM Makeup to 1B KC Surge Tank) (aux bldg, 767+2, JJ-58, under grating, between KC surge tanks).

__ b. Adjust makeup rate as required to prevent overflow of KC Surge Tank (approximately 8.5 ft).

__ 10. IF AT ANY TIME it is determined that YM makeup is inadequate to restore or stabilize KC surge tank level, THEN immediately align RN Makeup to KC PER Enclosure 3 (Aligning RN Makeup to KC Surge Tank) as required.

__ 11. Check both train's KC surge tank level - GREATER THAN 3 FT.

__ GO TO Step 16.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE
- The following OAC points may be used to determine level drop in next step. These points are also displayed on the KC system graphic:
  - M1P1317 (1A Train KC surge tank level rate)
  - M1P1318 (1B Train KC surge tank level rate).
- A 0.10 ft/min level drop in one train's surge tank equals approximately 50 GPM leak.

__ 12. Check both trains KC surge tank level drop - LESS THAN OR EQUAL TO 0.10 FT/MIN.

__ IF level is dropping faster than 0.10 ft/min, THEN GO TO Step 16.

NOTE The next step allows maintaining current KC system alignment for small leaks that should be within the capacity of normal makeup. Allowing level to drop to 2 ft allows more time for operators to locally align makeup, prior to taking action to isolate KC headers.

13. Do not continue until at least one of the following occurs:

__ • KC makeup has been locally opened from RN.

OR

__ • Either train's KC Surge Tank level is less than or equal to 2 ft.

OR

__ • Both KC surge tank levels are stable or going up.

__ 14. Check KC surge tank level on both train(s) - STABLE OR GOING UP.

IF KC surge tank level is still going down in an uncontrolled manner, THEN:

__ a. IF level goes below 2 ft, THEN ensure foldout page item 1 is implemented.

__ b. GO TO Step 16.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 15. GO TO Step 35.

16. **Isolate 1A KC Train from 1B KC Train as follows:**

__ a. Check any 1A KC Train Pump - RUNNING.

__ a. GO TO Step 16.f.

b. Check the following valves - OPEN:

__ b. GO TO Step 16.f.

__ • 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol)

__ • 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).

c. Close the following valves:

__ 1) 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol).

__ 2) 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol).

__ 3) 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).

__ 4) 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).

__ d. WHEN valves in Step 16.c are closed, THEN check 1A KC Surge Tank level - GOING DOWN.

__ d. IF 1A KC Surge Tank level stabilizes, AND 1B KC Surge tank level continues to go down, THEN leak is on 1B Essential header.

__ e. GO TO Step 17.

f. Close the following valves:

__ 1) 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol).

__ 2) 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol).

__ 3) 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).

__ 4) 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

16. (Continued)

__ g. WHEN valves in Step 16.f are closed, THEN check 1B KC Surge Tank level - GOING DOWN.

__ g. IF 1B KC Surge Tank level stabilizes, AND 1A KC Surge tank level continues to go down, THEN leak is on 1A Essential header.

__ 17. Check Unit 2 KC Surge Tank level - STABLE.

IF Unit 2 KC Surge Tank level is going up in an uncontrolled manner, THEN:

a. Have Rad Waste Chemistry check KC alignment for:

__ • NB and WL evaporators

__ • WG system.

b. IF KC drain tank pumps are aligned to Unit 2, THEN:

__ • Dispatch operator to align drain tank to Unit 1 PER OP/1/A/6400/005 (Component Cooling Water System), Enclosure 4.8 (Swapping KC Drain Tank Discharge to Unit 1 KC Surge Tank).

__ • Have Work Control SRO evaluate any KC drain operation in progress or other potential KC drain paths.

__ 18. Check KC pumps - AT LEAST ONE RUNNING.

WHEN KC Surge Tank Level greater than 2 ft, THEN start one KC Train PER one of the following:

__ • IF desired to start 1A KC Train, AND 1A KC Surge Tank is greater than 2 ft, THEN GO TO Enclosure 4 (Startup of 1A KC Train).

OR

__ • IF desired to start 1B KC Train, AND 1B KC Surge Tank is greater than 2 ft, THEN GO TO Enclosure 5 (Startup of 1B KC Train).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 19. **Check KC Surge Tank level on both train(s) - STABLE OR GOING UP.**

Perform the following:

__ a. IF either train's KC Surge Tank level is less than 3 ft, THEN GO TO Step 23.

__ b. IF Makeup to the KC Surge Tank from RN has been opened, AND level is still going down, THEN GO TO Step 23.

__ c. IF KC Surge Tank levels are greater than 3 ft, THEN observe note prior to Step 21 and GO TO Step 21.

__ 20. GO TO Step 35.

NOTE The next step allows waiting to see if KC Surge Tank levels can be stabilized using makeup, prior to taking actions to isolate KC headers. If level can be stabilized using makeup, header with leak may be left in service.

21. **Do not continue until one of the following is met:**

__ • Either train's KC Surge Tank level is less than 3 ft.

OR

__ • Makeup to the KC Surge Tank has been initiated using RN.

OR

__ • Both KC Surge Tank levels are stable or going up.

__ 22. RETURN TO Step 19.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

23. **IF AT ANY TIME leak is known to be on an Essential header, THEN perform one of the following:**

NOTE The enclosure used in next step will also isolate Essential header with leak.

__ • IF leak on 1B Train, THEN GO TO Enclosure 4 (Startup of 1A KC Train).

OR

__ • IF leak on 1A Train, THEN GO TO Enclosure 5 (Startup of 1B KC Train).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24. **Check if leak is on Reactor Bldg Non-essential header as follows:** __ • Containment Floor and Equipment Sumps level - GOING UP OR __ • Leak is known to be on the Reactor Bldg Non-essential header.	**Perform the following:** __ a. IF Containment Floor and Equipment pumps are off, THEN GO TO Step 26. __ b. Stop Containment Floor and Equipment pumps. __ c. Check if Containment Floor and Equipment sump level is going up. __ d. IF sump level indicates a leak in containment, THEN GO TO Step 27. __ e. IF sump level is normal, THEN GO TO Step 26.
__ 25. GO TO Step 27.	
26. **Attempt to isolate leak by isolating KC Aux Bldg Non-essential header as follows:** a. Isolate letdown as follows: 1) Close: __ • 1NV-458A (75 GPM L/D Orifice Outlet Cont Isol) __ • 1NV-457A (45 GPM L/D Orifice Outlet Cont Isol) __ • 1NV-35A (Variable L/D Orifice Outlet Cont Isol). __ 2) Check ND - IN SERVICE PRIOR TO EVENT. __ 3) Close 1NV-121 (ND Letdown Control). __ b. Close all NM valves located on 1MC-8 (vertical board).	__ 2) GO TO Step 26.b.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

26. (Continued)

c. Close the following:

__ 1) 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol).

__ 2) 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol).

__ 3) 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol).

__ 4) 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol).

d. Evaluate whether leak is isolated based on:

__ • Surge Tank(s) level trend

__ • Amount of makeup established

__ • IF KC surge tank level is going up, AND status of leak isolation is unknown, THEN reduce KC surge tank makeup flow as required to determine if leak is isolated.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

26. (Continued)

__ e. Check leak - ISOLATED.

e. IF leak still exists, THEN:

__ 1) Raise KC surge tank makeup flow as required to maintain level.

2) WHEN Surge Tank on operating train is greater than 2 ft, THEN reopen the following valves on the operating train:

- A Train

__ a) 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol).

__ b) 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol).

OR

- B Train

__ a) 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol).

__ b) 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol).

__ 3) GO TO Step 27.

__ f. Assume leak was on the Aux Bldg Non-essential header.

g. Close:

__ • 1NV-1A (NC L/D Isol To Regen Hx)

__ • 1NV-2A (NC L/D Isol To Regen Hx).

__ h. GO TO Step 35.

27. Check the following valves - CLOSED:

__ • 1KC-305B (Excess L/D Hx Sup Hdr Cont Otsd Isol)

__ • 1KC-315B (Excess L/D Hx Ret Hdr Cont Otsd Isol).

__ GO TO Step 29.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 28. GO TO Step 30.

29. **Attempt to isolate leak by isolating KC to excess letdown as follows:**

a. Isolate Excess Letdown by closing the following valves:

__ • 1NV-24B (C NC Loop To Exs L/D Hx Isol)

__ • 1NV-25B (C NC Loop To Exs L/D Hx Isol).

b. Close the following valves:

__ • 1KC-305B (Excess L/D Hx Sup Hdr Cont Otsd Isol)

__ • 1KC-315B (Excess L/D Hx Ret Hdr Cont Otsd Isol).

c. Evaluate whether leak is isolated based on:

__ • Surge Tank(s) level trend

__ • Amount of makeup established

__ • IF KC surge tank level is going up AND status of leak isolation is unknown, THEN reduce KC surge tank makeup flow as required to determine if leak is isolated.

__ d. Check leak - ISOLATED.

d. IF leak still exists, THEN:

__ 1) Raise KC surge tank makeup flow as required to maintain level.

__ 2) GO TO Step 30.

__ e. Assume leak was on excess letdown Hx.

__ f. GO TO Step 35.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

30. **Attempt to isolate leak by isolating KC to NCDT as follows:**

a. Close the following valves:

__ • 1KC-320A (NCDT Hx Sup Hdr Cont Outside Isol)

__ • 1KC-333A (NCDT Hx Ret Hdr Cont Outside Isol)

__ • 1KC-332B (NCDT Hx Ret Hdr Cont Inside Isol).

b. Evaluate whether leak is isolated based on:

__ • Surge Tank(s) level trend

__ • Amount of makeup established

__ • IF KC surge tank level is going up, AND status of leak isolation is unknown, THEN reduce KC surge tank makeup flow as required to determine if leak is isolated.

__ c. Check leak - ISOLATED.

c. IF leak still exists, THEN:

__ 1) Raise KC surge tank makeup flow as required to maintain level.

2) Reopen the following valves:

__ • 1KC-320A (NCDT Hx Sup Hdr Cont Outside Isol)
__ • 1KC-333A (NCDT Hx Ret Hdr Cont Outside Isol)
__ • 1KC-332B (NCDT Hx Ret Hdr Cont Inside Isol).

__ 3) GO TO Step 31.

d. Notify station management to evaluate NCDT cooling:

__ • WHEN reestablishing KC to NCDT, THEN evaluate the potential for KC steam void in NCDT Hx.

__ e. GO TO Step 35.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
31. **Check the following:** __ a. Any NC pump - RUNNING. __ b. Both trains KC surge tank level - ON SCALE. __ c. Both trains KC surge tank level - STABLE OR GOING UP.	**Perform one of the following:** __ • IF leak location is believed to be on Reactor Bldg header, OR location unknown, THEN observe notes prior to Step 34 and GO TO Step 34. OR __ • IF leak has been identified on an Essential header, THEN RETURN TO Step 23.
__ 32. IF AT ANY TIME KC surge tank level starts going down, THEN perform Step 31.	
__ 33. GO TO Step 35.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE
- If the leak is not stopped by isolating the KC Reactor Bldg Header, and KC pumps are on, then this step will immediately restore KC cooling to NC pumps.
- KC cooling for NC pump motor bearings and thermal barriers will be isolated in the next step. The foldout page provides NC pump trip criteria.

34. **Attempt to isolate leak by isolating entire KC Reactor Bldg Header as follows:**

a. Close the following valves:

__ 1) 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).

__ 2) 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).

__ 3) 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).

__ 4) 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).

b. Evaluate whether leak is isolated based on:

__ • Surge Tank(s) level trend

__ • Amount of makeup established

__ • IF KC surge tank level is going up, AND status of leak isolation is unknown, THEN reduce KC surge tank makeup flow as required to determine if leak is isolated.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

34. (Continued)

__ c. Check leak - ISOLATED.

c. IF leak still exists, THEN perform the following:

__ 1) Raise KC surge tank makeup flow as required to maintain level.

__ 2) Assume leak is on the train's Essential header with affected surge tank level.

3) IF 1A KC Pumps running, AND 1A KC Surge Tank level is greater than 1 ft, THEN align 1A KC train to Reactor Bldg header as follows:

a) Close the following valves:

__ (1) 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).

__ (2) 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).

b) Open the following valves:

__ (1) 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).

__ (2) 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).

(RNO continued on next page)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

34. (Continued)

4) IF 1B KC Pumps running, AND 1B KC Surge Tank level is greater than 1 ft, THEN align 1B KC train to Reactor Bldg header as follows:

a) Close the following valves:

__ (1) 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).

__ (2) 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).

b) Open the following valves:

__ (1) 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).

__ (2) 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).

NOTE The enclosure used in next step will also isolate Essential header with leak. It will also align non-essential headers to the intact KC train.

5) Perform one of the following:

__ • IF leak on 1B Train, THEN GO TO Enclosure 4 (Startup of 1A KC Train)

OR

__ • IF leak on 1A Train, THEN GO TO Enclosure 5 (Startup of 1B KC Train).

__ 6) GO TO Step 36.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

34. (Continued)

__ d. Trip reactor.

__ e. WHEN reactor tripped, THEN stop all 4 NC Pumps.

__ f. GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection), while continuing in this AP as time and conditions allow.

__ 35. Check KC pumps - AT LEAST ONE RUNNING.

WHEN KC Surge Tank Level greater than 2 ft, THEN start one KC Train PER one of the following:

__ • IF desired to start 1A KC Train, AND 1A KC Surge Tank is greater than 2 ft, THEN GO TO Enclosure 4 (Startup of 1A KC Train).

OR

__ • IF desired to start 1B KC Train, AND 1B KC Surge Tank is greater than 2 ft, THEN GO TO Enclosure 5 (Startup of 1B KC Train).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
36. **Continue attemps to identify and isolate leak:**	
__ a. Check header with leak - ISOLATED.	a. Perform the following as desired to isolate leak: NOTE Header with leak may be left in service as long as KC surge tank level can be maintained. The decision to isolate leak should depend on size of leak and critical components on associated header. __ • IF required to swap operating trains of KC due to leak on an Essential header, THEN evaluate performing Step 23. __ • IF required to isolate the entire Aux Bldg Non-essential header, THEN evaluate performing Step 26. (RNO continued on next page)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

36. (Continued)

__ • IF required to isolate leak on excess letdown or NCDT, THEN evaluate performing Steps 27 through 30.

NOTE If cooling to NC pumps will be isolated, it is preferable to wait until NC pumps are already shutdown.

• IF required to isolate KC to just the NC pumps, THEN:

__ 1) Ensure NC pump trip criteria on foldout is monitored.

2) Evaluate closing the following valves:

__ a) 1KC-338B (NC Pump Sup Hdr Cont Outside Isol).

__ b) 1KC-425A (NC Pumps Ret Hdr Cont Outside Isol).

__ c) 1KC-424B (NC Pumps Ret Hdr Cont Inside Isol).

__ • IF required to isolate entire Reactor Bldg Non-essential header, THEN observe notes prior to Step 34 and evaluate performing Step 34.

__ b. Determine individual component that is leaking.

__ 37. WHEN leaking individual component is isolated, OR if an isolated KC non-essential header is determined to be intact, THEN evaluate placing affected KC header back in service PER Enclosure 9 (Reopening KC Headers).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 38. Check any letdown path - IN SERVICE.	Perform the following: a. **IF** KC is aligned to the Aux Bldg Non-essential header, **THEN**: __ 1) Align normal letdown **PER** AP/1/A/5500/12 (Loss Of Letdown, Charging Or Seal Injection). __ 2) **IF** ND is in RHR mode and ND letdown is desired, **THEN** establish letdown from the ND System **PER** OP/1/A/6200/001A (Chemical and Volume Control System Letdown), Enclosure 4.1 (Establishing Letdown Flow from the ND System, Charging Flow, and Seal Injection Flow). __ b. **IF** KC is aligned to the Reactor Bldg Non-essential header, **AND** excess letdown is required, **THEN** establish **PER** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 2 (Establishing Excess Letdown).
39. Check NC pump thermal barrier valves - OPEN: __ • 1KC-394A (A NC Pump Therm Bar Otlt) __ • 1KC-345A (C NC Pump Therm Bar Otlt) __ • 1KC-364B (B NC Pump Therm Bar Otlt) __ • 1KC-413B (D NC Pump Therm Bar Otlt).	__ Open valves unless required closed to isolate leak.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 40. **Check KC to Aux Bldg Non-essential header - ESTABLISHED.**	**Perform the following:** __ a. Ensure all NM valves located on 1MC-8 (vertical board) are closed. b. Notify secondary and primary chemistry that: __ • NM valves have been isolated. __ • KC cooling to Aux Bldg Non-essential header is isolated. __ • Normal and ND letdown is isolated. __ c. REFER TO Enclosure 8 (VCT High Temperature Actions). __ d. Notify station management to evaluate Spent Fuel Pool cooling. __ e. GO TO Step 43.
__ 41. **Check NM valves (on 1MC-8) - PREVIOUSLY CLOSED BY THIS PROCEDURE.**	__ GO TO Step 43.
__ 42. **Notify Chemistry to coordinate reestablishing NM.**	
43. Evaluate KC chemistry requirements as follows: __ • Notify Primary Chemistry of KC makeup that has occurred or is in progress. __ • Evaluate recirculating the KC Surge Tank volume and feed and bleed of KC System PER OP/1/A/6400/005 (Component Cooling Water System).	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 44. **Check both trains RN suction - ALIGNED TO LLI.**	**Perform the following:** __ a. **IF** both A and B train RN pumps are aligned to the SNSWP, **THEN GO TO** Step 45. b. **IF** both of the following valves are closed, **THEN GO TO** Step 45: __ • 1RN-41B (Train B To Non Ess Hdr Isol) __ • 2RN-41B (Train B To Non Ess Hdr Isol). c. **IF** both of the following valves are closed, **THEN GO TO** Step 45: __ • 1RN-43A (Train B To Non Ess Hdr Isol) __ • 2RN-43A (Train B To Non Ess Hdr Isol). (RNO continued on next page)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

44. (Continued)

d. Contact station management to evaluate the following:

NOTE
- If train with suction on pond is aligned to train with discharge to RC (via open cross tie), or to non-essential header, SNSWP may be pumped to the lake.
- Unit 1 non-essential headers discharge to A Train discharge. Unit 2 non-essential headers discharge to B Train discharge.
- Unit 1 and 2 non-essential headers may be cross tied through RN to RL tie.

__ • SNSWP draw down

__ • Alignment of RN System.

__ 45. RETURN TO procedure and step in effect.

END

1. **KC header isolation criteria:**

   - IF KC surge tank level goes below 2 ft due to KC system leak, THEN immediately isolate affected train PER Enclosure 2 (Isolation of KC Non-essential Headers).

2. **NC pump trip criteria:**

   - IF NC pump motor bearing temperature reaches 195° F, THEN perform the following:

     a. Trip the reactor.

     b. WHEN reactor is tripped, THEN trip all NC pumps.

     c. GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection), while continuing in this procedure as time and conditions allow.

3. **ND pump trip and flow isolation criteria (Applies if ND aligned for RHR):**

   - IF KC cooling lost to either ND train's Hx, AND NC temperature is greater than 150° F, THEN perform the following on train of ND that lost KC flow to its ND Hx:

     - Stop associated ND pump.

     - IF 1A ND Hx lost KC flow, THEN close:

       - 1ND-33 (A ND Hx Bypass)
       - 1ND-32 (A ND Hx To Letdown Hx).

     - IF 1B ND Hx lost KC flow, THEN close:

       - 1ND-18 (B ND Hx Bypass)
       - 1ND-17 (B ND Hx To Letdown Hx).

4. **KC pump trip criteria:**

   - IF KC pumps show signs of cavitation, THEN:

     - Trip affected pumps.
     - Isolate affected train PER Enclosure 2 (Isolation of KC Non-essential Headers).

5. **VCT high temperature:**

   - IF "VCT HI TEMP" alarm (1AD7-D1) is received, THEN REFER TO Enclosure 8 (VCT High Temperature Actions).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 1. **Ensure letdown is isolated.**

2. **Isolate Aux Bldg Non-essential header from affected train:**

   - IF 1A KC Surge Tank is less than 2 ft, OR 1A KC Pumps tripped due to cavitation, THEN close:

   __ • 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol)
   __ • 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol).

   - IF 1B KC Surge Tank is less than 2 ft, OR 1B KC Pumps tripped due to cavitation, THEN close:

   __ • 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol)
   __ • 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol).

__ 3. **Close all NM valves located on 1MC-8 (vertical board).**

4. **Check both trains of KC surge tank level:**

   __ • Level - STABLE OR GOING UP

   __ • Level - ON SCALE

Perform the following:

__ a. IF surge tank level is less than 1 ft, OR KC pumps have been stopped due to cavitation, THEN GO TO Step 6.

__ b. IF AT ANY TIME either train's KC surge tank level goes below 1 ft, OR KC pumps trip due to cavitation, THEN *perform Steps 6 through 8.*

__ c. RETURN TO step in effect in body of procedure.

__ 5. **RETURN TO step in effect in body of procedure.**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

6. **Isolate Reactor Bldg Non-essential header from affected train as follows:**

   - **IF** 1A KC Surge Tank is less than 1 ft, **OR** 1A KC Pumps tripped due to cavitation, **THEN** close:

   __ • 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol)
   __ • 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).

   - **IF** 1B KC Surge Tank is less than 1 ft, **OR** 1B KC Pumps tripped due to cavitation, **THEN** close:

   __ • 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol)
   __ • 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).

   __ • Ensure NC pump trip criteria on foldout page is monitored.

__ 7. **Check either KC train surge tank level - GREATER THAN 2 FT.**

IF both trains of KC surge tank level are less than 2 ft, THEN perform the following:

__ a. Ensure makeup is initiated to restore surge tank level in both trains.

__ b. **WHEN** KC surge tank level is restored to greater than 2 ft, **THEN** perform Step 8.

__ c. **RETURN TO** step in effect in body of procedure.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE The enclosure used in next step will also isolate essential header on train with low surge tank level and restore cooling to the intact non-essential headers.

8. **Swap KC to train with surge tank level greater than 2 ft as follows:**

__ • To start 1A Train, **GO TO** Enclosure 4 (Startup of 1A KC Train)

OR

__ • To start 1B Train, **GO TO** Enclosure 5 (Startup of 1B KC Train).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION **RN pump must be running while RN to KC emergency makeup is open, to prevent draining KC surge tank back to RN.**

1. **Align one or both of the following flowpaths (Step 1.a or 1.b) as required:**

   a. IF 1A RN Train to 1A KC Surge Tank makeup is desired, THEN:

   __ 1) Ensure 1A RN Pump is on.

   __ 1) GO TO Step 1.b.

   2) Dispatch operator to open the following valves:

   __ • 1KC-494 (Trn A RN Emerg Makeup to KC) (aux bldg, 733+10, HH-56, in corner west of 1B1 KC Pump)

   __ • 1KC-496 (Trn A RN Emerg Makeup to KC) (aux bldg, 733+10, HH-56, in corner west of 1B1 KC Pump).

   b. IF 1B RN Train to 1B KC Surge Tank makeup is desired, THEN:

   __ 1) Ensure 1B RN Pump is on.

   1) Perform the following:

   __ a) IF makeup using A train RN is desired, THEN RETURN TO Step 1.a.

   __ b) GO TO Step 2.

   2) Dispatch operator to open the following valves:

   __ • 1KC-499 (Trn B RN Emerg Makeup to KC) (aux bldg, 733+10, HH-56, in corner west of 1B1 KC Pump)

   __ • 1KC-497 (Trn B RN Emerg Makeup to KC) (aux bldg, 733+10, HH-56, in corner west of 1B1 KC Pump).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 2. IF AT ANY TIME an RN pump trips, THEN dispatch operator to isolate affected trains RN to KC makeup line opened in Step 1.

__ 3. Adjust makeup rate as required to prevent overflow of KC Surge Tank (approximately 8.5 ft).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 1. Check 1KC-56A (KC To A ND Hx) - CLOSED.	**Perform the following:** __ a. IF any 1A KC Pump is on, AND 1A ND pump is on, THEN GO TO Step 2. b. IF all 1A Train KC pumps are off, OR 1A ND Pump off, THEN: __ 1) Close 1KC-56A. 2) IF NC temperature is greater than 150° F, THEN: __ a) Stop 1A ND Pump. b) Close ND cross tie valves: __ • 1ND-33 (A ND Hx Bypass) __ • 1ND-32 (A ND Hx To Letdown Hx).
__ 2. Check 1KC-81B (KC To B ND Hx) - CLOSED.	**Perform the following:** __ a. IF any 1B KC Pump is on, AND 1B ND pump is on, THEN GO TO Step 3. b. IF all 1B Train KC pumps are off, OR 1B ND Pump off, THEN: __ 1) Close 1KC-81B. 2) IF NC temperature is greater than 150° F, THEN: __ a) Stop 1B ND Pump. b) Close ND cross tie valves: __ • 1ND-18 (B ND Hx Bypass) __ • 1ND-17 (B ND Hx To Letdown Hx).
__ 3. Check 1B Train KC Pumps - OFF	__ GO TO Step 5.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 4. **Select "CLOSED" on 1KC-54B (Train B Recirc Isol).**

__ 5. **Check 1A Train KC Pumps - OFF.** __ **GO TO Step 17.**

NOTE Voiding of 1A train KC may be suspected if any of the following have occurred:

- 1A train KC pumps were tripped due to cavitation or air entrainment.
- 1B train KC pumps were tripped due to cavitation or air entrainment while A train was still cross-tied to B train.

6. **IF voiding of 1A train KC is suspected, THEN dispatch operator to perform the following:**

__ • *Open 1KC-24 (1A2 KC Pump Overflow* Isol) (aux bldg 733+3, GG-55, above KC Pump 1A2) until a solid stream of water is visible in sightglass then reclose valve

__ • Open 1KC-21 (1A1 KC Pump Overflow Isol) (aux bldg, 733, GG-55, top of KC Pump 1A1) until a solid stream of water is visible in sightglass then reclose valve

__ • Unlock and throttle 1KC-6 (1A1 KC Pump Discharge) (aux bldg, 733+7, HH-55, west of KC Pump 1A1) to one turn open.

7. **Close the following valves:**

__ a. 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol).

__ b. 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol).

__ c. 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).

__ d. 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 8. Start 1A RN Pump.	
__ 9. Ensure 1RN-86A (A KC Hx Inlet Isol) opens.	
__ 10. Place control switch for 1KC-51A (Train A Recirc Isol) in "AUTO".	
__ 11. Ensure 1KC-51A (Train A Recirc Isol) opens.	
__ 12. Start 1A1 KC Pump.	
__ 13. Check 1KC-6 (1A1 KC Pump Discharge) - LOCALLY THROTTLED IN STEP 6.	Perform the following: __ a. Start 1A2 KC Pump. __ b. GO TO Step 17.
__ 14. Have dispatched operator slowly throttle open 1KC-6 (1A1 KC Pump Discharge).	
__ 15. WHEN 1KC-6 (1A1 KC Pump Discharge) is open, THEN start 1A2 KC Pump.	
__ 16. Ensure 1KC-6 (1A1 KC Pump Discharge) is fully opened and locked.	
__ 17. Check ND Pumps - ANY ON PRIOR TO ENTERING THIS PROCEDURE.	__ GO TO Step 20.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 18. **Check VI pressure - GREATER THAN 60 PSIG.**	**Perform the following:** a. Dispatch operator to close the following valves: __ • 1KC-148 (A KF Hx Inlet) (aux bldg, 750+10, MM-52, 20 ft north of door to 1A ND Hx room) __ • 1KC-155 (B KF Hx Inlet) (aux bldg, 750+8, MM-52, 20 ft north of door to 1A ND Hx room). b. <u>WHEN</u> it is desired to reestablish fuel pool cooling, <u>THEN</u>: __ 1) Limit KC pump flow to 4000 GPM per operating KC pump in next step. 2) Dispatch operator to throttle open the following valves as necessary: __ • 1KC-148 (aux bldg, 750+10, MM-52, 20 ft north of door to 1A ND Hx room) __ • 1KC-155 (aux bldg, 750+8, MM-52, 20 ft north of door to 1A ND Hx room). __ c. <u>GO TO</u> Step 20.
__ 19. **Throttle KC to KF flow as required in subsequent steps to allow establishing adequate KC flow to ND Hx.**	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 20. **Check KC leak - HAS OCCURRED.**	**Perform the following:** __ a. Limit KC pump flow to 4000 GPM per operating KC pump in next step. b. Open the following valves: __ 1) 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol). __ 2) 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol). c. Close the following valves: __ 1) 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol). __ 2) 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol). d. Open the following valves: __ 1) 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol). __ 2) 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol). __ e. GO TO Step 25.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 21. **KC header with leak - HAS BEEN IDENTIFIED.**	**Perform the following:** __ a. **IF** the reactor is critical, **THEN GO TO** Step 23. b. **IF** the reactor is subcritical, **THEN**: __ 1) **WHEN** KC header with leak is identified, **THEN** perform Step 24. __ 2) **GO TO** Step 25.
__ 22. **GO TO** Step 24.	
23. **Attempt to establish KC cooling to NC pumps as follows:** a. Close the following valves: __ 1) 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol). __ 2) 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol). __ b. Open 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol). __ c. Check 1A KC Surge Tank level - STABLE OR GOING UP.	c. **IF** 1A KC Surge Tank level going down in an uncontrolled manner, **THEN** perform the following: __ 1) Reclose 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol). __ 2) Trip the reactor. __ 3) **WHEN** reactor is tripped, **THEN** trip all NC pumps. __ 4) **GO TO** EP/1/A/5000/E-0 (Reactor Trip or Safety Injection), while continuing in this procedure as time and conditions allow. __ 5) **GO TO** Step 23.f.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. (Continued)	
__ d. Open 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).	
e. Check 1A train KC:	e. **IF** 1A KC Surge Tank level going down in an uncontrolled manner, **OR** flow and amps indicate air binding of KC pumps, **THEN** perform the following:
__ • Surge Tank Level - STABLE OR GOING UP	__ 1) Reclose 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).
__ • Pump flow and amps - NORMAL.	__ 2) Reclose 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).
	__ 3) **IF** KC amps and flow indicate air binding of pumps, **THEN** stop 1A train KC pumps.
	__ 4) Trip the reactor.
	__ 5) **WHEN** reactor is tripped, **THEN** trip all NC pumps.
	__ 6) **GO TO** EP/1/A/5000/E-0 (Reactor Trip or Safety Injection), while continuing in this procedure as time and conditions allow.
	__ 7) **IF** 1A Train KC Pumps are off, **THEN RETURN TO** Step 6.
__ f. Check KC header with leak - HAS BEEN IDENTIFIED.	f. Perform the following:
	__ 1) **WHEN** KC header with leak is identified, **THEN** perform Step 24.
	__ 2) **GO TO** Step 25.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

24. **Align KC as follows:**

a. Monitor the following KC pump parameters while aligning KC in this step:

__ • Pump flow and amps

__ • KC surge tank level.

__ b. Limit KC pump flow to 4000 GPM per operating KC pump in next step.

__ c. Check - LEAK IDENTIFIED ON 1B KC TRAIN ESSENTIAL HEADER.

c. Perform the following:

1) Open the following valves unless required closed to keep leak on Reactor Bldg Header isolated:

__ a) 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).

__ b) 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).

2) Close the following valves:

__ a) 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).

__ b) 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).

3) Open the following valves unless required closed to keep leak on Aux Bldg Non-essential Header isolated:

__ a) 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol).

__ b) 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol).

__ 4) **GO TO** Step 25.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

24. (Continued)

d. Close the following valves:

__ 1) 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).

__ 2) 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).

e. Open the following valves:

__ 1) 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).

__ 2) 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).

f. Close the following valves:

__ 1) 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol).

__ 2) 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol).

g. Open the following valves:

__ 1) 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol).

__ 2) 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 25. **Check 1B ND pump - OFF.**	**Perform the following:** __ a. IF 1B train KC pumps are off, THEN GO TO Step 28. b. IF 1A ND pump is running, THEN: __ 1) Stop 1B ND Pump. 2) Close ND cross tie valves: __ • 1ND-18 (B ND Hx Bypass) __ • 1ND-17 (B ND Hx To Letdown Hx). __ 3) GO TO Step 26. __ c. IF 1B KC surge tank is on scale, AND can be maintained on scale for at least 15 more minutes (to allow time to swap ND trains), THEN GO TO Step 32. d. IF NC temperature is greater than 150° F, THEN: __ 1) Stop 1B ND Pump. 2) Close ND cross tie valves: __ • 1ND-18 (B ND Hx Bypass) __ • 1ND-17 (B ND Hx To Letdown Hx).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 26. **Check 1KC-81B (KC To B ND Hx) - CLOSED.**	**Perform the following:** __ a. IF 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol) OR 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol) is closed, THEN GO TO Step 27. b. IF 1B ND Pump is off, THEN: __ 1) Close 1KC-81B (KC To B ND Hx). __ 2) GO TO Step 27.
	CAUTION **If NC temperature is greater than 200° F, then KC flow must be maintained greater than 2000 GPM to operating ND train.** NOTE 1A KC Pumps will continue to feed 1B ND Hx after tripping 1B KC Pumps. c. Throttle the following as required to ensure 1A train KC pump flows will remain less than 4000 GPM per pump after stopping 1B train KC pumps: __ • 1KC-81B (KC To B ND Hx) __ • 1KC-56A (KC To A ND Hx) __ • KC to KF flow.
__ 27. **Stop 1B1 and 1B2 KC Pumps.**	
__ 28. **Place control switch for 1KC-54B (Train B Recirc Isol) in the "CLOSE" position.**	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 29. Ensure 1KC-54B (Train B Recirc Isol) closes.	
__ 30. Check KC flow - LESS THAN 4000 GPM PER OPERATING KC PUMP.	Throttle the following as required to reduce KC flow to less than 4000 GPM per KC pump: CAUTION If NC temperature is greater than 200° F, then KC flow must be maintained greater than 2000 GPM to operating ND train. __ • IF 1A KC Pumps are feeding 1B ND Hx (through cross-tie), THEN throttle 1KC-81B (KC To B ND Hx). __ • 1KC-56A (KC To A ND Hx) __ • KC to KF flow.
__ 31. Check ND pumps - ANY ON PRIOR TO ENTERING THIS PROCEDURE.	__ GO TO Step 37.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 32. **Check VI Pressure - GREATER THAN OR EQUAL TO 60 PSIG.**	**Perform the following:** a. IF both ND pumps are off, THEN: __ 1) REFER TO AP/1/A/5500/19 (Loss Of ND Or ND System Leakage). __ 2) GO TO Step 37. b. IF any ND pump is on, THEN use the following as required to determine KC to ND Hx flowrate in next step: NOTE ND Hx KC outlet flow indication fails low on loss of VI. KC pump flow indication and local ND Hx KC flow should still be available. __ • Use change in KC pump flowrate to determine KC to ND Hx flowrate. • Dispatch operator to monitor KC outlet flow for ND Hx(s) in service: __ • RHR HX A OUTLET FLOW (1MKCFS5670) (aux bldg, 733+1, MM-54, across hall from BAT B next to decon sink) __ • RHR HX B OUTLET FLOW (1MKCFS5680) (aux bldg, 733+1, JJ-55, on west side of column JJ-55).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE If both trains of KC Aux Bldg Non-essential header isolation valves are open, 1A train of KC can supply cooling to 1B ND Hx.

33. Establish KC to running ND train(s) and any ND train that is to be placed in service, as follows:

__ a. Check 1A ND Pump - ON.

a. Perform the following:

__ 1) IF 1A ND Pump will be started, THEN GO TO Step 33.b.

__ 2) GO TO Step 33.c.

b. Align KC to 1A ND Hx as follows:

__ 1) Limit KC pump flow to 4000 GPM per operating KC pump in next step.

__ 2) Throttle open 1KC-56A (KC To A ND Hx) to establish 2000 GPM to 5000 GPM KC flow to ND Hx 1A.

__ c. Check any 1B Train KC Pump - ON.

__ c. GO TO 33.e.

__ d. GO TO Step 33.f.

e. Check the following valves open:

__ e. GO TO Step 34.

__ • 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol)

__ • 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol)

__ • 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol)

__ • 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33. (Continued)	
__ f. Check 1B ND Pump - ON.	f. Perform the following: __ 1) IF 1B ND Pump will be started, THEN GO TO Step 33.g. __ 2) GO TO Step 34.
g. Align KC to 1B ND Hx as follows: __ 1) Limit KC pump flow to 4000 GPM per operating KC pump in next step. __ 2) Throttle open 1KC-81B (KC To B ND Hx) to establish 2000 GPM to 5000 GPM KC flow to ND Hx 1B.	
__ 34. Check any ND pump - RUNNING.	GO TO one of the following enclosures to start desired ND pump that has KC cooling established: __ • Enclosure 6 (Startup of 1A ND Train) OR __ • Enclosure 7 (Startup of 1B ND Train).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 35. **Check KC flow to the operating ND train's Hx - ESTABLISHED.**	**Perform the following:** a. IF NC temperature is less than 150° F, AND temperature is expected to stay less than 150° F for at least 5 more minutes, THEN: NOTE Operating procedure steps to locally listen for vibration and to align KC may be N/A'd. __ 1) Swap ND trains to the train with KC cooling PER OP/1/A/6100/SO-6 (Placing The Second ND Train In Service). __ 2) GO TO Step 37. b. IF NC temperature is greater than 150° F, OR will be above 150° F within 5 minutes, THEN GO TO one of the following enclosures to start desired ND pump that has KC cooling established: __ • Enclosure 6 (Startup of 1A ND Train) OR __ • Enclosure 7 (Startup of 1B ND Train).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 36. Check 1B train KC pumps - OFF.	**IF AT ANY TIME is is desired to stop 1B train KC Pumps, THEN evaluate performing the following:** NOTE Operating procedure steps to locally listen for vibration and to align KC may be N/A'd. __ a. Swap ND trains to 1A train and stop 1B ND Pump PER OP/1/A/6100/SO-6 (Placing The Second ND Train In Service). __ b. WHEN 1B ND Pump is off, THEN stop KC Pumps PER Steps 26 through 30.
__ 37. Check KC System leak - HAS OCCURRED.	__ GO TO Step 38 in body of procedure.
__ 38. GO TO Step 36 in body of procedure.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 1. Check 1KC-81B (KC To B ND Hx) CLOSED.	Perform the following: __ a. IF any 1B KC Pump is on, AND 1B ND pump is on, THEN GO TO Step 2. b. IF all 1B Train KC pumps are off, OR 1B ND Pump off, THEN: __ 1) Close 1KC-81B. 2) IF NC temperature is greater than 150° F, THEN: __ a) Stop 1B ND Pump. b) Close ND cross tie valves: __ • 1ND-18 (B ND Hx Bypass) __ • 1ND-17 (B ND Hx To Letdown Hx).
__ 2. Check 1KC-56A (KC To A ND Hx) CLOSED.	Perform the following: __ a. IF any 1A KC Pump is on, AND 1A ND pump is on, THEN GO TO Step 3. b. IF all 1A Train KC pumps are off, OR 1A ND Pump off, THEN: __ 1) Close 1KC-56A. 2) IF NC temperature is greater than 160° F, THEN: __ a) Stop 1A ND Pump. b) Close ND cross tie valves: __ • 1ND-33 (A ND Hx Bypass) __ • 1ND-32 (A ND Hx To Letdown Hx).
__ 3. Check 1A Train KC Pumps - OFF.	__ GO TO Step 5.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 4. **Select "CLOSED" on 1KC-51A (Train A Recirc Isol).**

__ 5. **Check 1B Train KC Pumps - OFF.** __ **GO TO Step 17.**

NOTE Voiding of 1B train KC may be suspected if any of the following have occurred:

- 1B train KC pumps were tripped due to cavitation or air entrainment.
- 1A train KC pumps were tripped due to cavitation or air entrainment while B train was still cross-tied to A train.

6. **IF voiding of 1B train KC is suspected, THEN dispatch operator to perform the following:**

__ • Open 1KC-30 (1B2 KC Pump Overflow Isol) (aux bldg, 733+3, HH-57, top of KC Pump 1B2) until a solid stream of water is visible in sightglass then reclose valve

__ • Open 1KC-27 (1B1 KC Pump Overflow Isol) (aux bldg, 733+3, HH-56, top of KC Pump 1B1) until a solid stream of water is visible in sightglass then reclose valve

__ • Unlock and throttle 1KC-12 (1B1 KC Pump Discharge) (aux bldg, 733+6, HH-57, east of KC Pump 1B1) to one turn open.

7. **Close the following:**

__ a. 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol).

__ b. 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol).

__ c. 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).

__ d. 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 8. Start 1B RN Pump.	
__ 9. Ensure 1RN-187B (B KC Hx Inlet Isol) opens.	
__ 10. Place control switch for 1KC-54B (Train B Recirc Isol) in the "AUTO" position.	
__ 11. Ensure 1KC-54B (Train B Recirc Isol) opens.	
__ 12. Start 1B1 KC Pump.	
__ 13. Check 1KC-12 (1B1 KC Pump Discharge) - LOCALLY THROTTLED IN STEP 6.	Perform the following: __ a. Start 1B2 KC Pump. __ b. GO TO Step 17.
__ 14. Have dispatched operator slowly throttle open 1KC-12 (1B1 KC Pump Discharge).	
__ 15. WHEN 1KC-12 (1B1 KC Pump Discharge) is open, THEN start 1B2 KC Pump.	
__ 16. Ensure 1KC-12 (1B1 KC Pump Discharge) is fully opened and locked.	
__ 17. Check ND pumps - ANY ON PRIOR TO ENTERING THIS PROCEDURE.	__ GO TO Step 20.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 18. Check VI pressure - GREATER THAN 60 PSIG.	**Perform the following:** a. Dispatch operator to close the following valves: __ • 1KC-148 (A KF Hx Inlet) (aux bldg, 750+10, MM-52, 20 ft north of door to 1A ND Hx room) __ • 1KC-155 (B KF Hx Inlet) (aux bldg, 750+8, MM-52, 20 ft north of door to 1A ND Hx room). b. WHEN it is desired to reestablish fuel pool cooling, THEN: __ 1) Limit KC pump flow to 4000 GPM per operating KC pump in next step. 2) Dispatch operator to throttle open the following valves as necessary: __ • 1KC-148 (aux bldg, 750+10, MM-52, 20 ft north of door to 1A ND Hx room) __ • 1KC-155 (aux bldg, 750+8, MM-52, 20 ft north of door to 1A ND Hx room). __ c. GO TO Step 20.
__ 19. Throttle KC to KF flow as required in subsequent steps to allow establishing adequate KC flow to ND Hx.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 20. Check KC leak - **HAS OCCURRED.**	**Perform the following:** __ a. Limit KC pump flow to 4000 GPM per operating KC pump in next step. b. Open the following valves: __ 1) 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol). __ 2) 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol). c. Close the following valves: __ 1) 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol). __ 2) 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol). d. Open the following valves: __ 1) 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol). __ 2) 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol). __ e. GO TO Step 25.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 21. **Check KC header with leak - HAS BEEN IDENTIFIED.**	**Perform the following:** __ a. IF the reactor is critical, THEN GO TO Step 23. b. IF the reactor is subcritical, THEN: __ 1) WHEN KC header with leak is identified, THEN perform Step 24. __ 2) GO TO Step 25.
__ 22. GO TO Step 24.	
23. **Attempt to establish KC cooling to NC pumps as follows:** a. Close the following valves: __ 1) 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol). __ 2) 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).	
__ b. Open 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).	
__ c. Check 1B KC Surge Tank level - STABLE OR GOING UP.	c. IF 1B KC Surge Tank level going down in an uncontrolled manner, THEN perform the following: __ 1) Reclose 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol). __ 2) Trip the reactor. __ 3) WHEN reactor is tripped, THEN trip all NC pumps. __ 4) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection), while continuing in this procedure as time and conditions allow. __ 5) GO TO Step 23.f.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. (Continued)	
__ d. Open 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).	
e. Check 1B Train KC:	e. IF 1B KC Surge Tank level going down in an uncontrolled manner, OR flow and amps indicate air binding of KC pumps, THEN perform the following:
__ • Surge Tank Level - STABLE OR GOING UP	__ 1) Reclose 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).
__ • Pump flow and amps - NORMAL.	__ 2) Reclose 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).
	__ 3) IF KC amps and flow indicate air binding of pumps, THEN stop 1B train KC pumps.
	__ 4) Trip the reactor.
	__ 5) WHEN reactor is tripped, THEN trip all NC pumps.
	__ 6) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection), while continuing in this procedure as time and conditions allow.
	__ 7) IF 1B Train KC Pumps are off, THEN RETURN TO Step 6.
__ f. Check KC header with leak - HAS BEEN IDENTIFIED.	f. Perform the following:
	__ 1) WHEN KC header with leak is identified, THEN perform Step 24.
	__ 2) GO TO Step 25.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

24. **Align KC as follows:**

a. Monitor the following KC pump parameters while aligning KC in this step:

__ • Pump flow and amps

__ • KC surge tank level.

__ b. Limit KC pump flow to 4000 GPM per operating KC pump in next step.

__ c. Check - LEAK IDENTIFIED ON 1A KC TRAIN ESSENTIAL HEADER.

c. Perform the following:

1) Open the following valves unless required closed to keep leak on Reactor Bldg Header isolated:

__ a) 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).

__ b) 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).

2) Close the following valves:

__ a) 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).

__ b) 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).

3) Open the following valves unless required closed to keep leak on Aux Bldg Non-essential Header isolated:

__ a) 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol).

__ b) 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol).

__ 4) **GO TO** Step 25.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

24. (Continued)

d. Close the following valves:

__ 1) 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).

__ 2) 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).

e. Open the following valves:

__ 1) 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).

__ 2) 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).

f. Close the following valves:

__ 1) 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol).

__ 2) 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol).

g. Open the following valves:

__ 1) 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol).

__ 2) 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 25. Check 1A ND Pump - OFF.	**Perform the following:** __ a. IF 1A train KC pumps are off, THEN GO TO Step 28. b. IF 1B ND pump is running, THEN: __ 1) Stop 1A ND Pump. 2) Close ND cross tie valves: __ • 1ND-33 (A ND Hx Bypass) __ • 1ND-32 (A ND Hx To Letdown Hx). __ 3) GO TO Step 26. __ c. IF 1A KC surge tank is on scale, AND can be maintained on scale for at least 15 more minutes (to allow time to swap ND trains), THEN GO TO Step 32. d. IF NC temperature is greater than 150° F, THEN: __ 1) Stop 1A ND Pump. 2) Close ND cross tie valves: __ • 1ND-33 (A ND Hx Bypass) __ • 1ND-32 (A ND Hx To Letdown Hx).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 26. Check 1KC-56A (KC To A ND Hx) - CLOSED.	**Perform the following:** __ a. IF 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol) OR 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol) is closed, THEN GO TO Step 27. b. IF 1A ND Pump is off, THEN: __ 1) Close 1KC-56A (KC To A ND Hx). __ 2) GO TO Step 27.
	CAUTION **If NC temperature is greater than 200° F, then KC flow must be maintained greater than 2000 GPM to operating ND train.** NOTE 1B KC Pumps will continue to feed 1A ND Hx after tripping 1A KC Pumps. c. Throttle the following as required to ensure 1B train KC pump flows will remain less than 4000 GPM per pump after stopping 1A train KC pumps: __ • 1KC-56A (KC To A ND Hx) __ • 1KC-81B (KC To B ND Hx) __ • KC to KF flow.
__ 27. Stop KC 1A1 and 1A2 Pumps.	
__ 28. Place control switch for 1KC-51A (Train A Recirc Isol) in the "CLOSE" position.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 29. Ensure 1KC-51A (Train A Recirc Isol) closes.

__ 30. Check KC flow - LESS THAN 4000 GPM PER OPERATING KC PUMP.

Throttle the following as required to reduce KC flow to less than 4000 GPM per KC pump:

CAUTION If NC temperature is greater than 200° F, then KC flow must be maintained greater than 2000 GPM to operating ND train.

__ • IF 1B KC Pumps are feeding 1A ND Hx (through cross-tie), THEN throttle 1KC-56A (KC To A ND Hx).

__ • 1KC-81B (KC To B ND Hx)

__ • KC to KF flow.

__ 31. Check ND pumps - ANY ON PRIOR TO ENTERING THIS PROCEDURE.

__ GO TO Step 37.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 32. Check VI pressure- GREATER THAN OR EQUAL TO 60 PSIG.	**Perform the following:** a. IF both ND pumps are off, THEN: __ 1) REFER TO AP/1/A/5500/19 (Loss Of ND Or ND System Leakage). __ 2) GO TO Step 37. b. IF any ND pump is on, THEN use the following as required to determine KC to ND Hx flowrate in next step: NOTE ND Hx KC outlet flow indication fails low on loss of VI. KC pump flow indication and local ND Hx KC flow should still be available. __ • Use change in KC pump flowrate to determine KC to ND Hx flowrate. • Dispatch operator to monitor KC outlet flow for ND Hx(s) in service: __ • RHR HX A OUTLET FLOW (1MKCFS5670) (aux bldg, 733+1, MM-54, across hall from BAT B next to decon sink) __ • RHR HX B OUTLET FLOW (1MKCFS5680) (aux bldg, 733+1, JJ-55, on west side of column JJ-55).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE If both trains of KC Aux Bldg Non-essential header isolation valves are open, 1B train of KC can supply cooling to 1A ND Hx.

33. Establish KC to running ND train(s) and any ND train that is to be placed in service, as follows:

__ a. Check 1B ND Pump - ON.

a. Perform the following:

__ 1) IF 1B ND Pump will be started, THEN GO TO Step 33.b.

__ 2) GO TO Step 33.c.

b. Align KC to 1B ND Hx as follows:

__ 1) Limit KC pump flow to 4000 GPM per operating KC pump in next step.

__ 2) Throttle open 1KC-81B (KC To B ND Hx) to establish 2000 GPM to 5000 GPM KC flow to ND Hx 1B.

__ c. Check any 1A Train KC Pump - ON.

__ c. GO TO 33.e.

__ d. GO TO Step 33.f.

e. Check the following valves open:

__ e. GO TO Step 34.

__ • 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol)

__ • 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol)

__ • 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol)

__ • 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33. (Continued)	
__ f. Check 1A ND Pump - ON.	f. Perform the following: __ 1) IF 1A ND Pump will be started, THEN GO TO Step 33.g. __ 2) GO TO Step 34.
g. Align KC to 1A ND Hx as follows: __ 1) Limit KC pump flow to 4000 GPM per operating KC pump in next step. __ 2) Throttle open 1KC-56A (KC To A ND Hx) to establish 2000 GPM to 5000 GPM KC flow to ND Hx 1A.	
__ 34. Check any ND pump - RUNNING.	GO TO one of the following enclosures to start desired ND pump that has KC cooling established: __ • Enclosure 6 (Startup of 1A ND Train) OR __ • Enclosure 7 (Startup of 1B ND Train).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 35. **Check KC flow to the operating ND train's Hx - ESTABLISHED.**	**Perform the following:** a. IF NC temperature is less than 150° F, AND temperature is expected to stay less than 150° F for at least 5 more minutes, THEN: NOTE Operating procedure steps to locally listen for vibration and to align KC may be N/A'd. __ 1) Swap ND trains to the train with KC cooling PER OP/1/A/6100/SO-6 (Placing The Second ND Train In Service). __ 2) GO TO Step 37. b. IF NC temperature is greater than 150° F, OR will be above 150° F within 5 minutes, THEN GO TO one of the following enclosures to start desired ND pump that has KC cooling established: __ • Enclosure 6 (Startup of 1A ND Train) OR __ • Enclosure 7 (Startup of 1B ND Train).

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 36. Check 1A train KC pumps - OFF.	**IF AT ANY TIME is is desired to stop 1A train KC Pumps, THEN evaluate performing the following:** NOTE Operating procedure steps to locally listen for vibration and to align KC may be N/A'd. __ a. Swap ND trains to 1B train and stop 1A ND Pump PER OP/1/A/6100/SO-6 (Placing The Second ND Train In Service). __ b. WHEN 1A ND Pump is off, THEN stop KC Pumps PER Steps 26 through 30.
__ 37. Check KC System leak - HAS OCCURRED.	__ GO TO Step 38 in body of procedure.
__ 38. GO TO Step 36 in body of procedure.	

1. **IF AP/1/A/5500/19 (Loss Of ND Or ND System Leakage) has been implemented, AND additional makeup has been aligned PER AP/1/A/5500/19 (Loss Of ND Or ND System Leakage), THEN:**

   __ a. Restart ND pump PER AP/1/A/5500/19 (Loss Of ND Or ND System Leakage).

   __ b. GO TO Step 15.

__ 2. **Stop 1B ND Pump.**

__ 3. **Close 1KC-81B (KC To B ND Hx).**

4. **Close the following:**

   __ • 1ND-29 (A ND Hx Outlet)

   __ • 1ND-34 (A & B ND Hx Bypass)

   __ • 1ND-32 (A ND Hx To Letdown Hx)

   __ • 1ND-18 (B ND Hx Bypass)

   __ • 1ND-17 (B ND Hx To Letdown Hx)

   __ • 1NI-178B (Train B ND To C & D CL)

   __ • 1ND-15B (Train B ND To Hot Leg Isol).

5. **Open the following valves:**

   __ • 1NI-173A (Train A ND To A & B CL)

   __ • 1ND-30A (Train A ND To Hot Leg Isol)

   __ • 1ND-33 (A ND Hx Bypass).

__ 6. **Limit KC pump flow to 4000 GPM per operating KC pump in next step.**

__ 7. **Throttle open 1KC-56A (KC To A ND Hx) to establish 2000 GPM to 5000 GPM KC flow to ND Hx 1A.**

__ 8. **IF 1ND-35 (ND To FWST Isol) is known to be open, THEN ensure 1ND-35 is closed before continuing in this procedure.**

__ 9. **Start 1A ND Pump.**

__ 10. **Ensure 1ND-68A (A ND Pump & A Hx Miniflow) opens.**

__ 11. **Slowly throttle open 1ND-34 (A & B ND Hx Bypass) to obtain ND flow between 1000 to 2000 GPM.**

12. **Throttle the following valves as necessary to maintain stable NC System temperature while controlling ND flow between 1000 and 2000 GPM:**

__ • 1ND-29 (A ND Hx Outlet)

__ • 1ND-34 (A & B ND Hx Bypass)

__ • IF NC temperature greater than 200° F, THEN maintain KC flow greater than 2000 GPM

__ • 1KC-56A (KC To A ND Hx).

13. **IF desired to align ND to all 4 Cold Legs, THEN perform the following:**

a. Open the following valves:

__ • 1NI-178B (Train B ND To C & D CL)

__ • 1ND-15B (Train B ND To Hot Leg Isol).

b. Throttle the following valves as necessary to maintain stable NC System temperature while controlling ND flow greater than 2000 GPM:

__ • 1ND-29 (A ND Hx Outlet)

__ • 1ND-34 (A & B ND Hx Bypass)

__ • IF NC temperature greater than 200° F, THEN maintain KC flow greater than 2000 GPM

__ • 1KC-56A (KC To A ND Hx).

__ 14. **WHEN KC is aligned to aux building non-essential header, AND ND letdown is desired, THEN establish letdown from the ND System PER OP/1/A/6200/001A (Chemical and Volume Control System Letdown), Enclosure 4.1 (Establishing Letdown Flow from the ND System, Charging Flow, and Seal Injection Flow).**

15. GO TO one of the following steps in body of procedure:

__ • IF KC System leak has occurred, THEN GO TO Step 36 in body of procedure.

OR

__ • IF KC System has remained intact, THEN GO TO Step 38 in body of procedure.

1. **IF AP/1/A/5500/19 (Loss Of ND Or ND System Leakage) has been implemented, AND additional makeup has been aligned PER AP/1/A/5500/19 (Loss Of ND Or ND System Leakage), THEN:**

   __ a. Restart ND pump PER AP/1/A/5500/19 (Loss Of ND Or ND System Leakage).

   __ b. GO TO Step 15.

__ 2. **Stop 1A ND Pump.**

__ 3. **Close 1KC-56A (KC To A ND Hx).**

4. **Close the following:**

   __ • 1NI-173A (Train A ND To A & B CL)

   __ • 1ND-30A (Train A ND To Hot Leg Isol)

   __ • 1ND-34 (A & B ND Hx Bypass)

   __ • 1ND-33 (A ND Hx Bypass)

   __ • 1ND-32 (A ND Hx To Letdown Hx)

   __ • 1ND-17 (B ND Hx To Letdown Hx)

   __ • 1ND-14 (B ND Hx Outlet).

5. **Open the following valves:**

   __ • 1ND-18 (B ND Hx Bypass)

   __ • 1NI-178B (Train B ND To C & D CL)

   __ • 1ND-15B (Train B ND To Hot Leg Isol).

__ 6. **Limit KC pump flow to 4000 GPM per operating KC pump in next step.**

__ 7. **Throttle open 1KC-81B (KC To B ND Hx) to establish 2000 GPM to 5000 GPM KC flow to ND Hx 1B.**

__ 8. **IF 1ND-35 (ND To FWST Isol) is known to be open, THEN ensure 1ND-35 is closed before continuing in this procedure.**

__ 9. **Start 1B ND Pump.**

__ 10. Ensure 1ND-67B (B ND Pump & B Hx Miniflow) opens.

__ 11. Slowly throttle open 1ND-34 (A & B ND Hx Bypass) to obtain ND flow between 1000 to 2000 GPM.

12. **Throttle the following valves as necessary to maintain stable NC System temperature while controlling ND flow between 1000 and 2000 GPM:**

__ • 1ND-14 (B ND Hx Outlet)

__ • 1ND-34 (A & B ND Hx Bypass)

__ • IF NC temperature greater than 200° F, THEN maintain KC flow greater than 2000 GPM

__ • 1KC-81B (KC To B ND Hx).

13. **IF desired to align ND to all 4 Cold Legs, THEN perform the following:**

a. Open the following valves:

__ • 1NI-173A (Train A ND To A & B CL)

__ • 1ND-30A (Train A ND To Hot Leg Isol).

b. Throttle the following valves as necessary to maintain stable NC System temperature while controlling ND flow greater than 2000 GPM:

__ • 1ND-14 (B ND Hx Outlet)

__ • 1ND-34 (A & B ND Hx Bypass)

__ • IF NC temperature greater than 200° F, THEN maintain KC flow greater than 2000 GPM

__ • 1KC-81B (KC To B ND Hx).

__ 14. **WHEN KC is aligned to aux building non-essential header, AND ND letdown is desired, THEN establish letdown from the ND System PER OP/1/A/6200/001A (Chemical and Volume Control System Letdown), Enclosure 4.1 (Establishing Letdown Flow from the ND System, Charging Flow, and Seal Injection Flow).**

15. GO TO one of the following steps in body of procedure:

__ • IF KC System leak has occurred, THEN GO TO Step 36 in body of procedure.

OR

__ • IF KC System has remained intact, THEN GO TO Step 38 in body of procedure.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

1. Isolate letdown as follows:

   a. Close:

   __ • 1NV-458A (75 GPM L/D Orifice Outlet Cont Isol)

   __ • 1NV-457A (45 GPM L/D Orifice Outlet Cont Isol)

   __ • 1NV-35A (Variable L/D Orifice Outlet Cont Isol).

   b. Close:

   __ • 1NV-1A (NC L/D Isol To Regen Hx)

   __ • 1NV-2A (NC L/D Isol To Regen Hx).

__ c. Check ND - IN SERVICE PRIOR TO EVENT.

__ c. GO TO Step 2.

__ d. Close 1NV-121 (ND Letdown Control).

__ 2. Check NV pumps suction - ALIGNED TO VCT.

__ RETURN TO step in effect in body of procedure.

CAUTION VCT high temperature will degrade NC pump seal cooling and NV pump operation.

NOTE A loss of KC cooling to KC aux building non-essential header causes VCT temperature to rise, primarily due to NV pump recirc flow.

__ 3. IF restoration of KC cooling to aux building non-essential header is expected within next 15 minutes, THEN exit this enclosure.

__ 4. Check excess letdown - ISOLATED.

Perform the following:

__ a. Place 1NV-27B (Excess L/D Hx Otlt 3-Way Cntrl) to "NCDT" position.

__ b. GO TO Step 6.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

__ 5. **IF AT ANY TIME excess letdown must be established, AND KC cooling still lost to KC aux building non-essential header, THEN excess letdown must be aligned to NCDT instead of VCT.**

NOTE
- PD Pump will not heat up VCT since it does not recirc water to VCT.
- Running PD Pump instead of swapping NV to FWST will prevent thermal transient on NC Pumps, and allow continued operation of unit. 1A and 1B NV Pumps will be stopped to prevent VCT overheating.

6. Check:

__ • PD Pump - AVAILABLE TO RUN

__ • Charging flow demand - LESS THAN 90 GPM

__ • 1ETA - ENERGIZED

__ • 1RN-42A (AB Non Ess Supply Isol) - OPEN.

__ **GO TO Step 15.**

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

7. **Start PD Pump as follows:**

   a. Open the following valves:

   __ • 1RN-63B (AB Non Ess Return Isol)

   __ • 1RN-64A (AB Non Ess Return Isol).

   __ b. Place "PD PUMP SPEED CNTRL" in "MAN" and set for minimum speed.

   __ c. Open 1NV-1047A (PD Pump Recirculation).

   __ d. Start the PD Pump.

   __ e. Ensure 1NV-1047A closes after 2 minutes.

   __ f. WHEN 1NV-1047A (PD Pump Recirculation) is closed, THEN raise "PD PUMP SPEED CNTRL" to establish desired charging flow.

__ **GO TO Step 15**

__ 8. **Close 1NV-238 (Charging Line Flow Control) while maintaining charging flow with PD Pump.**

__ 9. Stop 1A and 1B NV Pump.

__ 10. Place 1NV-238 (Charging Line Flow Control) at 80% open.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE NC pump seal return flow may still cause VCT heatup.

__ 11. Check VCT temperature - LESS THAN 125° F.

Perform the following:

CAUTION NC pumps number 1 seal D/P will go down by approximately 100 PSID when valves are closed in next step.

a. Close one of the following:

__ • 1NV-94AC (NC Pumps Seal Ret Cont Inside Isol)

OR

__ • 1NV-95B (NC Pumps Seal Ret Cont Outside Isol).

__ b. WHEN KC restored to KC aux building non-essential header, THEN valves above may be reopened to align seal return to VCT.

__ c. GO TO Step 13.

__ 12. IF AT ANY TIME VCT temperature goes above 125° F, THEN observe Note prior to Step 11 and RETURN TO Step 11.

__ 13. IF AT ANY TIME 1A or 1B NV Pumps must be started, AND KC cooling still lost to KC aux building non-essential header, THEN GO TO Step 15.

__ 14. RETURN TO step in effect in body of procedure.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
__ 15. Check Reactor - TRIPPED.	Perform the following: __ a. Reduce turbine load as required to maintain T-Ave at T-Ref in subsequent steps. __ b. REFER TO AP/1/A/5500/04 (Rapid Downpower) as required.
16. Swap NV suction to FWST as follows: a. Open: __ • 1NV-221A (NV Pumps Suct From FWST) __ • 1NV-222B (NV Pumps Suct From FWST). b. Close: __ • 1NV-141A (VCT Outlet Isol) __ • 1NV-142B (VCT Outlet Isol).	
17. WHEN KC cooling is restored to KC aux building non-essential header, THEN NV suction may be realigned to VCT as follows: a. Open: __ • 1NV-141A (VCT Outlet Isol) __ • 1NV-142B (VCT Outlet Isol). b. Close: __ • 1NV-221A (NV Pumps Suct From FWST) __ • 1NV-222B (NV Pumps Suct From FWST).	
__ 18. RETURN TO step in effect in body of procedure.	

1. IF header to be placed in service has had a leak or experienced voiding, THEN:

NOTE If available, it may be preferrable to fill using KC train that is less critical to plant operation.

__ • Evaluate performing actions to ensure header is filled and vented prior to opening any non-essential header isolation valves from the control room.

__ • IF necessary to fill a voided or drained non-essential header, THEN evaluate locally slowly cracking open supply isolation valve from one train of KC while monitoring KC pumps and surge tank levels.

2. IF desired to align 1A KC train to Reactor Bldg Non-essential header, THEN perform the following:

a. Close the following valves:

__ 1) 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).

__ 2) 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).

b. Open the following valves:

__ 1) 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).

__ 2) 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).

3. IF desired to align 1B KC train to Reactor Bldg Non-essential header, THEN perform the following:

a. Close the following valves:

__ 1) 1KC-230A (Trn A Rx Bldg Non Ess Sup Isol).

__ 2) 1KC-3A (Trn A Rx Bldg Non Ess Ret Isol).

b. Open the following valves:

__ 1) 1KC-18B (Trn B Rx Bldg Non Ess Ret Isol).

__ 2) 1KC-228B (Trn B Rx Bldg Non Ess Sup Isol).

4. IF desired to align just 1A KC train to Aux Bldg Non-essential header, THEN perform the following:

   a. Close the following valves:

   __ 1) 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol).

   __ 2) 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol).

   b. Open the following valves:

   __ 1) 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol).

   __ 2) 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol).

5. IF desired to align just 1B KC train to Aux Bldg Non-essential header, THEN perform the following:

   a. Close the following valves:

   __ 1) 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol).

   __ 2) 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol).

   b. Open the following valves:

   __ 1) 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol).

   __ 2) 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol).

CAUTION Reopening Aux Bldg Non-essential header isolation valves in next step will align operating train to opposite train's essential header and to any loads that are opened on opposite train (ND Hx and Reactor Bldg Non-essential header).

6. IF desired to reopen both trains of Aux Bldg Non-essential header valves (to establish normal alignment), THEN open the following valves:

- A Train:

__ a. 1KC-1A (Trn A Aux Bldg Non Ess Ret Isol).

__ b. 1KC-50A (Trn A Aux Bldg Non Ess Sup Isol).

- B Train:

__ a. 1KC-2B (Trn B Aux Bldg Non Ess Ret Isol).

__ b. 1KC-53B (Trn B Aux Bldg Non Ess Sup Isol).

7. IF desired to reopen KC to NCDT, THEN perform the following:

CAUTION Establishing KC flow rapidly to NCDT Hx may cause water hammers due to steam voiding of KC water in Hx.

a. IF NCDT temperature is greater than 220° F, OR air may have entered NCDT KC header, THEN dispatch operator to perform the following prior to opening KC valves in Step 7.b:

__ • Close 1KC-335 (NCDT Hx Ret Isol) (aux bldg, 733+14, JJ-51, room 730, 20 ft southwest of BIT, 2 ft from shield wall, above 230° mark, 1 ft from ceiling)

__ • Close 1KC-318 (NCDT Hx Sup Isol) (aux bldg, 733+9, JJ-50, room 730, outside door to VCT).

b. Open:

__ 1) 1KC-320A (NCDT Hx Sup Hdr Cont Outside Isol).

__ 2) 1KC-332B (NCDT Hx Ret Hdr Cont Inside Isol).

__ 3) 1KC-333A (NCDT Hx Ret Hdr Cont Outside Isol).

c. IF 1KC-335 and 1KC-318 closed in Step 7.a, THEN:

__ 1) Have dispatched operator slowly open 1KC-318.

__ 2) IF air has entered NCDT KC header, THEN vent NCDT Hx and associated piping as required.

__ 3) WHEN 1KC-318 open, AND any required venting completed, THEN have dispatched operator slowly open 1KC-335.