RO

Reference

Handouts

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1	**Check If RCPs Should Be Stopped:**	
	a. Injection flow to RCS: • SI pumps - AT LEAST ONE RUNNING AND FLOW INDICATED -OR- • RHR pumps - AT LEAST ONE RUNNING AND FLOW INDICATED	a. Go to Step 2.
	b. RCS pressure - LESS THAN 1275 PSIG [1600 PSIG]	b. Go to Step 2.
	c. Stop both RCPs	
2	**Check If SGs Are Not Faulted:**	
	a. Check SG pressures: • NO SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER • NO SG COMPLETELY DEPRESSURIZED	a. Verify faulted SG(s) isolated: • Steam lines • Feedlines IF NOT, THEN go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.
Δ 3	**Check Intact SG Levels:**	
	a. Narrow range level - GREATER THAN 7% [Wide Range 50%]	a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [Wide Range 50%] in at least one SG.
	b. Control feed flow to maintain narrow range level between 7% and 50% [Wide Range 50% and 64%]	b. IF narrow range level in any SG continues to increase in an uncontrolled manner, THEN go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

2.4.26 Locally **verify CV-31125**, COND RECIRC SPRAY CV, is OPEN. _____

2.4.27 **Verify** Emergency Classification has been implemented and **perform** actions per F3 from the TSC. _____ SM

2.4.28 **Monitor** the Source Range detectors to verify shutdown condition.

2N-51B, EXCORE DETECTION TRN A REMOTE INDICATOR _____

2N-51C, EXCORE DETECTION TRN B REMOTE INDICATOR _____

2.4.29 **Maintain** stable plant conditions. _____

NOTE:	**RCS Boron Concentration can be obtained from latest RCS Boron sample results or obtain new sample from Duty Chemist.**

2.4.30 **Determine** the required boration prior to Xenon level decreasing below the pre-trip concentration:

A. Present RCS Boron _____
Required (Per Fig. C1-10B) _____
Change in Boron (ppm) _____

B. **Multiply** the desired ppm change by 1.75 to determine the number of gallons of boric acid needed:

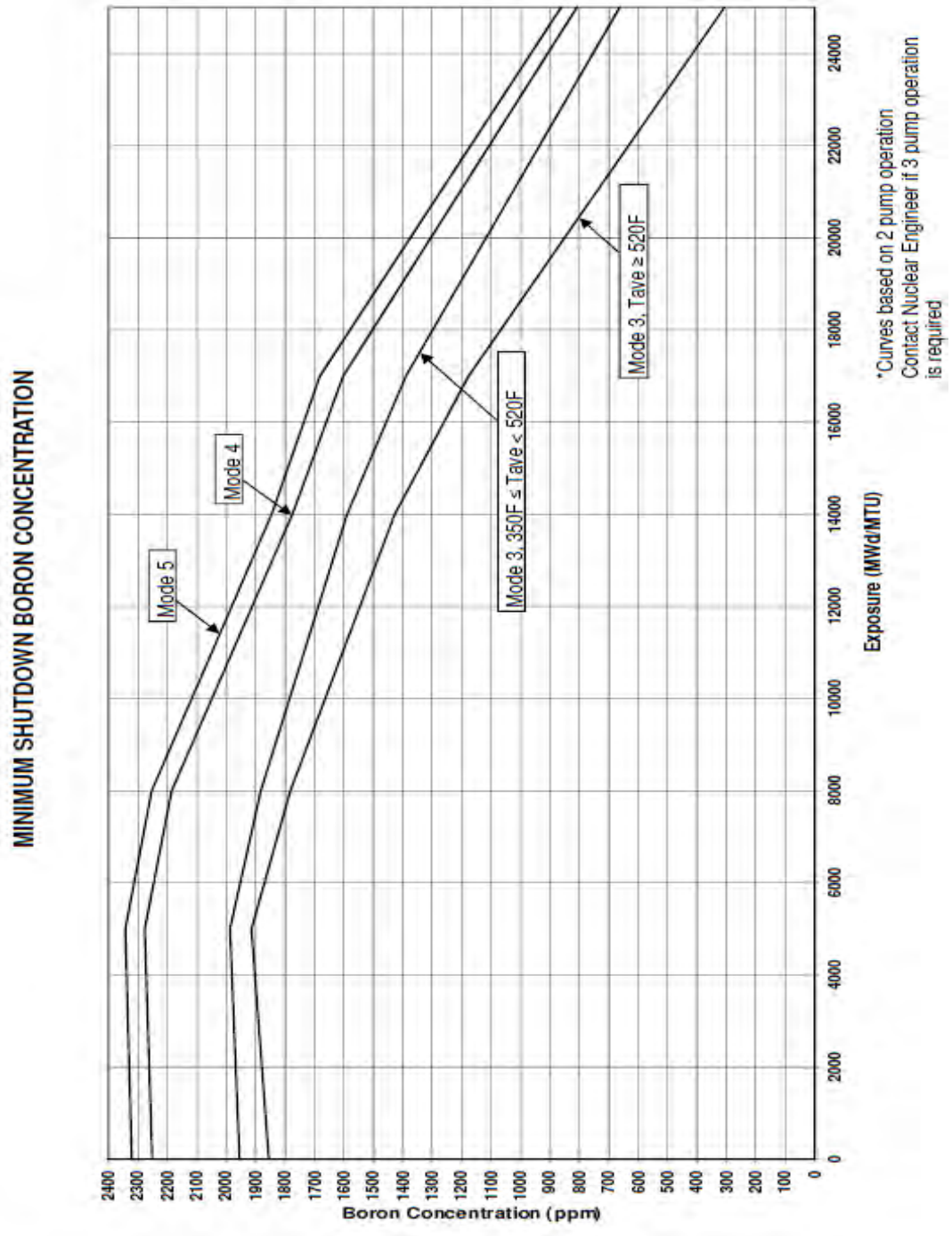
_____ ppm X 1.75 = _____ gal

C. **Divide** the number of gallons to be added by 12 to determine the time required to add at 12 gpm:

_____ gal/12 gpm = _____ min

(This step continued on the next page . . .)

C	SHUTDOWN BORON CONCENTRATION UNIT 2 CYCLE 30	NUMBER: FIG C1-10B
		REV: 26
		Page 1 of 3



PORC REVIEW DATE:	APPROVAL:
NR	PCR #: 602000001014

C	SHUTDOWN BORON CONCENTRATION UNIT 2 CYCLE 30	NUMBER: FIG C1-10B
		REV: 26
		Page 2 of 3

Minimum Shutdown Boron Concentrations, ppm

Mode 3	$T_{ave} \geq$ 520 ºF	(ARI, Most Reactive Rod Out)	
	0-1 Pump	2 Pumps	3 Pumps
0 MWD/MTU	1855	1855	1855
5,000 MWD/MTU	1914	1914	1914
8,000 MWD/MTU	1782	1782	1782
14,000 MWD/MTU	1427	1427	1427
17,000 MWD/MTU	1176	1176	1176
25,000 MWD/MTU	306	306	306

Mode 3	350 ºF $\leq T_{ave} <$ 520 ºF	(ARI, Most Reactive Rod Out)	
	0-1 Pump	2 Pumps	3 Pumps
0 MWD/MTU	1955	1955	1955
5,000 MWD/MTU	1987	1987	1987
8,000 MWD/MTU	1882	1882	1882
14,000 MWD/MTU	1589	1589	1589
17,000 MWD/MTU	1389	1389	1389
25,000 MWD/MTU	663	663	663

Mode 4	200 ºF $< T_{ave} <$ 350 ºF	(ARI, Most Reactive Rod Out)	
	0-1 Pump	2 Pumps	3 Pumps
0 MWD/MTU	1991	2251	2526
5,000 MWD/MTU	2008	2277	2575
8,000 MWD/MTU	1919	2185	2467
14,000 MWD/MTU	1644	1775	2043
17,000 MWD/MTU	1473	1602	1800
25,000 MWD/MTU	808	808	869

C	SHUTDOWN BORON CONCENTRATION UNIT 2 CYCLE 30	NUMBER: FIG C1-10B
		REV: 26
		Page 3 of 3

Mode 5	68 ºF ≤ T_{ave} ≤ 200 ºF	(ARI, Most Reactive Rod Out)	
	0-1 Pump	2 Pumps	3 Pumps
0 MWD/MTU	2071	2321	2654
5,000 MWD/MTU	2011	2343	2689
8,000 MWD/MTU	1927	2253	2530
14,000 MWD/MTU	1657	1845	2111
17,000 MWD/MTU	1496	1682	1873
25,000 MWD/MTU	862	862	978

Mode 6	68 ºF ≤ T_{ave} < 200 ºF	(ARI)	
	0-1 Pump	2 Pumps	3 Pumps
0 MWD/MTU	2331	2331	2582
5,000 MWD/MTU	2366	2366	2555
8,000 MWD/MTU	2276	2276	2465
14,000 MWD/MTU	2000	2000	2044
17,000 MWD/MTU	2000	2000	2000
25,000 MWD/MTU	2000	2000	2000

Mode 6	68 ºF ≤ T_{ave} < 200 ºF	(ARO)	
	0-1 Pump	2 Pumps	3 Pumps
0 MWD/MTU	2903	2954	3377
5,000 MWD/MTU	2972	3025	3462
8,000 MWD/MTU	2904	2904	3321
14,000 MWD/MTU	2645	2645	2985
17,000 MWD/MTU	2485	2485	2750
25,000 MWD/MTU	2000	2000	2000

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Note ***Normal conditions are desired but not required for starting the RCPs.***

18 **Check If RCPs Should Be Started:**

a. Core exit T/Cs - GREATER THAN 1200°F

a. Go to Step 19.

b. Check if an idle RCS cooling loop is available:

- Narrow range SG level - GREATER THAN 7% [Wide range 50%]
- RCP in associated loop - AVAILABLE AND NOT OPERATING

b. Perform the following:

1) Manually or locally reset SI [ATTACHMENT P].

2) Reset Containment Isolation.

3) Establish instrument air to containment.

4) Open all PRZR PORVs and block valves.

5) IF core exit T/Cs remain greater than 1200°F, THEN open all other RCS vent paths to containment:

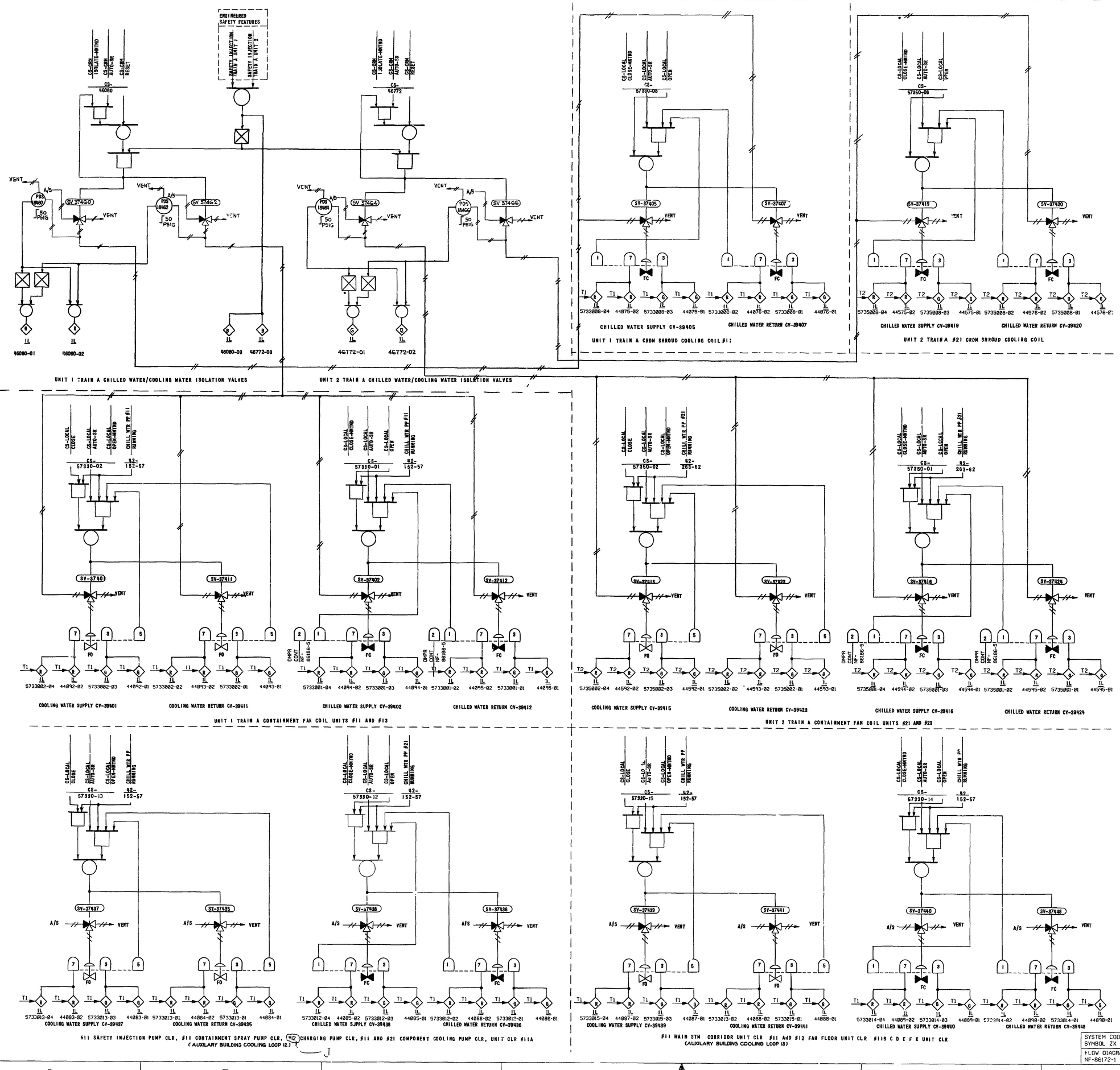
- SV-37035
- SV-37036
- SV-37037
- SV-37038
- SV-37039
- SV-37040

6) Go to Step 19.

c. Start idle RCP in one available RCS cooling loop

d. Return to Step 18a

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
Δ 6	**Check AFW Status:**	
	a. Verify AFW pumps discharge pressure - GREATER THAN 1000 PSIG	a. Perform the following: 1) Throttle AFW flow to maintain greater than 1000 psig discharge pressure while maintaining greater than 200 gpm AFW flow. 2) IF a single SG is depressurizing in an uncontrolled manner or is completely depressurized, THEN stop feed flow to that SG.
	b. Verify total AFW flow - GREATER THAN 200 GPM	b. IF SG wide range level greater than 50% in either SG, THEN control feed flow to maintain narrow range level greater than 7% [Wide Range 50%]. IF SG wide range level less than 50% in both SGs, THEN manually start AFW pumps and align valves, as necessary. IF AFW flow greater than 200 gpm can NOT be established, THEN go to 1FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, Step 1.
	c. Check SG levels - NARROW RANGE GREATER THAN 7% [Wide Range 50%] IN EITHER SG	c. Maintain total feed flow greater than 200 gpm until narrow range level in either SG is greater than 7% [Wide Range 50%].
	d. Control feed flow to maintain narrow range SG level between 7% and 50% [Wide Range 50% and 64%]	



REVISIONS

H ISSUED FOR CONSTRUCTION. CHANGED ML TO IL AND TAG NUMBERS TO REFLECT NEW IND. LT. MODULES. INCORP. NSP PROVIDED ASBUILT INFORMATION.
DWN: RSM
CHK'D: SLZ
PROJ#: E-90L221
REV'D:
APP'D & CERT:
WJJ
1-25-93 PE# 20013

FOR CONSTRUCTION
ADDED LOCAL IND. LT. TEST FUNCTION.
DWN: WJJ
CHK'D: JRL
PROJ#: E-90L221
REV'D:
APP'D & CERT:
G. SUNDBERG
9-2-94 PE# 11840

AS BUILT-
INCORPORATED A/E'S REV. H PER ORR PI-95-114
CERTIFIED REV. H TRANSFERRED TO RELORD TRACING
DWN: BMS 7-31-95
CHK'D:
MOD#: 90L221
FILMED:

J AS BUILT-
REVISED TO CORRECT CHARGING PUMP COOLER NO. AS SHOWN.

PER ORR PI-04-010
DWN: DMN 2-10-04
CHK'D: CMR 2-18-04
MOD#:
FILMED 3-04

DWN	DATE
CHECKED	
PROJECT NO. APP'D & CERT.	
FILMED	

SIGNIFICANT NO.	8630				100	3600	1	812L
GROUP	1	2	3	4	5	CL	6	

INTERLOCK LOGIC DIAGRAM-CONTAINMENT AND AUXILIARY BUILDING CHILLED WATER SYSTEM

SYSTEM CODE SYMBOL	ZX
FLOW DIAGRAM	NF-86172-1

NORTHERN STATES POWER COMPANY
PRAIRIE ISLAND NUCLEAR GENERATING PLANT
RED WING, MINNESOTA

SCALE NONE REV J

NF-86186-3

8618*93.DGN MSP GENERATION CAD

NF-86186-3

UNIT 1 TRAIN B CHILLED WATER/COOLING WATER ISOLATION VALVES

UNIT 2 TRAIN B CHILLED WATER/CHILLED WATER ISOLATION VALVES

UNIT 1 TRAIN B #12 CRDM SHROUD COOLING COIL

UNIT 2 TRAIN B #22 CRDM SHROUD COOLING COIL

CHILLED WATER SUPPLY CV-39406

CHILLED WATER RETURN CV-39408

CHILLED WATER SUPPLY CV-39417

CHILLED WATER RETURN CV-39418

COOLING WATER SUPPLY CV-39403

COOLING WATER RETURN CV-39409

CHILLED WATER SUPPLY CV-39404

CHILLED WATER RETURN CV-39410

COOLING WATER SUPPLY CV-39413

COOLING WATER RETURN CV-39421

CHILLED WATER SUPPLY CV-39414

CHILLED WATER RETURN CV-39422

UNIT 1 TRAIN B CONTAINMENT FAN COIL UNITS 12 AND 14

UNIT 2 TRAIN B CONTAINMENT FAN COIL UNITS 22 AND 24

COOLING WATER SUPPLY CV-39427

COOLING WATER RETURN CV-39425

CHILLED WATER SUPPLY CV-39428

CHILLED WATER RETURN CV-39426

COOLING WATER SUPPLY CV-39431

COOLING WATER RETURN CV-39429

CHILLED WATER SUPPLY CV-39432

CHILLED WATER RETURN CV-39430

#12 SAFETY INJECTION PUMP CLR, #11 AND #13 CHARGING PUMP CLR, #12 CONTAINMENT SPRAY PUMP CLR (AUXILARY BUILDING COOLING LOOP 11)

#21 SAFETY INJECTION PUMP CLR #22 CHARGING PUMP CLR #21 CONTAINMENT SPRAY PUMP CLR (AUXILARY BUILDING COOLING LOOP 21)

REVISIONS

H ISSUED FOR CONSTRUCTION. CHANGED ML TO IL AND TAG NUMBERS TO REFLECT NEW IND. L'. MODULES.
DWN: RSM
CHK'D: SLZ
PROJ#: E-90L22;
REV'D:
APP'D & CERT:
WJJ
1-25-93 PE* 20013

FOR CONSTRUCTION. ADDED LOCAL IND. LT. TEST FUNCTION.
DWN: WJJ
CHK'D: JRL
PROJ#: E-90L221
REV'D:
APP'D & CERT:
G. SUNDBERG
9-2-94 PE* 11842

AS BUILT- INCORPORATED A/E'S REV. H PER DRR P1-94-114 CERTIFIED REV. H TRANSFERRED TO RECORD TRACING
DWN: BMS 8-1-95
CHK'D:
MOD#: 90L221
FILMED:

J AS BUILT- REVISED TO CORRECT LOGIC AS SHOWN.
PER DRR P1-04-010
DWN: DMN 2-18-04
CHK'D: CMR 2-18-04
MOD#: ~
FILMED 3-04

LEGEND

- SYMBOLIZES VALVE LIMIT SWITCH
- SYMBOLIZES BREAKER AND MOTOR STARTER AUXILIARY CONTACTS
- IL INDICATING LIGHT
- NL MONITOR LIGHT
- A_l LOCAL CONTROL ALARM
- A_o OVERLOAD ALARM
- A_t BREAKER TRIP ALARM
- T1 LOCAL INDICATING LIGHT TEST CIRCUIT FROM SWITCH 57330-07
- T2 LOCAL INDICATING LIGHT TEST CIRCUIT FROM SWITCH 57350-07

AIR OPERATED VALVE LIMIT SWITCH LEGEND

SWITCH SYMBOL	SWITCH DESIG	VALVE POSITION CLOSED	OPEN
1	ac		
2	aa		
3	ba		
4	bb		
5	bc		
6	bc		
7	aa		
8	ac		

VALVE LIMIT SWITCH LEGEND DETAIL 13

NUCLEAR SAFETY RELATED
QA TYPE I & II

NF-86186-4

DWN	DATE	SIGNIFICANT NO.	8630			100	3600	1 81 0
CHECKED		GROUP	1	2	3	4	5	CL C
PROJECT NO.								
APP'D & CERT.								
FILMED								

INTERLOCK LOGIC DIAGRAM-CONTAINMENT AND AUXILIARY BUILDING CHILLED WATER SYSTEM

SYSTEM CODE SYMBOL ZX

FLOW DIAGRAM NF-86172-1

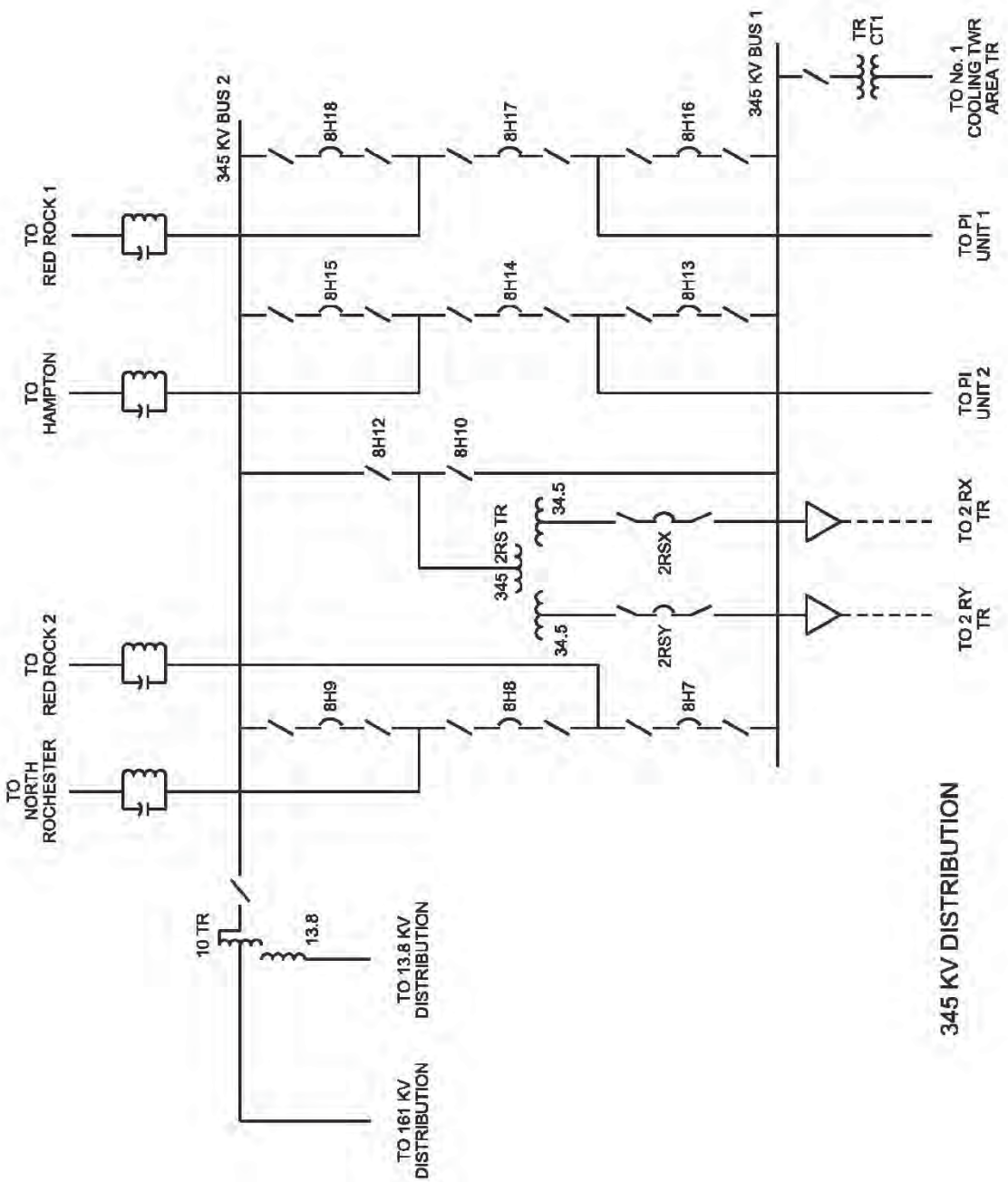
NORTHERN STATES POWER COMPANY
PRAIRIE ISLAND NUCLEAR GENERATING PLANT
RED WING, MINNESOTA

SCALE NONE | REV J

NF-86186-4

8618604.DGN WSP GENERATION CAD

FIGURE B20.2-2 – 345 KV DISTRIBUTION



X-HIAW- 1-242

STEAM GENERATOR

HIGH-HIGH STEAM FLOW OR HIGH STEAM FLOW COINCIDENT WITH LO-LO T AVG.

LOOP A (SHEET 7) LOOP B

LOW STEAM LINE PRESSURE

LOOP A (SHEET 7) LOOP B

PRESSURIZER

LOW PRESSURE

(SHEET 6)

CONTAINMENT PRESSURE

2/3 HI

2/3 HI-HI

HI-HI

HI-HI

(NOTE 4)

(NOTE 4)

MANUAL RESET BLOCK (NOTE 9)

1-2 (MIN)

P-4 REACTOR TRIP (SHEET 2)

MANUAL ACTUATION FROM CONTROL BOARD

STEAM LINE ISOLATION (NOTE 3)

LOOP A

LOOP B

(BY OTHERS)

SAFETY INJECTION ACTUATION

(NOTE 1)

CONTAINMENT ISOLATION

CONTAINMENT VENT. ISOLATION

(NOTE 1)

SPRAY ACTUATION

CONTAINMENT VENT. ISOLATION

(NOTE 2)

CONTAINMENT RADIOACTIVITY DETECTORS

AIR PARTICLE MONITOR

RADIO GAS MONITOR

MANUAL RESET

MANUAL RESET

CONTROL ROOM RADIATION MONITOR

R-23 R-24

"E"

(NOTE 5)

BY (W) BY OTHERS

BY (W) BY OTHERS

BY (W) BY OTHERS

MANUAL RESET (NOTE 9)

MANUAL RESET (NOTE 9)

MANUAL RESET (NOTE 9)

MANUAL RESET

"E"

"E"

CLOSE

CLOSE

LOOP A STEAM LINE STOP VALVE

LOOP B STEAM LINE STOP VALVE

REACTOR TRIP (SHEET 2)

FEEDWATER ISOLATION (SHEET 10) (NOTE 8)

EMERGENCY DIESEL START-UP

AUXILIARY FEEDWATER PUMPS (SHEET 15)

SAFEGUARDS SEQUENCE

SAFETY INJECTION

NSSS SEQUENCE REQUIREMENTS BY (W)

EMERGENCY FAN COOLING

SERVICE WATER COMPONENT COOLING PUMPS

CONTAINMENT SPRAY ACTUATION

CONTAINMENT ISOLATION (NOTE 6)

CONTAINMENT VENTILATION ISOLATION (NOTE 6)

CONTROL ROOM VENTILATION ISOLATION

(NOTE 5)

NOTES:

1. TWO MOMENTARY CONTROLS; OPERATING EITHER CONTROL WILL ACTUATE.
2. TWO MOMENTARY CONTROLS. ACTUATION IS EFFECTED ONLY IF BOTH CONTROLS ARE OPERATED SIMULTANEOUSLY.
3. ONE CONTROL PER LOOP.
4. CONTAINMENT PRESSURE BISTABLES FOR SPRAY ACTUATION ARE ENERGIZE - TO ACTUATE (OTHER BISTABLES ARE DE-ENERGIZE - TO - ACTUATE)
5. ENCLOSED CIRCUITRY IS NOT PART OF THE SAFEGUARD SYSTEM AND IS NOT REDUNDANT.
6. COMPONENTS ACTUATED BY CONTAINMENT ISOLATION SIGNAL AND COMPONENTS ACTUATED BY CONTAINMENT VENTILATION ISOLATION ARE ALL INDIVIDUALLY SEALED IN (LATCHED) SO THAT LOSS OF THE ACTUATION SIGNAL WILL NOT CAUSE THESE COMPONENTS TO RETURN TO THE POSITION HELD PRIOR TO THE ADVENT OF THE ACTUATION SIGNAL.
7. THIS SHEET IS IDENTICAL FOR UNITS 1 & 2 EXCEPT FOR THE TAG NUMBERS, WHICH ARE PRECEDED BY 1 OR 2 FOR UNITS 1 OR 2, RESPECTIVELY (HERE INDICATED FOR UNIT 1 ONLY).
8. FEEDWATER ISOLATION (SHEET 10) INCLUDES THE TRIPPING OF ALL MAIN FEEDWATER PUMPS BY OTHERS.
9. THE REDUNDANT MANUAL RESET CONSISTS OF TWO MOMENTARY CONTROLS ON THE CONTROL BOARD, ONE FOR EACH TRAIN.

REVISIONS

A AS BUILT - ADD'D P-4 HI'S WITH BETTER QUALITY DRAWINGS PER METHOD PPP-7045 DWN: LDW DATE: 6-23-80 CHKD: KMK 7-11-80 PROJ: — FILMED —

B AS BUILT - CHANGED PER DRR PI-80-74 DWN: JH DATE: 6-23-80 CHKD: KMK 7-11-80 PROJ: — FILMED —

C AS BUILT REVISED PER DRR PI-81-33 REPLACED PER LOW PRESSURE/LOW LEVEL COINCIDENCE BY WITH 2/3 LOW PRESSURE DWN: JM 4-24-81 CHK: PAS 4-24-81 PROJ: — FILMED 5-1-81

D AS BUILT - DELETED NOTE 10 PER PDC PI 93-140 PER DRR PI-93-140 DWN: [illegible] CHKD: [illegible] PROJ: [illegible] FILMED [illegible]

E AS BUILT - UPDATE LOGIC FOR CONTROL ROOM VENTILATION REFERENCE ACC 28014530 PER DRR PI-01-142 DWN: MPP 12/03/01 CHKD: CAR 12/20/01 MOD: — FILMED 01-02

Westinghouse Electric Corporation
ATOMIC POWER DIV., PITTSBURGH, PA., U.S.A.
5652D20

DWN	DATE	SIGNIFICANT NO.	8630			15.2	J100 / 4050	1	3310
CHECKED		GROUP	1	2	3	4	5	01	6
PROJECT NO.									
APPD & CERT.									
FILMED									

SAFEGUARDS ACTUATION SIGNALS LOGIC DIAGRAMS

NORTHERN STATES POWER COMPANY
PRAIRIE ISLAND NUCLEAR GEN. PLANT
RED WING, MINNESOTA

SCALE NONE REV E

X-HIAW- 1-242

X1B42.DGN USER GENERATED

ANNUNCIATOR LOCATION: 47012-0507

PRZR LVL DEVIATION	Alarm Level Deviation from Program Level
PRESSURIZER LEVEL DEVIATION SER Input Point: 206 Address: 2W43	Approximate Setpoints Tripped: ± 10% Reset: Not Specified

AUTOMATIC ACTIONS

Pressurizer high level backup heaters energize on high level deviation.

INITIAL ACTIONS

1. **Check** all pressurizer level channels. _____

2. IF actual pressurizer level deviation exists, THEN **perform** the following:

   A. **Verify** charging pump in automatic and charging flow proper for the level. _____

   B. IF necessary, THEN **place** charging pump speed control in "MANUAL". _____

   C. **Control** charging pump speed as necessary to restore pressurizer level to programmed level. _____

3. IF due to an instrument failure, THEN **refer** to 1C51, INSTRUMENT FAILURE GUIDE. _____

SUBSEQUENT ACTIONS

1. IF necessary, THEN **run** an RCS leak rate test. _____

2. IF necessary, THEN **refer** to 1C4 AOP1, REACTOR COOLANT LEAK. _____

3. IF condition was caused by malfunction of automatic pressurizer level control system, THEN **notify** System Engineer. _____

4. **Effect** repairs AND **return** system to normal. _____

INSTRUMENTS & REFERENCES

1. Actuating device (**1-LC-428B**, or **1-LC-428C**).

ANNUNCIATOR LOCATION: 47012-0507

INSTRUMENTS & REFERENCES (Continued)

2. Flow diagram XH-1-7.

3. Logic Diagram NF-40780 Sheet 2.

4. Schematic Diagram NE-40011 Sheet 185.

NOTE:	**Channel calibration may be performed in any channel sequence. If problems develop during calibration, it is acceptable to move on to another channel as long as the affected channel remains O.O.S. until the calibration is successfully completed, keeping in mind the C11 requirements for multiple channels out of service.**

NOTE:	**Steps within this section will be repeated for each rad monitor as necessary.**

6.3 Remove Channel to be calibrated as follows:

6.3.1 Have Control Room Operator log the monitor channel to be calibrated O.O.S. per C11, Radiation Monitoring System.

INITIAL for Each Monitor Removed from Service		
2R2 U2 CNTMT VSL AREA_____	**2R7 U2 INCORE SEALTABLE AREA_____**	**2R9 U2 RCS LT DN LINE AREA_____**
NOTES: None	**NOTES: None**	**NOTES: None**

NOTE:	**Record the following information on the appropriate Calibration Worksheets.**

2R-2 **2R-7** **2R-9**

6.3.2 For each monitor, inform the Control Room Operator(s) that the following CR Annunciators will alarm during the performance of this surveillance:

- **47022-0208**, Rad Monitor Down Scale Failure _____ _____ _____
- **47022-0209**, Rad Monitor CHECK SOURCE ACTUATED _____ _____ _____
- **47022-0109**, Hi Radiation Train “A” _____ _____ _____

6.3.3 Record “As Found” background reading. _____ _____ _____

Figure 1 Circulating Water Discharge Flows

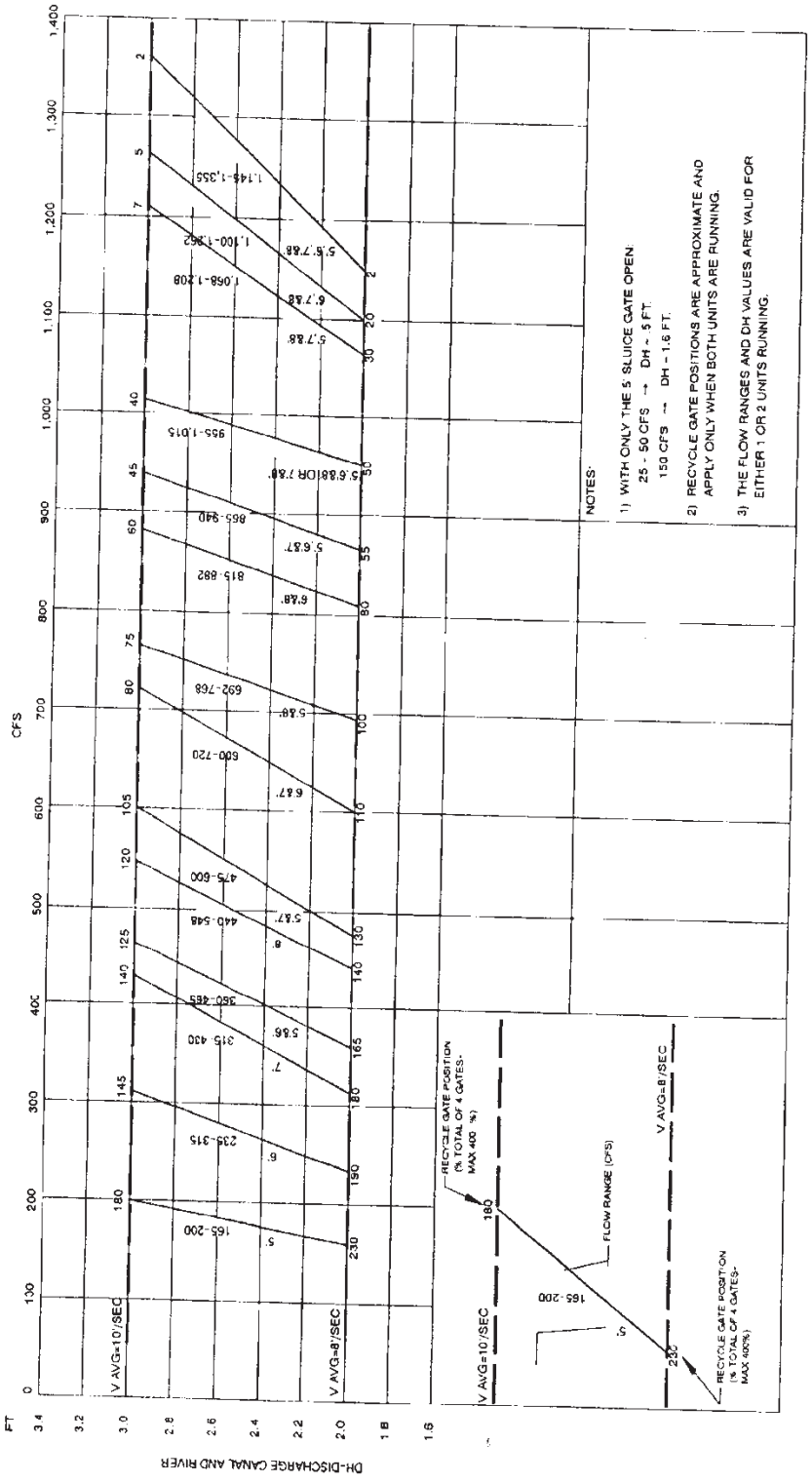


FIGURE 1 - CIRCULATING WATER DISCHARGE FLOWS

DATES: _____ **TO:** _____

EXTERNAL CIRC WATER LOG

DATE & TIME	U1 CDSR INLETS 1T2513A or TI-12001 (LOCAL) 1T2514A or TI-12002 (LOCAL)	U2 CDSR INLETS 2T2513A or TI-12003 (LOCAL) 2T2514A or TI-12004 (LOCAL)	AMBIENT RIVER 1T2576A or 2T2576A	LOCK & DAM NO. 3 (1) 1T2528A or 2T2528A	RIVER ΔT (2) 1T2578A or 2T2578A	CANAL/ RIVER ΔH (3) (4) 1[2]U1870A 91730/91731 BOARDS	SLUICE GATES OPEN 5′	6′	7′	8′	SITE DISCH FLOW cfs	OPCW UPDATED √ U1	U2	CTP/FANS IN SERVICE 121/12 123/12	 122/12 124/12	U1 MWe 1Q0340A U2 MWe 2Q0340A	REMARKS (√=Update)	INIT
														/	/			
														/	/			
														/	/			
														/	/			
														/	/			
														/	/			
														/	/			
														/	/			
														/	/			
														/	/			
														/	/			
														/	/			

*For CTP Status:
0 = Pump Off
1 = Pump On

Complete log at the following times:

1. **Daily between 0600 and 1200.**
2. **Immediately prior to adjusting discharge flow rate.**
3. **At equilibrium conditions following a discharge flow rate change.**
4. **Immediately following a change in the number of in-service cooling towers.**

(1) IF ERCS points are unavailable, THEN call the Lockmaster at 651-388-5794 and ask for the three (3) pier temperatures. Temperatures may also be acquired at ERCS points 1[2]T2573A, 1[2]T2574A, and 1[2]T2575A. Average the three (3) values.

(2) IF ERCS points are unavailable, THEN calculate the differential temperature by subtracting the ambient river temperature reading from the Lock & Dam No. 3 temperature reading.

(3) IF ERCS points unavailable, THEN use PI-91730 in Screenhouse and LT-91731 at sluice gates or local boards in Screenhouse and sluice gates to determine ΔH. IF ERCS ΔH not available between April 15 – June 30, THEN local ΔH readings should be taken twice per shift. [For LT-91731 add 672.0′ to Local reading.]

(4) On Sunday only record and compare ΔH readings from ERCS point and boards. IF different by ≥ .3, THEN submit a Work Request.

EXTERNAL CIRC WATER LOG

PLANT THERMAL AND DISCHARGE LIMITS

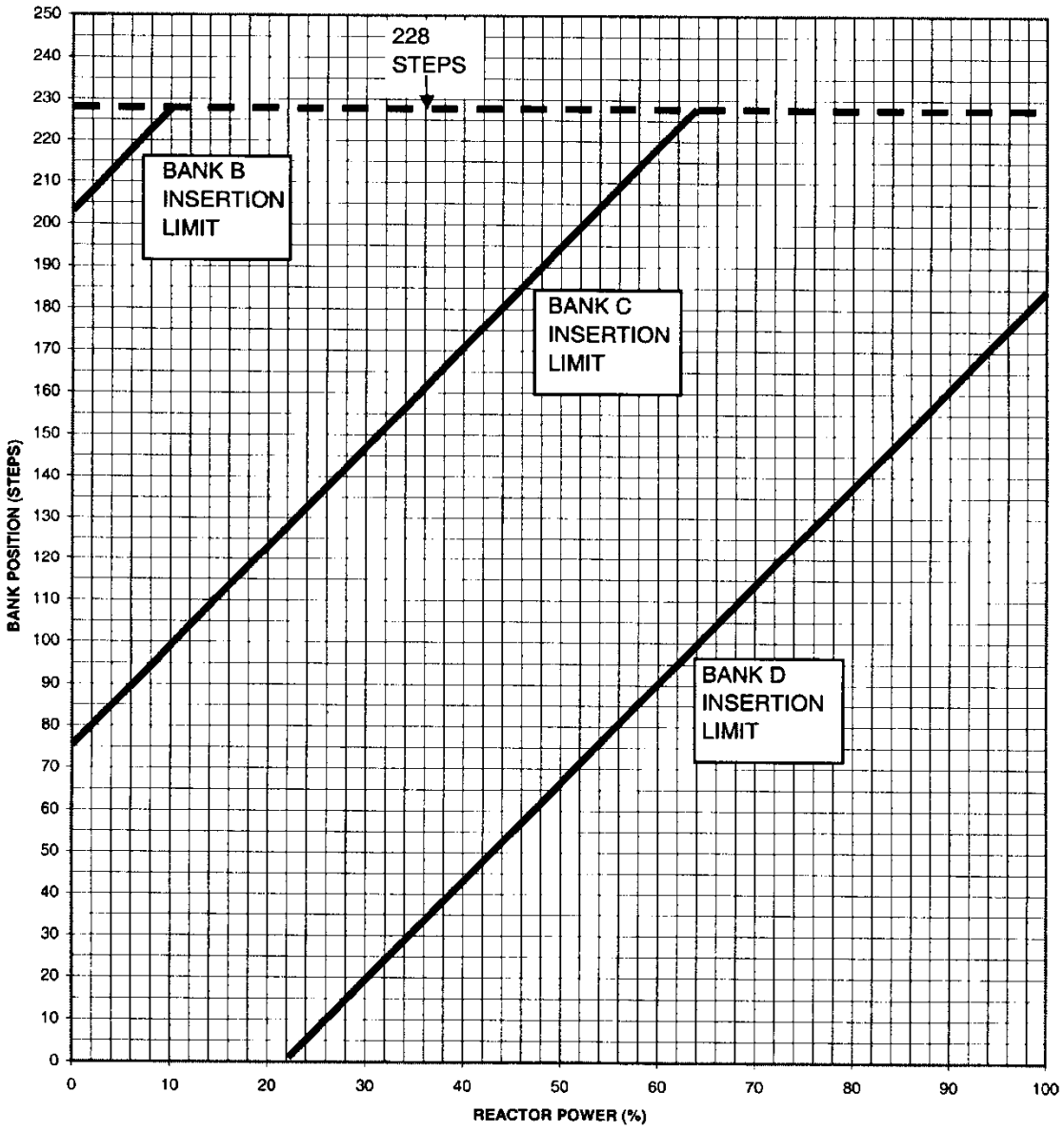
	Observe NPDES Permit Limits AND **adjust** the CW gates and **operate** Cooling Towers to maintain condenser inlets as low as possible without going below 45°F						
	Jan 1–Mar 31	Apr 1–14	Apr 15–Apr 30	May 1-31	Jun 1-15	Jun 16-30	Jul 1-Dec 31
Site Discharge Flow	NO LIMIT		IF River ≥ 15,000 cfs[1] THEN ≤300cfs[2,3] IF River < 15,000 cfs[1] THEN ≤150cfs[2]	≤300cfs[2,3]	≤400cfs[2,3]	≤800cfs[2,3]	NO LIMIT
	During Open Cycle operation, plant net MW output is improved by operating the **minimum** number of CT pumps and fans to meet the Thermal Limits		During Closed Cycle operation, plant net MW output can be improved by operating the CT pumps and CW pumps on a one–for–one basis with all fans in service on the operating cooling towers.				During Open Cycle operation, plant net MW output is improved by operating the **minimum** number of CT pumps and fans to meet the Thermal Limits
	WHEN Daily Average Ambient River Temp <43°F for 5 days, THEN;	WHEN Daily Average Ambient River Temp ≥43°F for 5 days OR beginning April 1st, whichever occurs first, THEN;					WHEN Daily Average Ambient River Temp <43°F for 5 days, THEN;
Daily Average Ambient (Upstream) River Temp	NO TRIGGER	IF ≥78°F for two consecutive days, THEN **Operate** towers to *maximum practical extent*[3]					NO TRIGGER
Daily Average Receiving Water Temperature (Lock & Dam #3)	IF ≥43°F for two consecutive days, THEN **Notify** site Environ. Group. MN PCA may require tower operation.	NPDES Permit limit = 86°F. IF, ERCS screen "RIVER", U2577AV, "DAM 24HR MAVG" reaches 85.8 °F, THEN **refer** to C25 AND **issue** a CAP to document the site's plan for exceeding the 86 °F limit.					IF ≥43°F for two consecutive days, THEN **Notify** site Environ. Group. MN PCA may require tower operation.
Monthly Average Plant Delta-T	NO LIMIT	**Operate** towers as necessary to maintain ≤5°F					NO LIMIT
Daily Average River Discharge Canal Temp.	<85°F[4]	<95°F[4]					<85°F[4]
	Jan 1–Mar 31	April 1-Aug 31					Sept. 1-Dec 31
Intake Screens	up to 3/8" Mesh	0.5 mm fine mesh screens OR alternate minimum larger sized screens upon approval of the MPCA.					up to 3/8" Mesh
Bypass Gates	IF OPEN for ≥24 cumulative hours in a calendar month, THEN **notify** site Environmental Group						

1. River flow rates may be obtained by calling Lock & Dam No. 3 @388-5794 OR at http://www2.mvr.usace.army.mil/watercontrol/new/layout.cfm (Select St. Paul District; Locks and Dams).
2. The plant may discharge at higher flow rates during the specified periods if needed to prevent condenser inlet temperatures from exceeding 85°F provided that such higher flows are minimized to the extent practical, and all cooling towers are operated to the maximum practical extent.
3. *Maximum practical extent* for single unit operations is satisfied by operation of two of the four cooling towers.
4. The 85°F [95°F] desired value is an Xcel Energy corporate guideline; Reference C25, Section 4.7.
5. **Minimize** abrupt temperature changes anywhere in the CW system (i.e. limit changes to ≤5 °F/hr).
6. IF Site Discharge Flow is <147 cfs, DO NOT make releases per Checklist series C21.1-5.x without approval of Radiation Protection & Chemistry Manager or designee.
7. IF Site Discharge Flow is <150 cfs, notify chemistry to monitor suspended solids content in the circulating water system.
8. Prior to any CW system changes OR following unplanned changes, **notify** Duty Chemist AND **make** Log Entry.
9. **Update** the ERCS "OPCW" program on each unit following a status change of Sluice Gates or a change in Delta–H.
10. Following changes in discharge canal level, THEN **adjust** duck pond valve IF required.
11 For a description of the various thermal limits, and ERCS points that may be used for trending, see C25, Section 4.0, Figure 3 and Figure 4.
12. Condenser inlet temperature <45°F may cause condenser in–leakage.
13. Daily average temperatures are available on the midnight printout obtained from the TSC by the Shift Manager.

C	ROD INSERTION LIMITS UNITS 1 AND 2	NUMBER: FIG C1-8 REV: 9 Page 1 of 6

NOTE:	**Rod Insertion Limits for Unit 1 and Unit 2 are given in the current cycle COLRs. For Rod Insertion Limits for operation with One Bottomed Rod or One Inoperable Rod, consult the current Unit 1 or Unit 2 COLR.**

ROD Insertion Limits Unit 1



PORC REVIEW DATE:	APPROVAL:
NR	PCR #: 6PCR01546712

C	ROD INSERTION LIMITS UNITS 1 AND 2	NUMBER: FIG C1-8
		REV: 9
		Page 2 of 6

ROD Insertion Limits Unit 1

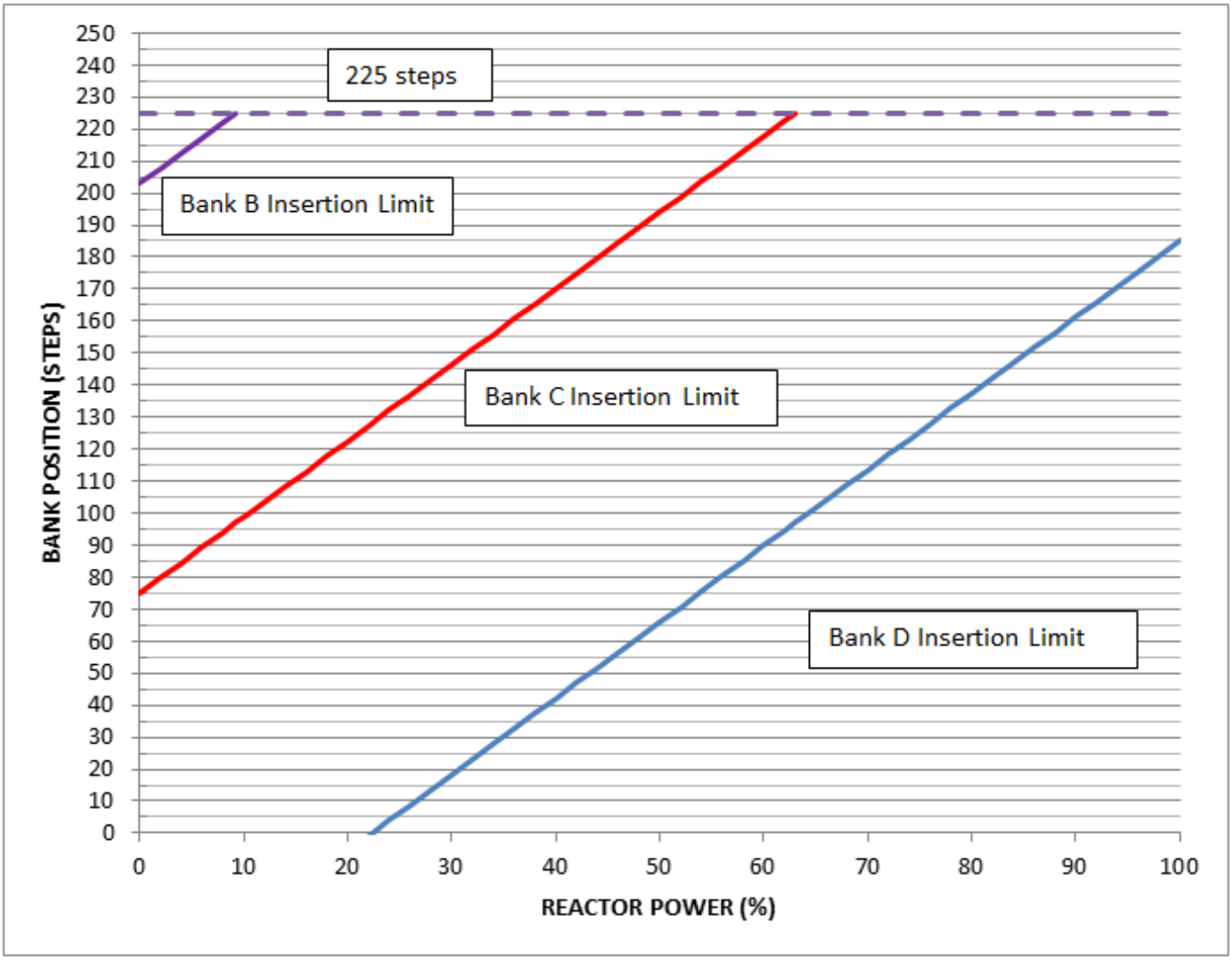
POWER	BANK B INSERTION LIMIT	BANK C INSERTION LIMIT	BANK D INSERTION LIMIT
0	203	75	
2	208	80	
4	212	84	
6	217	89	
8	222	94	
10	228	99	
12		103	
14		108	
16		113	
18		118	
20		123	
22		127	0
24		132	4
26		137	9
28		142	14
30		146	18
32		151	23
34		156	28
36		161	33
38		165	37
40		170	42
42		175	47
44		180	52
46		184	56
48		189	61
50		194	66
52		199	71
54		203	75
56		208	80
58		213	85
60		218	90
62		223	95
64		228	99
66			104

C	ROD INSERTION LIMITS UNITS 1 AND 2	NUMBER: FIG C1-8
		REV: 9
		Page 3 of 6

ROD Insertion Limits Unit 1

POWER	BANK B INSERTION LIMIT	BANK C INSERTION LIMIT	BANK D INSERTION LIMIT
68			109
70			114
72			118
74			123
76			128
78			133
80			137
82			142
84			147
86			152
88			156
90			161
92			166
94			171
96			175
98			180
100			185

ROD Insertion Limits Unit 2



ROD Insertion Limits Unit 2

POWER	BANK B INSERTION LIMIT	BANK C INSERTION LIMIT	BANK D INSERTION LIMIT
0	203	75	
2	208	80	
4	212	84	
6	217	89	
8	222	94	
10	225*	99	
12		103	
14		108	
16		113	
18		118	
20		123	
22		127	0
24		132	4
26		137	9
28		142	14
30		146	18
32		151	23
34		156	28
36		161	33
38		165	37
40		170	42
42		175	47
44		180	52
46		184	56
48		189	61
50		194	66
52		199	71
54		203	75
56		208	80
58		213	85
60		218	90
62		223	95
64		225*	99
66			104

C	ROD INSERTION LIMITS UNITS 1 AND 2	NUMBER: FIG C1-8
		REV: 9
		Page 6 of 6

ROD Insertion Limits Unit 2

POWER	BANK B INSERTION LIMIT	BANK C INSERTION LIMIT	BANK D INSERTION LIMIT
68			109
70			114
72			118
74			123
76			128
78			133
80			137
82			142
84			147
86			152
88			156
90			161
92			166
94			171
96			175
98			180
100			185

* = The new all rods out position of 225 will be reached before Bank C or D reaches 99 steps. Bank movement should be stopped at 225 steps rather than maintaining the 97 step overlap. Once rods are above 224 steps (the top of the active fuel), bank overlap and insertion limits have no impact.

3.1 REACTIVITY CONTROL SYSTEMS

3.1.4 Rod Group Alignment Limits.

LCO 3.1.4 All shutdown and control rods shall be OPERABLE.

AND

Individual actual rod positions shall be within 24 steps of their group step counter demand position when the demand position is between 30 and 215 steps, or within 36 steps of their group step counter demand position when the demand position ≤ 30 steps, or ≥ 215 steps.

----------NOTE----------
Individual RPIs may be outside their limits for ≤ 1 hour following substantial rod movement.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more rod(s) inoperable.	A.1.1	Verify SDM is within the limits provided in the COLR.	1 hour
	OR		
	A.1.2	Initiate boration to restore SDM to within limit.	1 hour
	AND		
	A.2	Be in MODE 3.	6 hours

C	FAILURE OF 21 BATTERY CHARGER	NUMBER: 2C20.9 AOP3
		REV: 14
		Page 1 of 17

CONTINUOUS USE
• *Continuous use of procedure required.*
• *Read each step prior to performing.*
• *Mark off steps as they are completed.*
• *Procedure SHALL be at the work location.*

PORC REVIEW DATE:	APPROVAL:
08/17/2016	PCR #: 01543137

TABLE OF CONTENTS

LIST OF ATTACHMENTS

1.0 PURPOSE

This procedure describes the actions necessary to assure DC power is maintained in the event of a failure of 21 Battery Charger.

2.0 PROCEDURES

2.1 Symptoms

2.1.1 Annunciator **47524-1102**, 21 DC SYSTEM TROUBLE

2.1.2 Annunciator **47524-1201**, 21 DC PANEL UNDERVOLTAGE

2.2 Automatic Actions

On a loss of 21 Battery Charger, 21 Battery will supply DC Panel 21 loads.

2.3 Immediate Manual Actions

NONE

2.4 Subsequent Manual Actions

NOTE:	**To perform a normal swap using the portable battery charger (21 Battery Charger <u>NOT</u> failed) refer to 2M-DC-21 PBC, Installation and Removal of the 11 Portable Battery Charger to Battery 21.**

2.4.1 **Notify** the Shift Supervisor T.S. LCO 3.8.4 is NOT met <u>AND</u> **enter** CONDITION A. _____

Entered CONDITION A at: _____
Time

NOTE:	**<u>IF</u> the Portable Battery Charger is in service to replace 21 Battery Charger, <u>THEN</u> the Portable Battery Charger will be treated as 21 Battery Charger in Attachment A and Attachment B.**

2.4.2 **Record** the status of 21 Battery Charger on Attachment A. _____

NOTE:	**IF 480V Bus 211 was subjected to a voltage transient OR the Battery Charger was subjected to an over-demand condition, THEN the Battery Charger may have shutdown due to a momentary internal synchronism problem.**

2.4.3 IF the status recorded in Step 2.4.2 is the result of loss of AC to the Battery Charger, THEN **perform** the following:

A. **Monitor** 21 Battery voltage and amperage on Unit 2 ERCS display DC1. _____

NOTE:	**21 Battery will supply design basis accident loads coincident with a sustained loss of AC for at least 3 hours.** **Under steady-state normal loads (less than 100 amps), 21 Battery will last over 8 hours.**

B. **Verify** Instrument Inverters 21, 23 and 27 are in a normal line-up per 2C20.8, Instrument AC Distribution System. This ensures the inverters are NOT a load on 21 Battery. _____

C. **Transfer** DC Panel 17 and DC Panel 19 to their standby source (DC panel 11) per C20.9, DC Distribution System. _____

D. **Contact** Electrical System Engineering for assistance in determining which additional loads may be de-energized. _____

E. WHEN AC has been restored, THEN **continue** with Step 2.4.4. _____

2.4.4 **Re-start** 21 Battery Charger per Attachment B. _____

2.4.5 IF the Battery Charger was successfully re-started, THEN **perform** the following:

A. **Notify** the Shift Supervisor to exit T.S. LCO 3.8.4 CONDITION A. _____

Exited CONDITION A at: _____
Time

B. **Notify** the Electrical Department of the Battery Charger re-start. _____

C. No further action in this AOP is required. _____

2.4.6 IF unable to re-start 21 Battery Charger, THEN **install** and **start-up** the Portable Battery Charger per Attachment C. (IF the Portable Battery Charger was already in service to replace 21 Battery Charger, THEN **NA** this step AND step 2.4.7.) _____

2.4.7 IF the Portable Battery Charger was successfully started, THEN **perform** the following:

A. **Determine** if SP 1411, 11 Portable Battery Charger Load Test, has been performed acceptably within the required frequency such that it can be credited for T.S. purposes. Yes / No
(Circle One)

B. IF the portable battery charger can be credited for T.S. purposes, THEN **notify** the Shift Supervisor to exit T.S. LCO 3.8.4 CONDITION A.

Exited CONDITION A at: _____
Time

2.4.8 IF the Portable Battery Charger cannot be started, OR was already in service to replace 21 Battery Charger, THEN **perform** the following:

A. **Monitor** 21 Battery voltage and amperage on Unit 2 ERCS display DC1. _____

NOTE:	**21 Battery will supply design basis accident loads coincident with a sustained loss of AC for at least 3 hours.** **Under steady-state normal loads (less than 100 amps), 21 Battery will last over 8 hours.**

B. **Verify** Instrument Inverters 21, 23 and 27 are in a normal line-up per 2C20.8, Instrument AC Distribution System. This ensures the inverters are NOT a load on 21 Battery. _____

C. **Verify** DC Panel 17 and DC Panel 19 are on their normal source (DC panel 11) per C20.9, DC Distribution System. _____

D. **Contact** Electrical System Engineering for assistance in determining which additional loads may be de-energized. _____

2.4.9 **Notify** the Electrical Department to investigate the cause of the Battery Charger failure and to attempt to restore the Battery Charger to service. _____

2.5 Recovery Actions

IF the Portable Battery Charger was started, THEN after 21 Battery Charger has been repaired:

2.5.1 **Notify** the Shift Supervisor T.S. LCO 3.8.4 is NOT met AND **enter** CONDITION A. _____

Entered CONDITION A at: _____
Time

2.5.2 **Shutdown** the Portable Battery Charger AND **restart** 21 Battery Charger per Attachment D. _____

2.5.3 **Notify** the Shift Supervisor to exit T.S. LCO 3.8.4 CONDITION A. _____

Exited CONDITION A at: _____
Time

3.0 ATTACHMENTS

3.1 Attachment A – Record of Failed 21 Battery Charger Indications

3.2 Attachment B – Restart of 21 Battery Charger Following a 480V Transient and/or an Over-Demand Condition

3.3 Attachment C – Installation and Start-up of the Portable Battery Charger in 21 Battery Room

3.4 Attachment D – Shutdown of the Portable Battery Charger and Restart of 21 Battery Charger

4.0 REFERENCES

4.1 Developmental References

4.1.1 NF-40547-1, Circuit Diagram “A” Train DC and Emergency AC Supply-Unit 2

4.1.2 NX-236975, Battery Charger Technical Manual

4.1.3 SP 1411, 11 Portable Battery Charger Load Test

4.1.4 2M-DC-21 PBC, Installation and Removal of the 11 Portable Battery Charger to Battery 21

4.2 Implementing References

4.2.1 2C20.8, Instrument AC Distribution System

4.2.2 C20.9, DC Distribution System

RADIATION WORK PERMIT

Task Number 101	RWP Number: 180051 Rev: 01

Task Description: RA/CA, GREEN PASS - 10 mrem / 25 mrem/h

Radiological Risk:	
NORMAL	

Areas Allowed for Entry (Area Status: RA)

Radiation Area:	High Radiation Area:	Locked High Radiation Area:	High Contamination Area:
YES	NO	NO	NO

Electronic Dosimeter Alarm Setpoints

Gamma Dose Alarm Setpoint (mRem):	Gamma Dose Rate Alarm Setpoint (mRem/Hr):
10	25
Neutron Dose Alarm Setpoint (mRem):	**Neutron Dose Rate Alarm Setpoint (mRem/Hr):**

Radiological Conditions

Description	Value	Unit
CONTAMINATION-ALPHA	LEVEL 1	dpm/100 cm2
CONTAMINATION-BETA	<10,000	dpm/100 cm2
GENERAL AREA GAMMA DOSE RATES	<25	mrem/h

Authorization List

Access List Required:
NO

RADIATION WORK PERMIT

Task Number 101	RWP Number: 180051 Rev: 01

Requirements

Requirement Groups	Requirement Descriptions
BRIEFING	See Exposure Control Instructions below.
PROTECTIVE CLOTHING	Extra gloves may be worn and changed out at a frequency to prevent cross contamination.
	Face shield may be required to prevent facial or nasal contamination when respirators are not required.
	Hard hat cover is required when donning protective clothing.
	Hood is required for carrying equipment on shoulders or wearing a headset in a CA/HCA.
	Knee pads are required when kneeling or crawling in a CA/HCA.
	Lab coat and surgeon gloves are required for localized contamination control with RP permission.
	Lab coat, shoe covers and surgeon gloves are required with RP permission for each use when entering a CA and there is a potential for the upper body to brush against or rub on equipment that is contaminated.
	Shoe covers and surgeon gloves is allowed with RP permission for each use and SHALL only be used in areas <2,000 dpm/100 cm2 for, inspections, observations, surveys, valve manipulation or tagging. NO kneeling, sitting, climbing or opening of radioactive systems is allowed.
	Single suit-up is required when entering a CA. Wear a single set of Ultras if the integrity of the protective clothing will be challenged (eg, tight spaces, potential rubbing, etc).
CONTAMINATION CONTROL	DO NOT open any; bags, barrels, items/equipment that are wrapped, etc, without RP permission and ensuring adequate controls are in place.
	HEPA vacuum or HEPA ventilation unit may be used with RP permission. RPM permission is also required prior to starting vacuum or HEPA in HCA.
	Immediately bag or wrap item/component upon removal from any contaminated system.
	The use of cleaning solvents shall be approved by RP Supervision prior to use.
RP COVERAGE	Contact RP for assistance when removing items from CA.
	Contact RP prior to any cleaning or decon activities.
	Contact RP prior to cutting, grinding, welding, burning, sanding, buffing or any activity that could potentially cause contamination to become airborne.
	Contact RP prior to isolating or draining radioactive systems.
DOSIMETRY	Standard DLR/Standard SRD is required.
EXPOSURE CONTROL	DO NOT move or reposition rad shielding without RP present.
	Use low dose waiting areas as much as practical.
FRISKING/MONITORING	Frisk hands, feet and areas of concern with frisker or use hand and foot monitor as soon as possible after exiting a Contaminated Area (CA).
	If contamination is detected when frisking or monitoring, then contact RP for assistance.
STOP WORK	See Stop Work Instructions below.

Additional Instructions

EXPOSURE CONTROL INSTRUCTIONS:

Green Pass;
*No Contaminated Area (CA) entries >10,000 dpm/100 cm2.
*No radioactive system breaches.
*No work above 8 feet.
*No entries into >25 mrem/h.
*Contact RP prior to entry into the RCA if unable to meet the green pass criteria.

DOSIMETRY INSTRUCTIONS:

RADIATION WORK PERMIT

Task Number 101	RWP Number: 180051 Rev: 01

CONTAMINATION CONTROL INSTRUCTIONS:

STOP WORK INSTRUCTIONS:

Stop work;
*For any evacuation or area monitor alarm.
*For any SRD dose alarm or un-briefed dose rate alarm.
*For any unexpected conditions or conditions that were not briefed.
*If unanticipated water is leaking.

When work is stopped then;
*Notify everyone near or in the same area and place all jobs in a safe condition.
*After placing job in a safe condition everyone leave the area and contact RP.
*Follow RP Supervision direction and guidance for stopping work or restarting the job .

ADDITIONAL INSTRUCTIONS:

RADIATION WORK PERMIT

Task Number 203	RWP Number: 180051 Rev: 01

Task Description: RA/CA, STANDARD ACTIVITIES - 20 mrem / 50 mrem/h

Radiological Risk:	
MEDIUM	M-Flow path could cause dose rates to change in other areas. M-Work activity is subject to changing and elevated radiological conditions . M-Work involves flushing, draining or venting a contaminated system that has the potential to cause a spread of contamination or a personal contamination event.

Areas Allowed for Entry (Area Status: RA)

Radiation Area:	High Radiation Area:	Locked High Radiation Area:	High Contamination Area:
YES	NO	NO	NO

Electronic Dosimeter Alarm Setpoints

Gamma Dose Alarm Setpoint (mRem):	Gamma Dose Rate Alarm Setpoint (mRem/Hr):
20	50
Neutron Dose Alarm Setpoint (mRem):	**Neutron Dose Rate Alarm Setpoint (mRem/Hr):**

Radiological Conditions

Description	Value	Unit
CONTAMINATION-ALPHA	LEVEL 1	dpm/100 cm2
CONTAMINATION-BETA	<50,000	dpm/100 cm2
GENERAL AREA GAMMA DOSE RATES	<50	mrem/h

Authorization List

Access List Required:
NO

RADIATION WORK PERMIT

Task Number 203	RWP Number: 180051 Rev: 01

Requirements

Requirement Groups	Requirement Descriptions
BRIEFING	Contact RP prior to each entry into the RCA.
PROTECTIVE CLOTHING	Extra gloves may be worn and changed out at a frequency to prevent cross contamination.
	Face shield may be required to prevent facial or nasal contamination when respirators are not required.
	Hard hat cover is required when donning protective clothing.
	Hood is required for carrying equipment on shoulders or wearing a headset in a CA/HCA.
	Knee pads are required when kneeling or crawling in a CA/HCA.
	Lab coat and surgeon gloves are required for localized contamination control with RP permission.
	Lab coat, shoe covers and surgeon gloves are required with RP permission for each use when entering a CA and there is a potential for the upper body to brush against or rub on equipment that is contaminated.
	Shoe covers and surgeon gloves is allowed with RP permission for each use and SHALL only be used in areas <2,000 dpm/100 cm2 for, inspections, observations, surveys, valve manipulation or tagging. NO kneeling, sitting, climbing or opening of radioactive systems is allowed.
	Single suit-up is required when entering a CA. Wear a single set of Ultras if the integrity of the protective clothing will be challenged (eg, tight spaces, potential rubbing, etc).
CONTAMINATION CONTROL	DO NOT open any; bags, barrels, items/equipment that are wrapped, etc, without RP permission and ensuring adequate controls are in place.
	HEPA vacuum or HEPA ventilation unit may be used with RP permission. RPM permission is also required prior to starting vacuum or HEPA in HCA.
	Immediately bag or wrap item/component upon removal from any contaminated system.
	The use of cleaning solvents shall be approved by RP Supervision prior to use.
RP COVERAGE	Contact RP for assistance when removing items from CA.
	Contact RP prior to any cleaning or decon activities.
	Contact RP prior to cutting, grinding, welding, burning, sanding, buffing or any activity that could potentially cause contamination to become airborne.
	Contact RP prior to entering areas above 8 feet. This includes working off a scaffold, free-climbing, temporary ladder, permanent ladder or stairs.
	Contact RP prior to isolating and draining radioactive filters or systems.
	Continuous RP coverage is required for radioactive system breach.
DOSIMETRY	Standard DLR/Standard SRD is required.
EXPOSURE CONTROL	DO NOT move or reposition rad shielding without RP present.
	Use low dose waiting areas as much as practical.
FRISKING/MONITORING	Frisk hands, feet and areas of concern with frisker or use hand and foot monitor as soon as possible after exiting a Contaminated Area (CA).
	If contamination is detected when frisking or monitoring, then contact RP for assistance.
STOP WORK	See Stop Work Instructions below.

Additional Instructions

EXPOSURE CONTROL INSTRUCTIONS:

DOSIMETRY INSTRUCTIONS:

RADIATION WORK PERMIT

Task Number 203	RWP Number: 180051 Rev: 01

CONTAMINATION CONTROL INSTRUCTIONS:

STOP WORK INSTRUCTIONS:

Stop work;
*For any evacuation or area monitor alarm.
*For any SRD dose alarm or un-briefed dose rate alarm.
*For any unexpected conditions or conditions that were not briefed.
*If unanticipated water is leaking.

When work is stopped then;
*Notify everyone near or in the same area and place all jobs in a safe condition.
*After placing job in a safe condition everyone leave the area and contact RP.
*Follow RP Supervision direction and guidance for stopping work or restarting the job .

ADDITIONAL INSTRUCTIONS:

SRO

Reference

Handouts

LEVEL OF USE

CONTINUOUS USE
• Continuous use of procedure required. • Read each step prior to performing. • Mark off steps as they are completed. • Procedure **SHALL** be at the work location.

PORC REVIEW DATE:	APPROVAL:
12/15/16	PCR 01485169

A. PURPOSE

This procedure provides actions to cooldown and depressurize the RCS to Mode 5, Cold Shutdown conditions following a loss of reactor coolant inventory.

B. ENTRY CONDITIONS

This procedure is entered from 1E-1, LOSS OF REACTOR OR SECONDARY COOLANT, when RCS pressure is greater than the shutoff head pressure of the RHR pumps.

C. ATTACHMENTS

ATTACHMENT A, Natural Circulation Conditions
ATTACHMENT D, Post LOCA Alignment of 12 RHR For Shutdown Cooling

INFORMATION PAGE FOR 1ES-1.1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
Δ 1	**Verify All AC Buses - ENERGIZED BY OFFSITE POWER**	Attempt to restore offsite power. IF offsite power NOT restored, THEN perform the following: a. Verify safeguards loads loaded on safeguards buses. b. Verify 100 kw diesel capacity available to run each charging pump.

Caution ***RCS pressure should be monitored. IF RCS pressure decreases in an uncontrolled manner to less than 275 psig [575 psig], THEN RHR pumps must be manually restarted to supply water to RCS.***

Δ 2	**Check If RHR Pumps Should Be Stopped:**	
	a. RHR pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST	a. Go to Step 3.
	b. Check RCS pressure:	b. Go to Step 3.
	1) Pressure - GREATER THAN 275 PSIG [575 PSIG]	
	2) Pressure - STABLE OR INCREASING	
	c. Stop RHR pumps aligned to RWST	

INFORMATION PAGE FOR 1ES-1.1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	**Establish Charging Flow:**	
	a. Charging pumps - AT LEAST ONE RUNNING	a. Perform the following: 1) IF CC flow to RCP(s) thermal barrier is lost, THEN isolate seal injection to affected RCP(s) before starting charging pumps. 2) Start charging pumps as necessary.
	b. Align charging pump suction to RWST	
	c. Establish maximum flow	
Δ 4	**Check Intact SG Levels:**	
	a. Narrow range level - GREATER THAN 7% [Wide Range 50%]	a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 7% [Wide Range 50%] in at least one SG.
	b. Control feed flow to maintain narrow range level between 7% and 50% [Wide Range 50% and 64%]	b. IF narrow range level in any SG continues to increase in an uncontrolled manner, THEN stop RCS cooldown and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.
5	**Place All PRZR Heaters In Off Position**	

INFORMATION PAGE FOR 1ES-1.1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	Note ***Shutdown margin should be monitored during RCS cooldown.***	
6	**Initiate RCS Cooldown To Cold Shutdown:**	
	a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR.	
	b. Use RHR System if in service	
	c. Check one condensate pump - RUNNING	c. Start one condensate pump.
	d. Dump steam to condenser from intact SG(s)	d. Dump steam using intact SG(s) PORV.
7	**Check RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 21°F [40°F]**	Go to Step 17.
8	**Check ECCS Pump Status:** • SI pumps - ANY RUNNING -OR- • RHR pumps - ANY RUNNING IN SI MODE	Go to Step 13.

INFORMATION PAGE FOR 1ES-1.1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Note ***IF the RCPs are not running, THEN the upper head region may void during RCS depressurization. This will result in a rapidly increasing PRZR level.***

9 **Depressurize RCS To Refill PRZR:**

a. Use normal PRZR spray

a. Use one PRZR PORV.

IF no PORV available, THEN use auxiliary spray.

b. PRZR level - GREATER THAN 23% [41%]

b. WHEN level greater than 23% [41%], THEN stop RCS depressurization.

Continue with Step 10.

c. Stop RCS depressurization

INFORMATION PAGE FOR 1ES-1.1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Caution ***IF RCP seal cooling had previously been lost, THEN the affected RCP(s) should not be started prior to a status evaluation.***

Note ***12 RCP is the preferred RCP for operation during cooldown to provide normal PRZR spray.***

10	**Check If An RCP Should Be Started:**	
	a. Both RCPs - STOPPED	a. Stop all but one RCP. Go to Step 11.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F]	b. Go to Step 17.
	c. PRZR level - GREATER THAN 23% [41%]	c. Return to Step 9.
	d. Attempt to start an RCP: 1) Establish conditions for starting an RCP per 1C3 AOP1, POST ACCIDENT START OF A RCP 2) Start 12 RCP	d. IF 12 RCP can NOT be started, THEN attempt to start 11 RCP.

INFORMATION PAGE FOR 1ES-1.1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Note

- ***RCS depressurization per Step 9 or charging flow control can be used to maintain PRZR level during SI flow reduction.***
- ***After stopping any SI pump, RCS pressure should be allowed to stabilize or increase before stopping another SI pump.***

11	**Check If One SI Pump Should Be Stopped:**		
	a. Both SI pumps - RUNNING	a. Go to Step 12.	
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 47°F [70°F]	b. IF either RCS hot leg temperature greater than 340°F, THEN go to Step go to Step 17. IF both RCS hot leg temperatures less than 340°F, THEN verify one RHR pump running. IF at least one RHR pump can NOT be started, THEN go to Step 17.	
	c. PRZR level - GREATER THAN 23% [41%]	c. Return to Step 9.	
	d. Stop one SI pump		

INFORMATION PAGE FOR 1ES-1.1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	**Check If Last SI Pump Should Be Stopped:**	
	a. One SI pump - RUNNING	a. IF any RHR pump running in SI mode, THEN go to Step 17. IF NOT, THEN go to Step 13.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 295°F [309°F]	b. IF either RCS hot leg temperature greater than 340°F, THEN go to Step go to Step 17. IF both RCS hot leg temperatures less than 340°F, THEN verify one RHR pump running. IF at least one RHR pump can NOT be started, THEN go to Step 17.
	c. PRZR level - GREATER THAN 23% [41%]	c. Return to Step 9.
	d. 11 RHR pump - RUNNING	d. Start 11 RHR pump. IF NOT, THEN start 12 RHR pump. IF no RHR pump can be started, THEN go to Step 17.
	e. Stop last SI pump	
13	**Check If Charging Flow Should Be Controlled To Maintain PRZR Level:**	
	a. Check RHR pumps - NONE RUNNING IN SI MODE	a. Go to Step 17.
	b. Control charging flow to maintain PRZR level	

INFORMATION PAGE FOR 1ES-1.1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Caution ***IF RCP seal cooling had previously been lost, THEN the affected RCP(s) should not be started prior to a status evaluation.***

Note ***12 RCP is the preferred RCP for operation during cooldown to provide normal PRZR spray.***

Δ14 **Check RCP Status:**

a. RCPs - AT LEAST ONE RUNNING

a. Attempt to start one RCP:

1) IF RVLIS full range indication less than 95%, THEN perform the following:

- Increase PRZR level greater than 90% [90%].
- Increase RCS subcooling based on core exit T/Cs greater than 53°F [72°F].
- Use PRZR heaters, as necessary to saturate the PRZR water.

2) Establish conditions for starting an RCP per 1C3 AOP1, POST ACCIDENT START OF A RCP

3) Start 12 RCP.

IF 12 RCP can NOT be started, THEN attempt to start 11 RCP.

IF no RCP can be started, THEN refer to ATTACHMENT A to verify natural circulation.

IF natural circulation NOT verified, THEN increase dumping steam.

b. Stop all but one RCP

INFORMATION PAGE FOR 1ES-1.1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Caution ***IF the SI pumps have been stopped, THEN the accumulators should be isolated when RCS pressure is less than 1000 psig.***

Note ***IF the RCPs are not running, THEN the upper head region may void during RCS depressurization. This will result in a rapidly increasing PRZR level.***

15 **Depressurize RCS To Minimize RCS Subcooling:**

a. Use normal PRZR spray

a. Use one PRZR PORV.

IF PORV NOT available or effective, THEN use auxiliary spray.

b. Control PRZR heaters as necessary

c. Depressurize RCS until EITHER of the following conditions satisfied:

- PRZR level - GREATER THAN 76% [69%]

-OR-

- RCS subcooling based on core exit T/Cs - LESS THAN 31°F [50°F]

16 **Verify Adequate Shutdown Margin:**

a. Sample RCS

b. Shutdown margin - ADEQUATE

b. Borate as necessary.

INFORMATION PAGE FOR 1ES-1.1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	**Verify SI Flow Not Required:**	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F]	a. Manually start SI pumps as necessary. Go to Step 18.
	b. PRZR level - GREATER THAN 8% [27%]	b. Manually start SI pumps as necessary. Return to Step 9.
18	**Check If SI Accumulators Should Be Isolated:**	
	a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F]	a. WHEN RCS hot leg temperatures less than 460°F, THEN go to Step 18c. Continue with Step 19.
	b. PRZR level - GREATER THAN 8% [27%]	b. Return to Step 9.
	c. Unlock and place the following 480 volt breakers - ON: • MCC-1LA1-D3 (MV-32071) (Key #176) • MCC-1LA2-C4 (MV-32072) (Key #177)	
	d. Close both accumulator isolation valves: • MV-32071 • MV-32072	d. Vent any unisolated accumulators. IF an accumulator can NOT be vented, THEN consult plant engineering staff to determine contingency actions.

INFORMATION PAGE FOR 1ES-1.1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	**Check If Diesel Generators Should Be Stopped:**	
	a. Verify safeguards buses - ENERGIZED BY OFFSITE POWER	a. Attempt to restore offsite power to safeguard buses.
	b. Stop any unloaded diesel generator per 1C20.7, D1/D2 DIESEL GENERATORS	
20	**Check If Safeguards Cooling Water Pumps Should Be Stopped:**	
	a. Verify 11 and 21 cooling water pumps - RUNNING	a. Start 11 and 21 cooling water pumps per C35, COOLING WATER SYSTEM. IF 11 and 21 cooling water pumps can NOT be started, THEN go to Step 21.
	b. Stop running safeguards cooling water pumps per C35, COOLING WATER SYSTEM	
21	**Check RCP Cooling:**	
	a. CC flow to each RCP - GREATER THAN 150 GPM	a. Attempt to restore CC to RCPs. IF NOT, THEN trip RCPs
	b. Verify thermal barrier coolant outlet valves - OPEN: • CV-31245 • CV-31246	b. IF seal injection normal, THEN restore CC to thermal barriers. IF seal injection NOT normal, THEN trip affected RCP(s).
	c. Seal injection flow to RCPs - NORMAL	c. IF CC flow to thermal barrier normal, THEN establish seal injection.

INFORMATION PAGE FOR 1ES-1.1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	**Check If Source Range Detectors Should Be Energized:**	
	a. Check intermediate range flux - LESS THAN 10^{-10} AMPS	a. WHEN flux less than 10^{-10} amps, THEN do Steps 22b and 22c. Continue with Step 23.
	b. Verify source range detectors - ENERGIZED	b. Manually energize source range detectors.
	c. Transfer nuclear recorders to source range scale	
23	**Shut Down Unnecessary Plant Equipment:**	
	a. Perform applicable shutdown steps of the following procedures: • 1C1.3-M2 through 1C1.3-M5 series of procedures • 1C1.3-BOP, UNIT 1 BALANCE OF PLANT SYSTEMS SHUTDOWN	
Δ24	**Check If RCPs Must Be Stopped:**	
	a. Check the following: • RCS pressure - LESS THAN 225 PSIG -OR- • RCP seal return flow - LESS THAN 0.5 GPM	a. IF neither condition satisfied, THEN go to Step 25.
	b. Stop affected RCP(s)	

INFORMATION PAGE FOR 1ES-1.1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Note ***ATTACHMENT D provides instructions for aligning one train of RHR for injection and the other train for shutdown cooling.***

25 **Check If RHR System Can Be Placed In Service:**

a. Check the following:

- RCS hot leg temperature - LESS THAN 350°F
- RCS pressure - LESS THAN 425 PSIG [175 PSIG]

a. Go to Step 26.

b. Consult plant engineering staff to determine if RHR System should be placed in service

b. IF RHR System NOT to be placed in service, THEN go to Step 26.

c. Check RHR pump flow indication - FLOW INDICATED

c. Align RHR for unit cooldown per 1C15, RESIDUAL HEAT REMOVAL SYSTEM. Go to Step 26.

d. Align RHR for shutdown cooling per:

- Plant engineering staff

-OR-

- ATTACHMENT D

26 **Check Containment Hydrogen Concentration:**

a. Hydrogen concentration - LESS THAN 6%

a. Consult plant engineering staff for additional recovery actions. Go to Step 27.

b. Hydrogen concentration - LESS THAN 0.5%

b. Place Hydrogen Recombiner System in service per C19.8, POST LOCA H2 ELECTRIC RECOMBINER CONTROL SYSTEM.

INFORMATION PAGE FOR 1ES-1.1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	**Check RCS Temperatures - LESS THAN 200°F**	Return to Step 2.
28	**Evaluate Long Term Plant Status:** a. Maintain Mode 5, Cold Shutdown conditions b. Consult plant engineering staff -END-	

ATTACHMENT A

NATURAL CIRCULATION CONDITIONS

The following conditions support or indicate natural circulation flow:

- RCS subcooling based on core exit T/Cs - GREATER THAN 21°F[40°F]
- SG pressures - STABLE OR DECREASING
- RCS hot leg temperatures - STABLE OR DECREASING
- Core Exit T/Cs - STABLE OR DECREASING
- RCS cold leg temperatures - AT SATURATION TEMPERATURE FOR SG PRESSURE

ATTACHMENT D

POST LOCA ALIGNMENT OF 12 RHR FOR SHUTDOWN COOLING

1. Verify both component cooling water pumps are running. _____

2. Verify 12 RHR pump is stopped. _____

3. Locally remove Safeguards Hold Cards from MCC breakers for RHR loop isolation valves and place breaker switches in "ON" position:

   - MCC 1LA1-D1, 1 RCS LP B COLD LEG RHR INJ MV-32066 (SFGDS Hold 1-181) _____
   - MCC 1LA1-B1, 1 RCS LP A HOT LEG RHR SPLY (INSIDE) MV-32164 (SFGDS Hold 1-180) _____
   - MCC 1LA2-C1, 1 RCS LP B HOT LEG RHR SPLY (INSIDE) MV-32230 (SFGDS Hold 1-182) _____

4. Locally remove Safeguards Hold Cards and OPEN 12 RHR heat exchanger inlet and outlet crossover valves:

   - RH-2-3, 12 RHR HX XOVR INLT (SFGDS Hold 1-089) _____
   - RH-2-5, 12 RHR HX OUTL XTIE (SFGDS Hold 1-091) _____

5. Locally CLOSE RH-1-2, 11 RHR PMP SUCT LINE. _____

6. CLOSE MV-32065, RHR TO RX VSL TRN B MV, using CS-46224. _____

7. Verify Containment Sump B to 12 RHR Suction valves are CLOSED:

   - MV-32076, SUMP B TO 12 RHR PUMP, using CS-46209 _____
   - MV-32078, SUMP B TO 12 RHR PUMP, using CS-46211 _____

8. CLOSE MV-32085, RWST TO 12 RHR PUMP, using CS-46023. _____

9. Place CS-46027, 12 RHR HX CC INLT MV-32094, to OPEN. _____

10. OPEN RHR Suction Isolation valves from the RCS:

    - MV-32164, LOOP A HOT LEG TO RHR, using CS-46226 _____
    - MV-32165, LOOP A HOT LEG TO RHR, using CS-46228 _____
    - MV-32230, LOOP B HOT LEG TO RHR, using CS-46227 _____
    - MV-32231, LOOP B HOT LEG TO RHR, using CS-46229 _____

ATTACHMENT D (Cont.)

POST LOCA ALIGNMENT OF 12 RHR FOR SHUTDOWN COOLING

11. Throttle CV-31236, 12 RHR HX RC OUTLET FLOW (1HC-625), to 90% CLOSED. _____

12. Throttle OPEN CV-31237, 11/12 RHR HX BYPASS FLOW (1HC-626A), to approximately 30%. _____

13. Start 12 RHR Pump using CS-46185. _____

14. OPEN MV-32066, RHR TO RC LOOP B COLD LEG, using CS-46225. _____

15. Adjust CV-31237, 11/12 RHR HX BYPASS FLOW (1HC-626A), for 2000 gpm flow. _____

16. Place CV-31237, 11/12 RHR HX BYPASS FLOW (1HC-626A), in "AUTO". _____

17. Allow a minimum of 5 minute warmup of 12 RHR heat exchanger. _____

18. Adjust CV-31236, 12 RHR HX RC OUTLET FLOW (1HC-625), to obtain desired cooldown rate. _____

BACKGROUND INFORMATION FOR

1ES-1.1, POST LOCA COOLDOWN AND DEPRESSURIZATION

SUMMARY FOR 1ES-1.1

1ES-1.1 provides procedural steps to cooldown and depressurize the RCS to Mode 5, Cold Shutdown conditions following a loss of reactor coolant inventory. This procedure is structured to deal primarily with small LOCAs, i.e. for those cases where SI flow can keep up with break flow, at pressure above the shutoff head pressure of the RHR pumps. In addition, if a LOCA occurs and the SI pumps fail, the cooldown will result in RCS depressurization, SI accumulator injection, and establishment of RHR flow for long term makeup.

BASIS FOR ACTIONS IN ES-1.1

Procedure Steps, Step 1

If any buses in the plant are not energized, then it should be verified that safeguards loads have been loaded on safeguards buses. Adequate diesel capacity to run the charging pumps should be ensured if offsite power is not available. (Available diesel generator capacity is the difference between 2750 KW and existing load.)

Caution Procedure Steps, Step 2

Except for relatively large LOCAs, the RCS pressure should remain greater than the shutoff head pressure of the RHR pumps until later in the recovery following a controlled cooldown and depressurization. To avoid damage to the RHR pumps, instructions are provided to stop these pumps early in the recovery if RCS pressure is greater than their shutoff head. An automatic signal to restart these pumps may not be available if RCS pressure subsequently decreases uncontrollably to less than their shutoff head. In that case, manual action is required to restart the pumps.

During the controlled depressurization, operation of the RHR pumps is not desirable unless they are being operated as part of the closed-loop RHR system. It is also possible that one RHR pump may be operated later to allow the operator to stop an SI pump. The RHR pumps may also have to be restarted upon transfer to recirculation mode.

Procedure Steps, Step 2

Upon safety injection initiation all safeguards pumps are started regardless of the possibility of high RCS pressure with respect to the RHR pump shutoff head. The RHR system recirculates on a small volume circuit and there is concern for pump and motor overheating. Shutdown of the pump when RCS pressure meets the criteria outlined in this step allows for future pump operability. Since this step only applies if the RHR pumps are running with suction aligned to the RWST, the RHR pumps should only be stopped in this step if they are running with suction aligned to the RWST.

Procedure Steps, Step 3

Maximum charging flow to the RCS is established to provide sufficient makeup so that SI pumps can later be stopped. If charging pumps are already running, then seal cooling is adequate and charging flow can be established as necessary. If pumps are not running, then seal injection flow is lost, and the only remaining source of seal cooling is CC. If CC flow to the RCP thermal barrier is also lost, then the seal is assumed to be already heated up. Rather than initiate the slow, tedious process of reestablishing seal cooling at this time, the seal injection flow path is isolated to allow charging pumps to be started and charging flow to be established. Since letdown will be isolated at this time, suction for the charging pumps is also transferred to the RWST to prevent draining of the VCT.

Charging pump operation is not essential for recovery. Actions to restore charging flow should not delay subsequent steps to cooldown and depressurize the RCS and reduce SI flow which are necessary to limit reactor coolant leakage.

Procedure Steps, Step 4

The minimum feed flow requirement satisfies the feed flow requirement of the Heat Sink Status Tree until level in at least one SG is restored into the narrow range. Narrow range level is reestablished in both SGs to maintain symmetric cooling of the RCS. The control range ensures adequate inventory with level readings on span. This step also provides for monitoring level in the steam generators to detect tube failures. In the case of steam generator level increasing in an uncontrolled manner, the operator is directed to stop any RCS cooldown in progress and transition to 1E-3, STEAM GENERATOR TUBE RUPTURE, to isolate the affected steam generator. Note that 1E-3 and its associated network deals with minimizing primary-to-secondary leakage whether it be due to a single event or multiple events, such as a SGTR coincident with a LOCA.

"Level increase in an uncontrolled manner" means that the operator cannot control level using available equipment, i.e., level continues to rise even when all feed flow valves to that SG are fully closed.

If a steam generator tube rupture is identified during the recovery actions of 1ES-1.1, the operator is directed to 1E-3, Step 1 to take actions to isolate the ruptured steam generator. This action is necessary in order to isolate the steam generator in a timely manner to allow for a higher RCS pressure at which the rupture is isolated. It will also decrease the likelihood of overfilling the ruptured steam generator. If RCS cooldown is already in progress when the SGTR is diagnosed, the operator should stop the cooldown until the ruptured steam generator is isolated.

Procedure Steps, Step 5

This action, consistent with normal cooldown procedures, prevents PRZR heat inputs from being automatically initiated. This added heat would tend to keep the RCS pressurized.

Note Procedure Steps, Step 6

This note advises the operator to monitor RCS boron concentration to verify adequate shutdown margin during the cooldown to cold shutdown. Note that since SI was in service, RCS boron concentration is expected to be sufficient. Periodic samples should be taken to monitor shutdown margin, however, the operator should not wait for the sample results.

Procedure Steps, Step 6

The objective of a controlled cooldown is to reduce the overall temperature of the RCS coolant and metal to reduce the need for supporting plant systems and equipment required for heat removal. The maximum cooldown rate of 100°F/hr will preclude violation of the Integrity Status Tree thermal shock limits. The preferred steam release path is to the condenser conserve inventory; however, atmospheric release through the SG PORVs is the stated alternative. If RCS temperature and pressure are below certain limits, the RHR System may be in service and should be used to cool the RCS to Mode 5, Cold Shutdown.

In the case of a LOCA without SI pumps, the cooldown will result in RCS depressurization, accumulator injection and establishment of RHR flow for long term makeup.

The RCS cooldown should be initiated and performed as expeditiously as possible within the stated limits. An expeditious cooldown and depressurization will lengthen the time until recirculation is necessary, or preclude the necessity for recirculation, and result in RHR injection at an earlier time. Lengthening the time to recirculation allows debris in containment to settle and thus reduces the potential for debris ingestion while on recirculation. RHR injection is also important for small LOCAs where core boiling occurs for extended periods of time. The establishment of RCS subcooling or RHR injection resulting from the RCS cooldown will preclude the potential for boron precipitation in the upper core regions.

Even if the lowest cold leg temperature has been reduced by 100°F in the last 60 minutes, or a "soak" period is required per 1FR-P.1, some steam may be released from intact SGs with a pressure higher than saturation pressure for the lowest cold leg temperature. In order to prevent further cold leg cooldown or severe challenge to the INTEGRITY Critical Safety Function, steam release must be stopped when SG pressure reaches saturation pressure for the lowest cold leg temperature or SG pressure reaches saturation pressure for the temperature corresponding to an ORANGE path on the INTEGRITY Critical Safety Function. Additionally, SG pressure should be stabilized when natural circulation flow has been restored as indicated by loop delta-T values approximately equal to full-power forced convection values and individual loop hot leg and cold leg temperatures approaching each other.

Procedure Steps, Step 7

If RCS subcooling can be verified, the LOCA is most likely small and controllable, i.e., SI flow equals or exceeds break flow. Subsequent steps that may be allowed include deliberate RCS depressurization, RCP restart, and makeup (SI) flow reduction. If subcooling cannot be verified, a transition is provided to bypass these actions.

This step is contained within the main cooldown loop. Consequently, it is possible that subcooling could be verified later as the cooldown continues.

Procedure Steps, Step 8

If SI is in service, checks will be made in subsequent steps to determine if SI flow can be reduced. After the SI pumps are stopped in sequence, makeup will be provided by previously established charging flow. If SI is not in service, adequate makeup is being provided by charging flow and PRZR level can be maintained by adjusting the charging flow or RHR injection flow.

Note Procedure Steps, Step 9

Without RCPs running, there is very little flow into the upper head region. Liquid in that region remains relatively hot even though the liquid temperature in the active regions of the RCS has been significantly reduced during the RCS cooldown. As the RCS is subsequently depressurized, the hotter liquid in the upper head may flash to steam, forming an upper head void. Steam formation in the upper head will displace water into the PRZR, causing rapidly increasing PRZR level with the potential for water relief through the PRZR PORVs. The PRZR may fill with water within a few minutes. This note informs the operator of the potential for this condition, so that RCS depressurization can be stopped quickly to avoid a water solid PRZR.

Procedure Steps, Step 9

The combination of subcooling and PRZR level ensures that RCS conditions are under adequate operator control. Subcooling should have been established before entry to this step. If subcooling is lost during the depressurization, it will be reestablished after the depressurization is stopped as the RCS continues to cool down.

If RCPs are running, normal PRZR spray is the preferred means of restoring PRZR level. Level can be restored with normal spray since SI flow increases and break flow decreases as the RCS is depressurized. If normal spray is not available, use of one PRZR PORV has priority over auxiliary spray. Auxiliary spray is used as a last resort to minimize thermal shock to the PRZR spray nozzle.

This step is performed immediately before starting an RCP. Transitions from other steps when PRZR level is low are also possible. For all possible entries, the RCS should be subcooled prior to RCS depressurization. Since this prior subcooling requirement ensures a small break, subcooling should be restored with continued cooldown if subcooling is lost during the depressurization. Pressurizer level (and pressure) will increase after the operator stops the depressurization until injection flow balances break flow and loss due to cooldown shrink.

Caution Procedure Steps, Step 10

If RCP seal cooling is lost for only a few minutes, the inventory of cold water in the seal area should prevent excessive seal heat up. For longer periods of time, seal and bearing temperatures may increase greater than 260°F. If excessive temperatures develop, the affected RCP should not be restarted prior to a complete RCP evaluation.

The potential for degradation in RCP seal performance and seal life increases with increasing temperature above 260°F. Hence, if RCP seal cooling is lost for a significant period of time, seal and/or bearing damage may occur. The potential non-uniform sealing surfaces and seal crud blockage that may exist prior to RCP start can aggravate bearing and seal damage if the RCP is started. Following restoration of seal cooling, the RCP should not be started prior to a complete status evaluation in order to minimize potential RCP seal damage on restart.

Note Procedure Steps, Step 10

There are PRZR connections to Loop B RCS hot leg via the surge line and to both RCS cold legs via the spray lines. The RCP in the loop with the pressurizer surge line (12 RCP) is the preferred RCP to run since it provides the best normal spray flow and can supply flow through either spray valve. If 12 RCP is unavailable, then 11 RCP can be run to provide normal spray flow, however it may only be capable of providing flow through its corresponding spray valve.

Procedure Steps, Step 10

Forced coolant flow is the preferred mode of operation to allow for normal RCS cooldown and provide PRZR spray. If both RCPs are running, one is now stopped to reduce heat input to the RCS. If no RCP is running, RCS subcooling, PRZR level, and certain conditions are required before starting an RCP. The RCP started or left running is selected to provide the best normal PRZR spray (see preceding note).

Depressurization of the RCS may generate a steam bubble in the upper head region of the reactor vessel if no RCP is running. This bubble could rapidly condense during pump startup, drawing liquid from the PRZR and reducing RCS subcooling. If PRZR inventory is not sufficient, level may decrease off span. In addition, local flashing of reactor coolant could occur if RCS subcooling is not adequate. These conditions would require SI reinitiation and may confuse the operator if such behavior was unexpected.

If all seal cooling has been lost long enough that the maximum RCP seal parameters identified in the RCP/Seal Vendor Manual have been exceeded, seal injection and CC thermal barrier cooling should not be established to the affected RCP(s). Both of these methods of seal cooling could have unintended consequences that result in additional pump damage or the failure of plant safety systems. Seal cooling should instead be restored by cooling the RCS, which will reduce the temperature of the water flowing through the pump seals.

1st Note Procedure Steps, Step 11

Pressurizer level may decrease rapidly when SI flow is reduced. In order to maintain level on span, it may be necessary to concurrently decrease RCS pressure as directed in Step 9. It would also be advantageous to establish a pressurizer level significantly greater than the minimum required value prior to reducing SI flow to ensure level remains on span.

The change in RCS subcooling when stopping an SI pump can be reduced if charging flow is throttled, i.e., gradually decreased before and increased immediately after stopping the SI pump.

2nd Note Procedure Steps, Step 11

After an SI pump is stopped, RCS pressure may decrease rapidly to a new equilibrium value where the reduced SI flow again matches leakage from the RCS. The criteria for stopping the next SI pump has been calculated based on steady-state conditions. To ensure that these criteria are appropriate, RCS pressure and subcooling should be allowed to stabilize or increase before stopping additional SI pumps.

RCS pressure may continue to decrease slowly as the reactor coolant temperature is reduced. However, if subcooling is increasing, the SI reduction criteria are appropriate and the SI flow can be further reduced when such criteria are satisfied.

Procedure Steps, Step 11

With SI in service, RCS pressure will trend toward an equilibrium value where SI flow matches leakage from the RCS. For subcooled conditions, the amount of leakage from the RCS is directly related to the capacity of the operating SI pumps. In order to minimize the loss of coolant from the primary system, SI flow must be reduced. Conversely, some SI flow is necessary to maintain coolant inventory and pressurize the RCS sufficiently to promote primary to secondary heat transfer. A conflict arises between keeping the SI pumps running to maintain adequate coolant inventory and reducing SI flow to minimize leakage from the RCS. Calculations have been performed for various pressure/temperature relationships to ensure stopping SI pumps as directed will maintain adequate coolant inventory. The sequence for reducing SI flow is by stopping the SI pumps one at a time. This step checks that subcooling is sufficient for stopping one SI pump. If subcooling is not sufficient, the operator continues with other procedure steps and subcooling will continue to increase as the cooldown proceeds.

If the RCS subcooling criterion is not satisfied, but the RCS hot leg temperatures are less than the saturation temperature corresponding to the RHR pump head at minimum pump recirculation flow, the high-head SI pump can be stopped if a RHR pump is running or can be started. Starting a RHR pump for this case ensures that RCS subcooling will be maintained after the high-head SI pump is stopped. [Ref DW-14-022]

Procedure Steps, Step 12

This step checks conditions necessary for stopping the last SI pump. If core exit temperature is less than specified, subcooling is sufficient and one RHR pump is running, the operator is directed to stop the second SI pump. Operation of one RHR pump with core exit temperature less than the specified value ensures that RCS subcooling will be maintained after the second SI pump is stopped. If the required conditions for stopping the last SI pump are not met, the operator is directed to continue on in the procedure until the requirement is met.

The intent of the RNO transitions based on any RHR pump running in the SI mode is to determine whether three subsequent steps should be bypassed or performed: 1) control charging flow to maintain reactor coolant inventory; 2) establish single-RCP operation; 3) minimize RCS subcooling to reduce break flow. These steps should be bypassed if a RHR pump is injecting flow into the RCS in either from the RWST or from Sump B. These steps should be performed if a RHR pump is operating in the shutdown cooling mode or if RCS pressure is above RHR pump shutoff head.

If the RCS subcooling criterion is not satisfied, but the RCS hot leg temperatures are less than the saturation temperature corresponding to the RHR pump head at minimum pump recirculation flow, the high-head SI pump can be stopped if a RHR pump is running or can be started. Starting a RHR pump for this case ensures that RCS subcooling will be maintained after the high-head SI pump is stopped. [Ref DW-14-022]

Procedure Steps, Step 13

PRZR level will tend to decrease when SI flow is terminated as leakage from the RCS continues. If SI has been terminated, the operator is instructed to control charging flow as necessary to compensate for this leakage and coolant shrinkage so that pressurizer level is maintained on span.

If the PRZR is solid, charging flow will also control RCS pressure. In that case, flow should be controlled as necessary to maintain RCS subcooling.

The RCS depressurization in a subsequent step will restore PRZR level if PRZR level continues to decrease with maximum normal charging flow.

The intent of the substep "Check RHR pumps - NONE RUNNING IN SI MODE" is to determine whether three subsequent steps should be bypassed or performed: 1) control charging flow to maintain reactor coolant inventory; 2) establish single-RCP operation; 3) minimize RCS subcooling to reduce break flow. These steps should be bypassed if a RHR pump is injecting flow into the RCS in either from the RWST or from Sump B. These steps should be performed if a RHR pump is operating in the shutdown cooling mode or if RCS pressure is above RHR pump shutoff head.

Caution Procedure Steps, Step 14

The potential for degradation in RCP seal performance and seal life increases with increasing temperature above 260°F. Hence, if RCP seal cooling is lost for a significant period of time, seal and/or bearing damage may occur. The potential non-uniform sealing surfaces and seal crud blockage that may exist prior to RCP start can aggravate bearing and seal damage if the RCP is started. Following restoration of seal cooling, the RCP should not be started prior to a complete status evaluation in order to minimize potential RCP seal damage on restart.

If RCP seal cooling is lost for only a few minutes, the inventory of cold water in the seal area should prevent excessive seal heat up. For longer periods of time, seal and bearing temperatures may increase greater than 260°F. If excessive temperatures develop, the affected RCP should not be restarted prior to a complete RCP evaluation.

Note Procedure Steps, Step 14

There are PRZR connections to Loop B RCS hot leg via the surge line and to both RCS cold legs via the spray lines. The RCP in the loop with the pressurizer surge line (12 RCP) is the preferred RCP to run since it provides the best normal spray flow and can supply flow through either spray valve. If 12 RCP is unavailable, then 11 RCP can be run to provide normal spray flow, however it may only be capable of providing flow through its corresponding spray valve.

Procedure Steps, Step 14

Forced coolant flow is the preferred mode of operation to allow for normal RCS cooldown and provide PRZR spray. If both RCPs are running, one is now stopped to reduce heat input to the RCS. If no RCP is running, RCS subcooling, PRZR level, and certain conditions are required before starting an RCP. The RCP started or left running is selected to provide the best normal PRZR spray (see preceding note). If RCPs cannot be started, then natural circulation flow should be verified using Attachment A to ensure adequate RCS heat removal. If natural circulation cannot be verified, steam dump should be increased to remove heat from the primary system and reestablish natural circulation.

Depressurization of the RCS may generate a steam bubble in the upper head region of the reactor vessel if no RCP is running. This bubble could rapidly condense during pump startup, drawing liquid from the pressurizer and reducing reactor coolant subcooling. If pressurizer inventory is not sufficient, level may decrease offspan. In addition, local flashing of reactor coolant could occur if RCS subcooling is not adequate. These conditions would require SI reinitiation and may confuse the operator if such behavior was unexpected. To limit the pressure decrease on RCP restart, saturated conditions should first be established in the PRZR. Although PRZR pressure and level will still decrease when an RCP is started under saturated conditions, the rate of decrease will be slower than if saturated conditions were not established, since vapor is created as the pressure decreases.

PRZR level and subcooling requirements to accommodate a void in the upper head are designed to address operational concerns due to the collapse of the void. Starting an RCP will preclude the use of a pressurizer PORV during subsequent recovery, however, the operator should anticipate a decrease in pressurizer level and RCS subcooling when the RCP is started with upper head voiding. Charging flow should be increased as necessary to maintain pressurizer level on span and adequate RCS subcooling. If pressurizer level or RCS subcooling is lost, SI pump operation will be required per the information page SI Reinitiation Criteria.

Caution Procedure Steps, Step 15

If the criteria for stopping the SI pumps has been met and normal charging is maintaining RCS inventory, the accumulator water is not required. To prevent their injecting, the accumulators should be isolated prior to depressurizing the RCS to the pressure at which accumulator injection would be initiated.

Note Procedure Steps, Step 15

Without RCPs running, there is very little flow into the upper head region. Liquid in that region remains relatively hot even though the liquid temperature in the active regions of the RCS has been significantly reduced during the RCS cooldown. As the RCS is subsequently depressurized, the hotter liquid in the upper head may flash to steam, forming an upper head void. Steam formation in the upper head will displace water into the PRZR, causing rapidly increasing PRZR level with the potential for water relief through the PRZR PORVs. The PRZR may fill with water within a few minutes. This note informs the operator of the potential for this condition, so that RCS depressurization can be stopped quickly to avoid a water solid PRZR.

Procedure Steps, Step 15

Upon entry to this step, RCS injection flow may be provided by normal charging flow alone. Subcooling can then be minimized to reduce break flow and charging flow can be used to maintain PRZR level. As in the previous depressurization, normal PRZR spray has priority over auxiliary spray. If the RCS is highly subcooled, PRZR heaters can be used to limit the PRZR level rise and maintain a steam bubble in the PRZR.

If subcooling decreases below the setpoint for reinitiating SI during the depressurization, the operator should take the appropriate actions such as closing the PORV or the block valve for a stuck open PORV, and wait and see if the actions are successful (i.e., allow adequate time for valves to stroke closed), before reinitiating SI. If the actions stop the depressurization and subcooling is restored, SI reinitiation is not necessary.

Procedure Steps, Step 16

Upon entry to this step, the SI pumps will have been stopped and no longer be delivering borated water to the RCS. Additional boration may be required to ensure subcriticality at the target Mode 5, Cold Shutdown condition.

Procedure Steps, Step 17

The combination of subcooling and PRZR level ensures that RCS conditions are under adequate operator control. Loss of control will require SI flow.

If subcooling is temporarily lost during RCS depressurization to restore PRZR level (Step 9), it should soon be restored as the cooldown to cold shutdown continues. If the cooldown is effective in restoring subcooling, SI pump restart is not required.

If PRZR level is decreasing, subsequent RCS depressurization in Steps 9 or 15 should restore PRZR level so that no SI pumps need to be restarted.

If conditions deteriorate and the operator is required to manually start SI pumps to restore RCS subcooling or pressurizer level, the operator should leave the SI pumps on until the SI reduction criteria is met in the appropriate step.

Procedure Steps, Step 18

SI accumulators are isolated to prevent discharge into the RCS when RCS subcooling or hot leg temperature criteria are satisfied. Either the contents are no longer required because of operator control actions, or the contents are considered to be discharged, and isolation prevents nitrogen injection into the RCS. Nitrogen could collect in high places and produce either a "hard" PRZR bubble or cause gas binding in the SG U-tubes. Venting the nitrogen gas also prevents injection. A hot leg temperature was selected in the RNO actions so the RCS saturation pressure exceeds the accumulator pressure after the accumulator water has been discharged. Instrument uncertainties are not included in the determination of the RCS hot leg temperature setpoint to preclude a bias toward either having more accumulator water injected into the RCS or having less nitrogen injection into the RCS.

RCS depressurization can be performed concurrently with accumulator venting provided RCS pressure is maintained greater than the accumulator nitrogen pressure.

If it is determined that any SI accumulator cannot be isolated or vented, the plant engineering staff should be consulted to evaluate the effect of nitrogen in the RCS on plant recovery actions. Nitrogen in the RCS may interfere with core cooling by natural circulation, if required, following a small-break LOCA. The plant engineering staff will evaluate whether actions should be taken to prevent or minimize nitrogen injection, or vent the nitrogen from the RCS following injection.

Procedure Steps, Step 19

Manufacturers recommend that diesels not be run extensively unless carrying load. Diesels should auto start on an SI signal, but will not load if offsite power is available.

Procedure Steps, Step 20

If the horizontal motor driven cooling water pumps are running or can be started, then the cooling water pumps may be running in an undesired low flow condition. This step will stop the safeguards cooling water pumps and align them for automatic starting if operating in a possible low flow condition.

Procedure Steps, Step 21

CC water is used for RCP motor oil cooling as well as thermal barrier cooling. Seal injection is only used in the cooling of the seals. CC flow to RCP thermal barriers is not indicated on the main control board. The operator checks thermal barrier outlet valves open and CC flow to RCPs to verify flow to thermal barriers. If CC flow to RCPs is not indicated, the operator is directed to trip RCPs to prevent damage to RCP bearings. If CC is available to thermal barriers, then the operator can restore seal injection. If either seal injection or thermal barrier cooling is available, then seal cooling is adequate. This step ensures that RCP cooling is maintained or restored to the RCP as soon as possible in order not to aggravate the plant transient due to the potential loss of reactor coolant through damaged shaft seals.

If all seal cooling has been lost long enough that the maximum RCP seal parameters identified in the RCP/Seal Vendor Manual have been exceeded, seal injection and CC thermal barrier cooling should not be established to the affected RCP(s). Both of these methods of seal cooling could have unintended consequences that result in additional pump damage or the failure of plant safety systems. Seal cooling should instead be restored by cooling the RCS, which will reduce the temperature of the water flowing through the pump seals.

Procedure Steps, Step 22

When intermediate range flux decreases below the intermediate range permissive to block source range high flux trip (P-6), the source range detectors should be automatically energized, and subsequent flux monitoring should use the source range indicators.

Procedure Steps, Step 23

Since the plant may have been operating at full power prior to the trip, certain equipment may be in operation and not needed at this time, e.g., circulating water pumps, cooling towers, etc. The normal shutdown procedure provides necessary instruction for shutdown alignments.

Procedure Steps, Step 24

A minimum RCS pressure and RCP seal return flow are required to prevent seal damage. This step alerts the operator to stop any RCP when such conditions are not satisfied.

Note Procedure Steps, Step 25

For a limited range of break sizes, it may be desirable to have one train of RHR aligned for injection to maintain RCS inventory and the other RHR train aligned for shutdown cooling. ATTACHMENT D provides instructions for this alignment. It will be necessary to enter the RHR pit to perform this alignment. Since this is a specialized lineup, careful consideration by engineering and operations staffs of alternatives should be considered.

Procedure Steps, Step 25

The RHR System is designed to operate below specific RCS pressure and temperature conditions. For smaller breaks, one or both of the SI pumps will have been stopped and most of the RWST water will still be available by the time RHR System entry criteria are satisfied. For these cases, the RHR System could be placed in service in its usual alignment (with RHR pumps taking suction from the hot legs). Any SI pumps left running would remain aligned in the cold leg injection mode taking suction from the RWST. When charging flow is established, the injection source is also from the RWST. For larger breaks, the RWST level will eventually decrease to the switchover setpoint and at least one RHR pump must be used for cold leg recirculation. If the RHR System is not placed in service, the safeguard systems can remain in the long term recirculation mode with decay heat being dissipated through the RHR heat exchangers. The plant engineering staff is consulted to determine if the RHR System should be placed in service according to plant procedures when required conditions are established.

Procedure Steps, Step 26

The operator is directed to check containment Hydrogen concentration. Depending on the magnitude of the Hydrogen concentration, the operator will either continue with 1ES-1.1, turn on the Hydrogen recombiners or notify the plant engineering staff to determine additional recovery actions before continuing with this procedure.

A determination is made of the flammability of the hydrogen mixture with respect to the possible containment pressure rise. If the hydrogen mixture is between 0.5 volume percent and 6.0 volume percent in dry air, either no hydrogen burn is possible or a limited burn may occur which does not produce a significant pressure rise. If containment hydrogen concentration is between 0.5 volume percent and the upper value specified, the operator is instructed to start the hydrogen recombiner system to slowly reduce containment hydrogen concentration. If the hydrogen concentration is less than 0.5 volume percent in dry air, a flammable situation is not imminent and the operator continues with guideline 1ES-1.1. If the concentration is greater than the upper value, the operator is instructed to consult with plant engineering staff for additional recovery actions while proceeding with this procedure.

When inadequate core cooling has occurred, the containment hydrogen concentration may be as much as 10 to 12 volume percent, depending on the amount of metal-water reaction (to produce hydrogen) that has occurred in the core. The hydrogen concentration is of concern since a flammable mixture can burn, if an ignition source is available, and cause a sudden rise in containment pressure which may challenge containment integrity. In order to have the potential for flammable hydrogen concentrations, an inadequate core cooling situation must have already existed. Without an inadequate core cooling situation, sufficient hydrogen would not be expected to have been produced to cause potentially flammable mixtures.

Procedure Steps, Step 27

This procedure provides instructions for cooldown and depressurization of the plant to Mode 5, Cold Shutdown conditions of less than 200°F. Subsequent actions necessary for repair are event specific.

Procedure Steps, Step 28

After reaching and maintaining Mode 5, Cold Shutdown conditions, the plant is effectively stable for the long term. This is the appropriate time for plant staff to make decisions about long term plant operation and any repairs necessary for plant restart.

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

LCO 3.5.1 Two 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.	24 hours
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3. AND C.2 Reduce RCS pressure to ≤ 1000 psig.	6 hours 12 hours

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.4 Refueling Water Storage Tank (RWST)

LCO 3.5.4 The RWST shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RWST boron concentration not within limits.	A.1 Restore RWST to OPERABLE status.	8 hours
B. RWST borated water volume not within limits.	B.1 Restore RWST to OPERABLE status.	1 hour
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	**Initiate Evaluation Of Plant Status:**	
	a. Verify at least one train of recirculation capability: • Train A: • 11 RHR pump - AVAILABLE • Sump B to RHR valves (MV-32075 and MV-32077) - AVAILABLE • SI test line to RWST valve (MV-32202) - AVAILABLE -OR- • Train B: • 12 RHR pump - AVAILABLE • Sump B to RHR valves (MV-32076 and MV-32078) - AVAILABLE • SI test line to RWST valve (MV-32203) - AVAILABLE	a. IF at least one train of Sump B recirculation capability can NOT be verified, THEN go to 1ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
	b. Check Auxiliary Building Radiation - NORMAL	b. Evaluate cause of abnormal conditions. IF the cause is a loss of RCS inventory outside containment, THEN go to 1ECA-1.2, LOCA OUTSIDE CONTAINMENT, Step 1.
	c. Start all containment dome recirculation fans	

INFORMATION PAGE FOR 1E-1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUXILIARY FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17	**Check If Outside Air Can Be Supplied To Control Room:**	
	a. Check radiation monitors - NORMAL: • R-23 • R-24 • 1R-22 • 2R-22	a. Go to Step 18.
	b. Check Aux Building steam exclusion - NOT ACTUATED	b. Go to Step 18.
	c. Open one train Control Room alternate outside air dampers: • CS-46160 -OR- • CS-46578	
18	**Align Containment FCU Cooling Water Outlet Radiation Monitor R-16 And R-38:**	
	a. Locally open sample valves: • RD-4-6 • 2RD-4-2	
	b. Verify solenoid isolation valves - OPEN: • SV-33384 • SV-33907	b. Open valve(s).

INFORMATION PAGE FOR 1E-1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUXILIARY FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Caution ***IF at any time 12 annulus sump high level alarm (47019-0502) received, THEN actions in Step 19 should be performed.***

19	**Check Annulus Sump High Level Alarm - OFF**	Perform the following: a. Check containment isolation status light 44104 D-15 LIT b. Check containment isolation status light 44104 E-15 LIT c. IF both status lights are LIT, THEN open containment Sump A discharge valves (CV-31438 and CV-31439). d. WHEN annulus sump alarm clears, THEN close Sump A discharge valves.
20	**Check If RCS Cooldown And Depressurization Is Required:**	
	a. RCS pressure - GREATER THAN 275 PSIG [575 PSIG]	a. Check RHR flow. IF RHR flow is less than 1000 gpm, THEN go to 1ES-1.1, POST LOCA COOLDOWN AND DEPRESSURIZATION, Step 1. IF RHR flow is greater than 1000 gpm, THEN go to Step 21.
	b. Go to 1ES-1.1, POST LOCA COOLDOWN AND DEPRESSURIZATION, Step 1	

INFORMATION PAGE FOR 1E-1*

1 RCP TRIP CRITERIA

Trip both RCPs if ALL conditions listed below occur:

a. Injection flow exists to RCS:
   - AT LEAST ONE SI PUMP RUNNING AND FLOW INDICATED
   -OR-
   - AT LEAST ONE RHR PUMP RUNNING AND FLOW INDICATED.
b. RCS Pressure - LESS THAN 1275 PSIG [1600 PSIG].
c. An operator controlled cooldown has NOT been initiated.

2 SI TERMINATION CRITERIA

Go to 1ES-0.2, SI TERMINATION, if ALL conditions listed below occur:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 21°F [40°F].
b. Total feed flow to intact SGs - GREATER THAN 200 GPM
   -OR-
   Narrow range level in at least one intact SG - GREATER THAN 7% [WR 50%].
c. RCS pressure:
   - GREATER THAN 2000 PSIG.
   - STABLE OR INCREASING.
d. PRZR level - GREATER THAN 8% [27%].

3 SI REINITIATION CRITERIA

Manually start SI pumps as necessary if EITHER condition listed below occurs:

- RCS subcooling based on core exit T/Cs - LESS THAN 21°F [40°F].
- PRZR level - CANNOT BE MAINTAINED GREATER THAN 8% [27%].

4 SECONDARY INTEGRITY CRITERIA

Go to 1E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1, if either SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated.

5 E-3 TRANSITION CRITERIA

Manually start SI pumps as necessary and go to 1E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if either SG level increases in an uncontrolled manner or either SG has abnormal radiation.

6 RECIRCULATION SWITCHOVER CRITERION

Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1, if RWST level decreases to less than 33%.

7 AFW SUPPLY SWITCHOVER CRITERION

Switch to alternate AFW water supply if CST level decreases to less than 12,500 gallons per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUXILIARY FEEDWATER PUMP SUCTION.

*Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/hr (10,000 R/hr).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Caution ***Cooling water pressure should be monitored during the preparation to switchover to recirculation. Removal of the CC HX cooling water outlet CV stops may cause it to decrease. IF cooling water pressure decreases to less than 70 psig, THEN pressure recovery may be necessary per C35 AOP1, LOSS OF PUMPING CAPACITY OR SUPPLY HEADER WITH SI.***

21 **Prepare For Switchover To Recirculation Phase:**

a. Stop Spent Fuel Pool Ventilation System

b. Notify Auxiliary Building Operator to perform 1ES-1.2, TRANSFER TO RECIRCULATION, ATTACHMENT K (Located by keys in Aux Shack)

22 **Check If Switchover To Recirculation Is Required:**

a. RWST level - LESS THAN 33%

a. Return to Step 16.

b. Go to 1ES-1.2, TRANSFER TO RECIRCULATION, Step 1

EMERGENCY ACTION LEVEL MATRIX

GENERAL EMERGENCY

Abnormal Rad Release — Rad Effluent — Offsite Rad Conditions

RG1 Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mRem TEDE or 5000 mRem Thyroid CDE for the Actual or Projected Duration of the Release Using Actual Meteorology.

RG1.1 1 2 3 4 5 6 DEF

NOTE: If dose assessment results are available at the time of declaration, the classification should be based on RG1.2 instead of RG1.1. While necessary declarations should not be delayed awaiting results, the dose assessment should be initiated / completed in order to determine if the classification should be subsequently escalated.

VALID reading on one or more monitors listed in Table R-1 that exceeds or expected to exceed column "GE" for 15 minutes or longer:

RG1.2 1 2 3 4 5 6 DEF

Dose assessment using actual meteorology indicates doses GREATER THAN 1000 mRem TEDE or 5000 mRem thyroid CDE at or beyond the site boundary.

RG1.3 1 2 3 4 5 6 DEF

Field survey results indicate closed window dose rates exceeding 1000 mR/hr expected to continue for more than one hour, at or beyond site boundary;

OR

Analyses of field survey samples indicate thyroid CDE of 5000 mRem for one hour of inhalation, at or beyond site boundary.

Abnormal Rad Release — Rad Effluent — Onsite Rad Conditions

No entries.

SITE AREA EMERGENCY

Abnormal Rad Release — Rad Effluent — Offsite Rad Conditions

RS1 Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mRem TEDE or 500 mRem Thyroid CDE for the Actual or Projected Duration of the Release.

RS1.1 1 2 3 4 5 6 DEF

NOTE: If dose assessment results are available at the time of declaration, the classification should be based on RS1.2 instead of RS1.1. While necessary declarations should not be delayed awaiting results, the dose assessment should be initiated / completed in order to determine if the classification should be subsequently escalated.

VALID reading on one or more monitors listed in Table R-1 that exceeds or is expected to exceed column "SAE" for 15 minutes or longer:

RS1.2 1 2 3 4 5 6 DEF

Dose assessment using actual meteorology indicates doses GREATER THAN 100 mRem TEDE or 500 mRem thyroid CDE at or beyond the site boundary.

RS1.3 1 2 3 4 5 6 DEF

Field survey results indicate closed window dose rates exceeding 100 mR/hr expected to continue for more than one hour, at or beyond the site boundary;

OR

Analyses of field survey samples indicate thyroid CDE of 500 mRem for one hour of inhalation, at or beyond the site boundary.

Abnormal Rad Release — Rad Effluent — Onsite Rad Conditions

No entries.

ALERT

Abnormal Rad Release — Rad Effluent — Offsite Rad Conditions

RA1 Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the Offsite Dose Calculation Manual Specification for 15 Minutes or Longer.

RA1.1 1 2 3 4 5 6 DEF

VALID reading on any effluent monitor that exceeds 200 Times the alarm setpoint established by a current radioactivity discharge permit for 15 minutes or longer.

OR

VALID reading on effluent monitor R-18 that exceeds 900,000 cpm for 15 minutes or longer.

RA1.2 1 2 3 4 5 6 DEF

VALID reading on one or more of the following radiation monitors (Table R-1) that exceeds the reading shown for 15 minutes or longer:

RA1.3 1 2 3 4 5 6 DEF

Confirmed sample analysis for gaseous or liquid release indicates concentrations or release rates, with a release duration of 15 minutes or longer, in excess of 200 Times ODCM specification.

Abnormal Rad Release — Rad Effluent — Onsite Rad Conditions

RA2 Damage to Irradiated Fuel or Loss of Water Level that Has or Will Result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel.

RA2.1 1 2 3 4 5 6 DEF

A VALID alarm on one or more of the following radiation monitors:

- R-25 or R-31 SFP Air Monitor (HI Alarm)
- R-5 Fuel Handling Area Monitor reading (HI Alarm)
- R-28 New Fuel Pool Criticality Area Monitor (HI Alarm)
- 1(2) R-11 Ctmt/SBV Air Particulate Monitor (HI Alarm)
- 1(2) R-12 Ctmt/SBV Radio Gas Monitor (HI Alarm)
- 1(2) R-2 Containment Vessel Area Monitor (HI Alarm)

RA2.2 1 2 3 4 5 6 DEF

Water level LESS THAN 10 feet above an irradiated fuel assembly for the reactor refueling cavity, spent fuel pool and fuel transfer canal that will result in irradiated fuel uncovering

RA3 Release of Radioactive Material or Increases in Radiation Levels Within the Facility That Impedes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown.

RA3.1 1 2 3 4 5 6 DEF

VALID radiation monitor readings GREATER THAN 15 mR/hr in areas requiring continuous occupancy to maintain plant safety functions:

Control Room (Rad monitor R-1);

OR

Central Alarm Station (by portable radiation monitoring instrumentation).

RA3.2 1 2 3 4 5 6 DEF

Any VALID radiation monitor reading GREATER THAN 1 R/hr in areas requiring infrequent access to maintain plant safety functions (Table H-1).

UNUSUAL EVENT

Abnormal Rad Release — Rad Effluent — Offsite Rad Conditions

RU1 Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds Two Times the Offsite Dose Calculation Manual Specification for 60 Minutes or Longer.

RU1.1 1 2 3 4 5 6 DEF

VALID reading on any effluent monitor that exceeds two times the alarm setpoint established by a current radioactivity discharge permit for 60 minutes or longer.

RU1.2 1 2 3 4 5 6 DEF

VALID reading on one or more of the following radiation monitors (Table R-1) that exceeds the reading shown for 60 minutes or longer:

RU1.3 1 2 3 4 5 6 DEF

Confirmed sample analysis for gaseous or liquid release indicates concentrations or release rates, with a release duration of 60 minutes or longer, in excess of two times ODCM specification.

Abnormal Rad Release — Rad Effluent — Onsite Rad Conditions

RU2 Unexpected Increase in Plant Radiation.

RU2.1 1 2 3 4 5 6 DEF

VALID indication of uncontrolled water level decrease in the reactor refueling cavity, spent fuel pool, or fuel transfer canal with all irradiated fuel assemblies remaining covered by water as indicated by level LESS THAN SFP low water level alarm, Refueling Canal Level, or visual observation (752.5 feet elevation);

AND

Any UNPLANNED VALID Area Radiation Monitor reading increases as indicated by:

- R-5 Fuel Handling Area Monitor reading
- R-28 New Fuel Pool Criticality Area Monitor
- 1(2) R-2 Containment Vessel Area Monitor
- Other Portable Area Radiation Monitoring Instrumentation

RU2.2 1 2 3 4 5 6 DEF

Any UNPLANNED VALID Area Radiation Monitor reading increases by a factor of 1000 over normal* levels.

*Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

HOT & COLD

Abnormal Rad Release — Rad Effluent — Offsite Rad Conditions

Abnormal Rad Release — Rad Effluent — Onsite Rad Conditions

Table R-1 Effluent Monitor Classification Thresholds

Monitor	GE	SAE	Alert	UE
Gaseous			**CPM**	**CPM**
1(2) R-50 High Range Stack Gas Monitor	43000 mR/hr	4300 mR/hr	N/A	N/A
1R-22* Shield Building Vent Rad Monitor	N/A	N/A	160,000*/ 1.6 E5	1,600*/ 1.6 E3
2R-22* Shield Building Vent Rad Monitor	N/A	N/A	100,000*/ 1 E5	1,000*/ 1 E3
1R-30* & 1R-37* Unit 1 Aux. Building Vent Rad Monitors	N/A	N/A	100,000*/ 1 E5	1,000*/ 1 E3
2R-30* Unit 2 Aux. Building Vent Rad Monitors	N/A	N/A	100,000*/ 1 E5	1,000*/ 1 E3
2R-37* Unit 2 Aux. Building Vent Rad Monitors	N/A	N/A	120,000*/ 1.2 E5	1,200*/ 1.2 E3
R-35* Radwaste Building Vent Rad Monitor	N/A	N/A	100,000*/ 1 E5	1,000*/ 1 E3
R-25* & R-31* Spent Fuel Pool Vent Rad Monitors	N/A	N/A	800,000*/ 8 E5	8,000*/ 8 E3
Liquid				
R-18* Waste Effluent Liquid Monitor	N/A	N/A	900,000*/ 9 E5	30,000*/ 3 E4
1R-19* SG Blowdown Radiation Monitor	N/A	N/A	100,000*/ 1 E5	1,000*/ 1 E3
2R-19* SG Blowdown Radiation Monitor	N/A	N/A	60,000*/ 6 E4	600*/ 6 E2
R-21 Circ Water Discharge Monitor	N/A	N/A	800,000/ 8 E5	8,000/ 8 E3

Notes: 1) ERCS EAL Alarms indicate an EAL threshold May have been exceeded. Further evaluation of the radiation monitor reading is required to determine if the EAL threshold is exceeded. 2) * Applies when Effluent discharge not isolated.

Table H-1 Plant Areas

Area	HU1.6*	HU2.1*	HA1.2	HA1.3	HA1.4	HA1.5	HA2.1	HA3.1*	HA3.2*	RA3.2
- Shield/Containment Building	X	X	X	X	X	X	X	X	X	
- Auxiliary Building	X	X	X	X	X	X	X	X	X	X
- D5/D6 Diesel Generator Building	X	X	X	X	X	X	X	X	X	X
- Plant Screenhouse	X	X	X	X	X	X	X	X	X	X
- Control Room	X	X	X	X	X	X	X	X	X	
- Relay Room	X	X	X	X	X	X	X	X	X	X
- Turbine Building	X	X	X	X	X	X	X	X	X	X
- Condensate Storage Tanks			X	X	X	X				

* Also consider areas contiguous to these.

EMERGENCY ACTION LEVEL MATRIX

		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT	HOT & COLD	
Hazards	Natural & Destructive Phenomenon	None	None	HA1 Natural and Destructive Phenomena Affecting the Plant VITAL AREA. **HA1.1** [1] [2] [3] [4] [5] [6] [DEF] Seismic Event GREATER THAN Operating Basis Earthquake (OBE) as indicated by "OBE Exceedance" alarm on Seismic Monitoring Panel. **HA1.2** [1] [2] [3] [4] [5] [6] [DEF] Tornado or high winds GREATER THAN 95 mph within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following plant structures / equipment or Control Room indication of degraded performance of those systems (Table H-1). **HA1.3** [1] [2] [3] [4] [5] [6] [DEF] Vehicle crash within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following plant structures / equipment therein or Control Room indication of degraded performance of those systems (Table H-1). **HA1.4** [1] [2] [3] [4] [5] [6] [DEF] Turbine failure-generated missiles result in any VISIBLE DAMAGE to or penetration of any of the following plant areas (Table H-1). **HA1.5** [1] [2] [3] [4] [5] [6] [DEF] Uncontrolled flooding in any Table H-1 area of the plant that results in degraded safety system performance as indicated in the Control Room or that creates industrial safety hazards (e.g., electric shock) that precludes access necessary to operate or monitor safety equipment. **HA1.6** [1] [2] [3] [4] [5] [6] [DEF] High or low river water level occurrences affecting the PROTECTED AREA as indicated by: River intake level GREATER THAN 698 ft MSL; **OR** River intake level LESS THAN 666.5 ft MSL.	HU1 Natural and Destructive Phenomena Affecting the PROTECTED AREA. **HU1.1** [1] [2] [3] [4] [5] [6] [DEF] Earthquake felt in plant as indicated by VALID "Event" alarm on Seismic Monitoring Panel. **HU1.2** [1] [2] [3] [4] [5] [6] [DEF] Report by plant personnel of tornado or high winds GREATER THAN 95 mph striking within PROTECTED AREA boundary. **HU1.3** [1] [2] [3] [4] [5] [6] [DEF] Vehicle crash into plant structures or systems within PROTECTED AREA boundary. **HU1.4** [1] [2] [3] [4] [5] [6] [DEF] Report by plant personnel of an unanticipated EXPLOSION within PROTECTED AREA boundary resulting in VISIBLE DAMAGE to permanent structure or equipment. **HU1.5** [1] [2] [3] [4] [5] [6] [DEF] Report of turbine failure resulting in casing penetration or damage to turbine or generator seals. **HU1.6** [1] [2] [3] [4] [5] [6] [DEF] Uncontrolled flooding in following areas of the plant that has the potential to affect safety related equipment needed for the current operating mode (Table H-1). **HU1.7** [1] [2] [3] [4] [5] [6] [DEF] High or low river water level occurrences affecting the PROTECTED AREA as indicated by: River intake level GREATER THAN 692 ft MSL; **OR** River intake level LESS THAN 669.5 ft MSL.	Natural & Destructive Phenomenon	Hazards
	Fire or Explosion	None	None	HA2 FIRE or EXPLOSION Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown. **HA2.1** [1] [2] [3] [4] [5] [6] [DEF] FIRE or EXPLOSION in any of the following areas (Table H-1): **AND** Affected system parameter indications show degraded performance or plant personnel report VISIBLE DAMAGE to permanent structures or equipment within the specified area.	HU2 FIRE Within PROTECTED AREA Boundary Not Extinguished Within 15 Minutes of Detection. **HU2.1** [1] [2] [3] [4] [5] [6] [DEF] FIRE in buildings or areas contiguous (in actual contact with or immediately adjacent) to any Table H-1 area not extinguished within 15 minutes of control room notification or verification of a control room alarm.	Fire or Explosion	
	Toxic and Flammable Gas	None	None	HA3 Release of Toxic or Flammable Gases Within or Contiguous to a VITAL AREA Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or Establish or Maintain Safe Shutdown. **HA3.1** [1] [2] [3] [4] [5] [6] [DEF] Report or detection of toxic gases within or contiguous to Table H-1 areas in concentrations that may result in an atmosphere IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH). **HA3.2** [1] [2] [3] [4] [5] [6] [DEF] Report or detection of gases in concentration GREATER THAN the LOWER FLAMMABILITY LIMIT within or contiguous to Table H-1 areas.	HU3 Release of Toxic or Flammable Gases Deemed Detrimental to Normal Operation of the Plant. **HU3.1** [1] [2] [3] [4] [5] [6] [DEF] Report or detection of toxic or flammable gases that has or could enter the site area boundary in amounts that can affect NORMAL PLANT OPERATIONS. **HU3.2** [1] [2] [3] [4] [5] [6] [DEF] Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.	Toxic and Flammable Gas	

Table H-1 Plant Areas

Area	HU1.6*	HU2.1*	HA1.2	HA1.3	HA1.4	HA1.5	HA2.1	HA3.1*	HA3.2*	RA3.2
- Shield/Containment Building	X	X	X	X	X	X	X	X	X	
- Auxiliary Building	X	X	X	X	X	X	X	X	X	X
- D5/D6 Diesel Generator Building	X	X	X	X	X	X	X	X	X	X
- Plant Screenhouse	X	X	X	X	X	X	X	X	X	X
- Control Room	X	X	X	X	X	X	X	X	X	
- Relay Room	X	X	X	X	X	X	X	X	X	X
- Turbine Building	X	X	X	X	X	X	X	X	X	X
- Condensate Storage Tanks			X	X	X	X				

* Also consider areas contiguous to these.

EMERGENCY ACTION LEVEL MATRIX

		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT	HOT & COLD	
Hazards Continued	Security	HG1 HOSTILE ACTION Resulting in Loss of Physical Control of the Facility. **HG1.1** 1 2 3 4 5 6 DEF A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions. **HG1.2** 1 2 3 4 5 6 DEF A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off-loaded reactor core in pool.	HS4 HOSTILE ACTION Within the PROTECTED AREA. **HS4.1** 1 2 3 4 5 6 DEF A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by Shift Security Supervision.	HA4 HOSTILE ACTION Within the OWNER CONTROLLED AREA or Airborne Attack Threat. **HA4.1** 1 2 3 4 5 6 DEF A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by Security Shift Supervision. **HA4.2** 1 2 3 4 5 6 DEF A validated notification from NRC of an airliner attack threat within 30 minutes of the site.	HU4 Confirmed SECURITY CONDITION or Threat Which Indicates a Potential Degradation in the Level of Safety of the Plant. **HU4.1** 1 2 3 4 5 6 DEF A SECURITY CONDITION that does NOT involve a HOSTILE ACTION as reported by Security Shift Supervision. **HU4.2** 1 2 3 4 5 6 DEF A credible PINGP security threat notification. **HU4.3** 1 2 3 4 5 6 DEF A validated notification from NRC providing information of an aircraft threat.	Security	Hazards Continued
	Control Room Evacuation	None	HS2 Control Room Evacuation Has Been Initiated and Plant Control Cannot Be Established. **HS2.1** 1 2 3 4 5 6 DEF Control room evacuation has been initiated; **AND** Control of the plant cannot be established per 1(2)C1.3 AOP-1, Shutdown from Outside the Control Room or F-5 Appendix B, Control Room Evacuation (Fire) within 15 minutes.	HA5 Control Room Evacuation Has Been Initiated. **HA5.1** 1 2 3 4 5 6 DEF Entry into 1(2)C1.3 AOP-1 Shutdown from Outside the Control Room or F-5 Appendix B Control Room Evacuation (Fire) for control room evacuation.	None	Control Room Evacuation	
	Emergency Director Judgment	HG2 Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of General Emergency. **HG2.1** 1 2 3 4 5 6 DEF Other conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	HS3 Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of Site Area Emergency. **HS3.1** 1 2 3 4 5 6 DEF Other conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	HA6 Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of an Alert. **HA6.1** 1 2 3 4 5 6 DEF Other conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or likely potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	HU5 Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of a UE. **HU5.1** 1 2 3 4 5 6 DEF Other conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.	Emergency Director Judgment	

Table H-1 Plant Areas

Area	HU1.6*	HU2.1*	HA1.2	HA1.3	HA1.4	HA1.5	HA2.1	HA3.1*	HA3.2*	RA3.2
- Shield/Containment Building	X	X	X	X	X	X	X	X	X	
- Auxiliary Building	X	X	X	X	X	X	X	X	X	X
- D5/D6 Diesel Generator Building	X	X	X	X	X	X	X	X	X	X
- Plant Screenhouse	X	X	X	X	X	X	X	X	X	X
- Control Room	X	X	X	X	X	X	X	X	X	
- Relay Room	X	X	X	X	X	X	X	X	X	X
- Turbine Building	X	X	X	X	X	X	X	X	X	X
- Condensate Storage Tanks			X	X	X	X				

* Also consider areas contiguous to these.

EMERGENCY ACTION LEVEL MATRIX

		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT	HOT	
System Malfunct.	Loss of Power	SG1 Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power to Safeguards Buses. **SG1.1** 1 2 3 4 Loss of power to or from Transformers CT-11, CT-12, 1RY, and 2RY that results in a loss of all offsite power to both Safeguards Buses 15 and 16 (25 and 26); **AND** Failure of Diesel Generators D1 and D2 (D5 and D6) to supply power to Safeguards Buses 15 and 16 (25 and 26); **AND** Either of the following: a. Restoration of Safeguards Bus 15 or 16 (25 or 26) within 4 hours is <u>not</u> likely; **OR** b. Continuing degradation of core cooling based on Fission Product Barrier monitoring as indicated by Core Cooling-RED or ORANGE path.	SS1 Loss of All Offsite Power and Loss of All Onsite AC Power to Safeguards Buses. **SS1.1** 1 2 3 4 Loss of power to or from Transformers CT-11, CT-12, 1RY, and 2RY that results in a loss of all offsite power to both Safeguards Buses 15 and 16 (25 and 26); **AND** Failure of both Diesel Generators D1 and D2 (D5 and D6) to supply power to Safeguards Buses 15 and 16 (25 and 26); **AND** Failure to restore power to Safeguards Bus 15 or 16 (25 or 26) within 15 minutes from the time of loss of both offsite and onsite AC power. SS3 Loss of All Vital DC Power. **SS3.1** 1 2 3 4 Loss of all Safeguards DC power based on LESS THAN 112 VDC on 125VDC Panels 11 and 12 (21 and 22) for GREATER THAN 15 minutes.	SA5 AC power capability to Safeguards Buses reduced to a single power source for GREATER THAN 15 minutes such that any additional single failure would result in station blackout. **SA5.1** 1 2 3 4 AC power capability to Safeguards Buses 15 and 16 (25 and 26) reduced to only one of the following sources for GREATER THAN 15 minutes: • Transformer CT-11; • Transformer CT-12; • Transformer 1RY; • Transformer 2RY; • Diesel Generator D1 (D5); • Diesel Generator D2 (D6); **AND** Any additional single failure will result in station blackout.	SU1 Loss of All Offsite Power to Safeguards Buses for GREATER THAN 15 Minutes. **SU1.1** 1 2 3 4 Loss of power to or from Transformers CT-11, CT-12, 1RY, and 2RY that results in a loss of all offsite power to both Safeguards Buses 15 and 16 (25 and 26) for GREATER THAN 15 minutes; **AND** Two Diesel Generators (D1, D2, D5, D6) are supplying power to Safeguards Buses 15 and 16 (25 and 26).	Loss of Power	System Malfunct.
	RPS Failure	SG2 Failure of the Reactor Protection System to Complete an Automatic Trip and Manual Trip was NOT Successful and There is Indication of an Extreme Challenge to the Ability to Cool the Core. **SG2.1** 1 2 Indication(s) exist that automatic and manual trip were NOT successful in reducing power to LESS THAN 5%; **AND** Either of the following: a. Core cooling is extremely challenged as indicated by Core Cooling - RED path; **OR** b. Heat removal is extremely challenged as indicated by Heat Sink - RED path.	SS2 Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Trip Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Trip Was NOT Successful. **SS2.1** 1 2 Indication(s) exist that automatic and manual trip were NOT successful in reducing power to LESS THAN 5%.	SA2 Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Trip Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Trip Was Successful. **SA2.1** 1 2 3 **NOTE:** A failed manual trip followed by a successful manual trip reducing reactor power to less than 5% meets this EAL. Indication(s) exist that a Reactor Protection System setpoint was exceeded; **AND** RPS automatic trip did <u>not</u> reduce power to LESS THAN 5%; **AND** Any of the following operator actions are successful in reducing power to LESS THAN 5%, Manual Control Board: • Reactor Trip • AMSAC/DSS Actuation • Turbine Trip	None	RPS Failure	
	Inability to Reach or Maintain Shutdown Conditions	None	SS4 Complete Loss of Heat Removal Capability. **SS4.1** 1 2 3 4 Loss of core cooling and heat sink as indicated by: a. Core Cooling - RED path; **AND** b. Heat Sink - RED path.	None	SU2 Inability to Reach Required Shutdown Within Technical Specification Limits. **SU2.1** 1 2 3 4 Plant is not brought to required operating mode within Technical Specifications LCO Action Statement Time.	Inability to Reach or Maintain Shutdown Conditions	
	Inst. / Comm.	None	SS6 Inability to Monitor a SIGNIFICANT TRANSIENT in Progress. **SS6.1** 1 2 3 4 Loss of most (approximately >75%) or all annunciators associated with safety systems: • Main Control Boards A, B-1(2), C-1(2), D-1(2), E-1(2), F-1(2), G-1(2) NIS Racks I, II, III, IV, and ERCS Alarms; **AND** A SIGNIFICANT TRANSIENT in progress; **AND** Compensatory non-alarming indications are unavailable; **AND** Indications needed to monitor the ability to shut down the reactor, maintain the core cooled, maintain the reactor coolant system intact, and maintain containment intact are unavailable.	SA4 UNPLANNED Loss of Most or All Safety System Annunciation or Indication in Control Room With Either (1) a SIGNIFICANT TRANSIENT in Progress, or (2) Compensatory Non-Alarming Indicators are Unavailable. **SA4.1** 1 2 3 4 UNPLANNED loss of most (approximately >75%) or all annunciators or indicators associated with safety systems for GREATER THAN 15 minutes: • Main Control Boards A, B-1(2), C-1(2), D-1(2), E-1(2), F-1(2), G-1(2) NIS Racks I, II, III, IV, and ERCS Alarms; **AND** Either of the following: a. A SIGNIFICANT TRANSIENT in progress; **OR** b. Compensatory non-alarming indications are unavailable.	SU3 UNPLANNED Loss of Most or All Safety System Annunciation or Indication in the Control Room for Greater Than 15 minutes. **SU3.1** 1 2 3 4 UNPLANNED loss of most (approximately >75%) or all annunciators or indicators associated with safety systems for GREATER THAN 15 minutes: • Main Control Board A, B-1(2), C-1(2), D-1(2), E-1(2), F-1(2), G-1(2) NIS Racks I, II, III, IV, and ERCS Alarms. SU6 UNPLANNED Loss of All Onsite or Offsite Communications Capabilities. **SU6.1** 1 2 3 4 Loss of all Table C-1 onsite communications capability affecting the ability to perform routine operations. **SU6.2** 1 2 3 4 Loss of all Table C-2 offsite communications capability.	Inst. / Comm.	

Table C-1 Onsite Communications Systems

- Sound Powered Phones
- Plant Paging System
- Plant Telephone Network
- Plant Radio System

Table C-2 Offsite Communications System

- Plant Telephone Network
- Plant Radio System (dedicated offsite channels)
- ENS Network

EMERGENCY ACTION LEVEL MATRIX

		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT	HOT	
System Malfunct.	Fuel Clad Degradation	None	None	None	SU4 Fuel Clad Degradation. ☐ **SU4.1** 1 2 3 4 Radiation Monitor 1(2)R-9 GREATER THAN 1.2 R/hr indicating fuel clad degradation. ☐ **SU4.2** 1 2 3 4 Coolant sample activity GREATER THAN Technical Specification 3.4.17 Condition C allowable limits indicating fuel clad degradation.	Fuel Clad Degradation	System Malfunct.
	RCS Leakage	None	None	None	SU5 RCS Leakage. ☐ **SU5.1** 1 2 3 4 Unidentified or pressure boundary leakage GREATER THAN 10 gpm. ☐ **SU5.2** 1 2 3 4 Identified leakage GREATER THAN 25 gpm.	RCS Leakage	
	Inadvertent Criticality	None	None	None	SU8 Inadvertent Criticality. ☐ **SU8.1** 3 4 An UNPLANNED sustained positive startup rate observed on nuclear instrumentation.	Inadvertent Criticality	

Table C-1 Onsite Communications Systems

- Sound Powered Phones
- Plant Paging System
- Plant Telephone Network
- Plant Radio System

Table C-2 Offsite Communications System

- Plant Telephone Network
- Plant Radio System (dedicated offsite channels)
- ENS Network

		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT	MODE-NA	
ISFSI Events	Cask Confine. Boundary	None	None	None	EU1 Damage to a loaded cask CONFINEMENT BOUNDARY. ☐ **EU1.1** Natural phenomena events affecting a loaded cask CONFINEMENT BOUNDARY as indicated by VISIBLE DAMAGE to the cask: • earthquake • tornado (and tornado missile) • flood • lightning • snow / ice ☐ **EU1.2** Accident conditions affecting a loaded cask CONFINEMENT BOUNDARY as indicated by VISIBLE DAMAGE to the cask: • dropped cask • tipped over cask • cask burial • explosion • fire ☐ **EU1.3** Any condition in the opinion of the Emergency Director that indicates loss of loaded fuel storage cask CONFINEMENT BOUNDARY.	Cask Confine. Boundary	ISFSI Events

EMERGENCY ACTION LEVEL MATRIX

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT	HOT
Fission Product Barriers	☐ FG1 1 2 3 4 — Loss of ANY two Barriers AND Loss or Potential Loss of Third Barrier (Table F-1).	☐ FS1 1 2 3 4 — Loss or Potential Loss of ANY two Barriers (Table F-1).	☐ FA1 1 2 3 4 — ANY Loss or ANY Potential Loss of EITHER Fuel Clad OR RCS (Table F-1).	☐ FU1 1 2 3 4 — ANY Loss or ANY Potential Loss of Containment (Table F-1).	Fission Product Barriers

Table F-1 FISSION PRODUCT BARRIER REFERENCE TABLE

NOTE

Determine which combination of the three barriers are lost or have a potential loss and use the following key to classify the event. Also an event for multiple events could occur which result in the conclusion that exceeding the Loss or Potential Loss thresholds is imminent (i.e., within 1 to 2 hours). In this imminent loss situation use judgment and classify as if the thresholds are exceeded.

Fuel Cladding Barrier		RCS Barrier		Containment Barrier	
☐ Loss	☐ Potential Loss	☐ Loss	☐ Potential Loss	☐ Loss	☐ Potential Loss
1. Critical Safety Function Status Core-Cooling Red.	1. Critical Safety Function Status Core Cooling-Orange; **OR** Heat Sink-Red.	1. Critical Safety Function Status Not Applicable.	1. Critical Safety Function Status RCS Integrity-Red; **OR** Heat Sink-Red.	1. Critical Safety Function Status Not Applicable.	1. Critical Safety Function Status Containment-Red.
2. Primary Coolant Activity Level Coolant Activity GREATER THAN 300 µCi/gm I-131 equivalent.	2. Primary Coolant Activity Level Not Applicable.	2. RCS Leak Rate GREATER THAN available makeup capacity as indicated by a loss of RCS subcooling LESS THAN 21 [40]* degree F. * Adverse containment conditions are defined as a containment pressure greater than 5 psig or containment radiation level greater than 1E4 R/Hr.	2. RCS Leak Rate Unisolable leak exceeding 60 gpm.	2. Containment Pressure Rapid unexplained decrease following initial increase; **OR** Containment pressure or sump level response not consistent with LOCA conditions.	2. Containment Pressure 46 PSIG and increasing; **OR** Containment hydrogen concentration GREATER THAN OR EQUAL TO 6%; **OR** Containment pressure GREATER THAN 23 psig with LESS THAN one full train of depressurization equipment operating.
3. Core Exit Thermocouple Readings GREATER THAN 1200 degree F.	3. Core Exit Thermocouple Readings GREATER THAN 700 degree F.	3. SG Tube Rupture SGTR that results in an ECCS (SI) Actuation.	3. SG Tube Rupture Not Applicable.	3. Core Exit Thermocouple Readings Not Applicable.	3. Core Exit Thermocouple Readings Core exit thermocouples in excess of 1200 degrees F and restoration procedures not effective within 15 minutes; **OR** Core exit thermocouples in excess of 700 degrees F with reactor vessel level below 40% RVLIS Full Range and restoration procedures not effective within 15 minutes.
4. Reactor Vessel Water Level Not Applicable.	4. Reactor Vessel Water Level Level LESS THAN: - 40% RVLIS Full Range (no RCPs); - 30% RVLIS Dynamic Head Range (1 RCP); - 60% RVLIS Dynamic Head Range (2 RCPs).	4. Containment Radiation Monitoring Containment rad monitor 1(2)R-48 or 49 reading GREATER THAN 7 R/hr.	4. Containment Radiation Monitoring Not Applicable.	4. SG Secondary Side Release with P-to-S Leakage RUPTURED S/G is also FAULTED outside of containment; **OR** Primary-to-Secondary leak rate GREATER THAN 10 gpm with nonisolable steam release from affected S/G to the environment.	4. SG Secondary Side Release with P-to-S Leakage Not Applicable
5. Containment Radiation Monitoring Containment rad monitor 1(2)R-48 or 49 reading GREATER THAN 200 R/hr.	5. Containment Radiation Monitoring Not Applicable.			5. CNMT Isolation Valves Status After CNMT Isolation Containment isolation Valve(s) not closed; **AND** Direct pathway to the environment exists after Containment Isolation signal.	5. CNMT Isolation Valves Status After CNMT Isolation Not Applicable.
6. Other Indications Not Applicable	6. Other Indications Not Applicable.	5. Other Indications Not Applicable.	5. Other Indications Not Applicable.	6. Significant Radioactive Inventory in Containment Not Applicable.	6. Significant Radioactive Inventory to Containment Containment rad monitor 1(2)R-48 or 49 reading GREATER THAN 800 R/hr.
				7. Other Indications Not Applicable.	7. Other Indications Not Applicable.
7. Emergency Director Judgment Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.	7. Emergency Director Judgment Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.	6. Emergency Director Judgment Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.	6. Emergency Director Judgment Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.	8. Emergency Director Judgment Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.	8. Emergency Director Judgment Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

EMERGENCY ACTION LEVEL MATRIX

		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT	COLD	
Cold SD/ Refuel System Malfunct.	Loss of Power	None	None	CA3 Loss of All Offsite Power and Loss of All Onsite AC Power to Safeguards Buses. **CA3.1** (5, 6, DEF) Loss of power to or from Transformers CT-11, CT-12, 1RY, and 2RY that results in a loss of all offsite power to both Safeguards Buses 15 and 16 (25 and 26); **AND** Failure of Diesel Generators D1 and D2 (D5 and D6) to supply power to Safeguards Buses 15 and 16 (25 and 26); **AND** Failure to restore power to Safeguards Bus 15 or 16 (25 or 26) within 15 minutes from the time of loss of both offsite and onsite AC power.	CU3 Loss of All Offsite Power to Safeguards Buses for GREATER THAN 15 Minutes. **CU3.1** (5, 6) Loss of power to or from Transformers CT-11, CT-12, 1RY, and 2RY that results in a loss of all offsite power to both Safeguards Buses 15 and 16 (25 and 26) for GREATER THAN 15 minutes; **AND** At least one Diesel Generator (D1, D2, D5, D6) is supplying power to one of the affected safeguards buses. CU7 UNPLANNED Loss of Required DC Power for GREATER THAN 15 Minutes. **CU7.1** (5, 6) UNPLANNED Loss of required vital DC power based on LESS THAN 112 VDC on 125 VDC Panels 11 and 12 (21 and 22); **AND** Failure to restore power to at least one required DC panel within 15 minutes from the time of loss.	Loss of Power	
	Reactor Vessel Level	CG1 Loss of RPV Inventory Affecting Fuel Clad Integrity with Containment Challenged with Irradiated Fuel in the RPV. **CG1.1** (5, 6) 1. Loss of RPV inventory as indicated by unexplained level increase in Containment Sumps A or C, or Waste Holdup Tank as indicated by sump pump run times, levels, or alarms; **AND** 2. RPV Level: a. LESS THAN 63% RVLIS Full Range for GREATER THAN 30 minutes; **OR** b. cannot be monitored, with indication or core uncovery for GREATER THAN 30 minutes as evidenced by one or more of the following: • Containment Vessel Area Monitor R-2 reading GREATER THAN 1000 mR/hr • Erratic Source Range Monitor Indication; **AND** 3. Indication of CONTAINMENT challenged as indicated by one or more of the following: • Containment hydrogen concentration GREATER THAN OR EQUAL TO 6% • CONTAINMENT CLOSURE not established • Containment pressure GREATER THAN 1.0 psig with CONTAINMENT CLOSURE established.	CS1 Loss of RPV Inventory Affecting Core Decay Heat Removal Capability. **CS1.1** (5) With CONTAINMENT CLOSURE not established: a. RPV inventory as indicated by RPV level LESS THAN 73% RVLIS Full Range; **OR** b. RPV level cannot be monitored for GREATER THAN 30 minutes with a loss of RPV inventory as indicated by unexplained level increase in Containment Sumps A or C, or Waste Holdup Tank as indicated by sump pump run times, levels, or alarms. **CS1.2** (5) With CONTAINMENT CLOSURE established: a. RPV inventory as indicated by RPV level LESS THAN 63% RVLIS Full Range; **OR** b. RPV level cannot be monitored for GREATER THAN 30 minutes with a loss of RPV inventory as indicated by either: • Unexplained level increase in Containment Sumps A or C, or Waste Holdup Tank as indicated by sump pump run times, levels, or alarms • Erratic Source Range Monitor Indication CS2 Loss of RPV Inventory Affecting Core Decay Heat Removal Capability with Irradiated Fuel in the RPV. **NOTE:** CS2.1 and CS2.2 should not be used for classification unless RPV level is below the bottom inside diameter (ID) of the RCS hot leg penetration. If level is at or above the Bottom ID, CU2 or CA2 should be used for event classification in the Refueling mode. **CS2.1** (6) With CONTAINMENT CLOSURE not established, and RPV level cannot be monitored, with indication of core uncovery as evidenced by one or more of the following: • Containment Vessel Area Monitor R-2 reading GREATER THAN 1000 mR/hr • Erratic Source Range Monitor Indication **CS2.2** (6) With CONTAINMENT CLOSURE established, and RPV level cannot be monitored, with indication of core uncovery as evidenced by one or more of the following: • Containment Vessel Area Monitor R-2 reading GREATER THAN 1000 mR/hr • Erratic Source Range Monitor Indication	CA1 Loss of RCS Inventory. **CA1.1** (5) Loss of RCS inventory as indicated by RPV level at 0 inches Refueling Canal / RCS Narrow Range / Ultrasonic (at or LESS THAN 75% RVLIS Full Range). **CA1.2** (5) Loss of RCS inventory as indicated by unexplained level increase in Containment Sumps A or C, or Waste Holdup Tank as indicated by sump pump run times, levels, or alarms; **AND** RCS level cannot be monitored for GREATER THAN 15 minutes. CA2 Loss of RPV Inventory with Irradiated Fuel in the RPV. **CA2.1** (6) Loss of RPV inventory as indicated by RPV level at 0 inches Refueling Canal / RCS Narrow Range / Ultrasonic. **CA2.2** (6) Loss of RCS inventory as indicated by unexplained level increase in Containment Sumps A or C, or Waste Holdup Tank as indicated by sump pump run times, levels, or alarms; **AND** RPV level cannot be monitored for GREATER THAN 15 minutes.	CU2 UNPLANNED Loss of RCS Inventory with Irradiated Fuel in the RPV. **CU2.1** (6) UNPLANNED RCS level decrease below the RPV flange for GREATER THAN OR EQUAL TO 15 minutes. **CU2.2** (6) Loss of RPV inventory as indicated by unexplained level increase in Containment Sumps A or C, or Waste Holdup Tank as indicated by sump pump run times, levels, or alarms; **AND** RPV level cannot be monitored.	Reactor Vessel Level	Cold SD/ Refuel System Malfunct.

EMERGENCY ACTION LEVEL MATRIX

		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT	COLD	
Cold SD/ Refuel System Malfunct.	RCS Temp.	None	None	CA4 Inability to Maintain Plant in Cold Shutdown with Irradiated Fuel in the RPV. ☐ **CA4.1** 5 6 With CONTAINMENT CLOSURE and RCS integrity not established an UNPLANNED event results in RCS temperature exceeding 200°F. **NOTES** [1]If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced then this EAL is not applicable. [2]If the Pressurizer is solid then only the RCS temperature threshold is applicable to CA4.3. ☐ **CA4.2** 5 6 With CONTAINMENT CLOSURE established and RCS integrity not established or RCS inventory reduced an UNPLANNED event results in RCS temperature exceeding 200°F for GREATER THAN 20 minutes[1]. ☐ **CA4.3** 5 6 An UNPLANNED event results in RCS temperature exceeding 200°F for GREATER THAN 60 minutes[1] or results in an RCS pressure increase of GREATER THAN 25 psig[2].	CU4 UNPLANNED Loss of Decay Heat Removal Capability with Irradiated Fuel in the RPV. ☐ **CU4.1** 5 6 An UNPLANNED event results in RCS temperature exceeding 200°F. ☐ **CU4.2** 5 6 Loss of all RCS temperature and RPV level indication for GREATER THAN 15 minutes.	RCS Temp.	Cold SD/ Refuel System Malfunct.
	Comm.	None	None	None	CU6 UNPLANNED Loss of All Onsite or Offsite Communications Capabilities. ☐ **CU6.1** 5 6 Loss of all Table C-1 onsite communications capability affecting the ability to perform routine operations. ☐ **CU6.2** 5 6 Loss of all Table C-2 offsite communications capability.	Comm.	
	Fuel Clad Degradation	None	None	None	CU5 Fuel Clad Degradation. ☐ **CU5.1** 5 6 RCS Letdown Rad Monitor 1(2)R-9 or portable radiation monitoring instrumentation GREATER THAN 1.2 R/hr indicating fuel clad degradation. ☐ **CU5.2** 5 6 Coolant sample activity GREATER THAN Technical Specification 3.4.17 Condition C allowable limits indicating fuel clad degradation.	Fuel Clad Degradation	
	RCS Leakage	None	None	None	CU1 RCS Leakage. ☐ **CU1.1** 5 Unidentified or pressure boundary leakage GREATER THAN 10 gpm. ☐ **CU1.2** 5 Identified leakage GREATER THAN 25 gpm.	RCS Leakage	
	Inadvertent Criticality	None	None	None	CU8 Inadvertent Criticality. ☐ **CU8.1** 5 6 An UNPLANNED sustained positive startup rate observed on nuclear instrumentation.	Inadvertent Criticality	

Table C-1 Onsite Communications Systems

- Sound Powered Phones
- Plant Paging System
- Plant Telephone Network
- Plant Radio System

Table C-2 Offsite Communications System

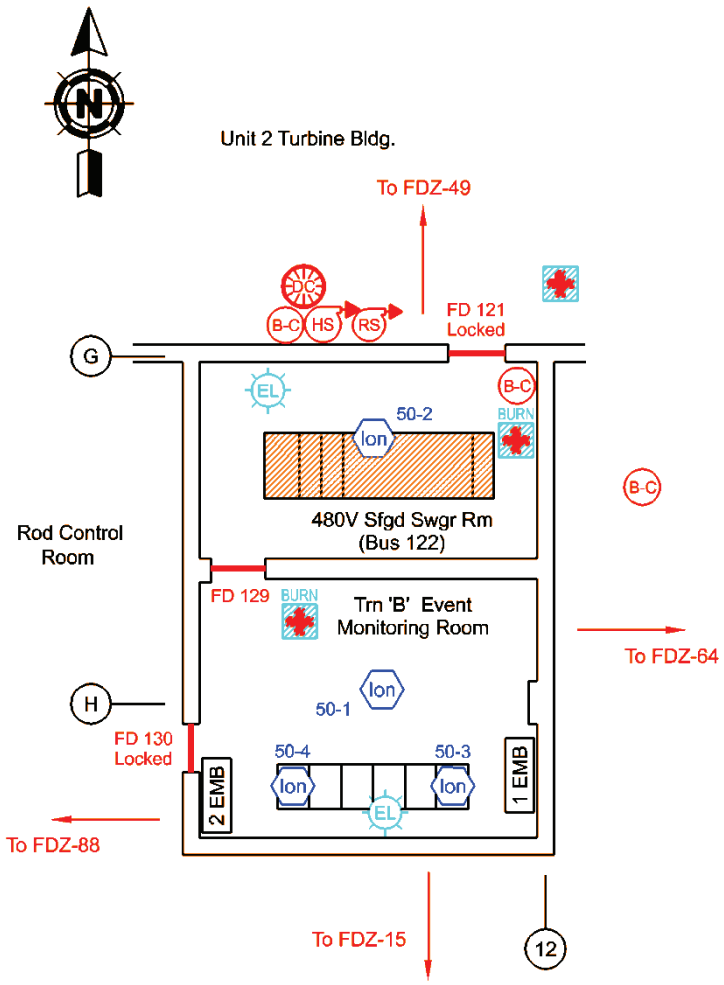
- Plant Telephone Network
- Plant Radio System (dedicated offsite channels)
- ENS Network

FIRE DETECTION ZONE 50
FIRE AREAS 16 & 82

FIRE DETECTION ZONE 50

FIRE AREA(S):	16 & 82	LOCATION:	Bus 122 and Train B Event Monitoring Rooms, El. 735′
EMERGENCY LIGHTING:	Yes - plus 8 hrs.		
TYPE OF FIRE:	82 - None (Bus 122) Misc.	16 - Cables (Train B Event Monitor Room), Misc.	
PERSONNEL HAZARDS:	480V - Ensure adequate distance and spray if using water fog		
COMMUNICATIONS:	Dial telephone Sound powered phone jackboxes Train B Event Monitor Room only		
FIRE EQUIPMENT:	CO_2 fire ext. Bus 122 Room Hose Station and dry chemical near entry to Bus 122 Switchgear Room Low gallonage reel station Water proof tarpaulins for equipment protection are located in the 735′ fire fighting lockers.		
EQUIPMENT CONTROL:	Safeguards Bus 122 Racks 1EMB, 2EMB (Process Instrumentation)	Main Xfmr (Bus 16 Bkr 11) Alt Xfmr (Bus 26 Bkr 3)	Isolate Main from Panel G-1. Isolate Alt from local control panel.
	SECURE NORMAL VENTILATION Bus 122 Cooling Fans: Bus 122 Internal XFMR Train B Event Monitor Cooling Fans: PNL 219 CKT. - #1		
SPECIAL INSTRUCTIONS:	Smoke removal via portable fans.		
SUMMARY:	A fire in this zone would be restricted to a cable fire. This fire can be controlled with fire extinguishers. Care should be exercised if water fog is being used.		

FIRE DETECTION ZONE 50



Bus 122 & Trn 'B' Event Monitoring Rm
Flr El. 735'

FIRE DETECTION ZONE 50
Fire Area 82 & 16

CAD FILE: Z50F823

LEVEL OF USE

CONTINUOUS USE
• Continuous use of procedure required. • Read each step prior to performing. • Mark off steps as they are completed. • Procedure **SHALL** be at the work location.

PORC REVIEW DATE:	APPROVAL:
12/15/16	PCR 6PCR01540958

A. PURPOSE

This procedure provides the necessary instructions for transferring the safety injection system to the recirculation mode.

B. ENTRY CONDITIONS

This procedure is entered from:

1. 1E-1, LOSS OF REACTOR OR SECONDARY COOLANT, on low RWST level.
2. 1ECA-0.2, LOSS OF ALL SAFEGUARDS AC POWER RECOVERY WITH SI REQUIRED, and used as guidance for recirculation alignment on low RWST level.
3. 1ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS, on low RWST level.
4. Other procedures whenever RWST level reaches the switchover setpoint.

C. ATTACHMENTS:

ATTACHMENT K: Unit 1 Alignment For Switchover To Recirculation

ATTACHMENT P: Local SI Reset

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Caution ***Switchover to recirculation phase may cause high radiation in the Auxiliary Building.***

Note ***Steps to establish recirculation flow SHALL be performed without delay. FR procedures should NOT be implemented until completion of this procedure.***

1 **Notify Auxiliary Building Operator to perform ATTACHMENT K (Copy of attachment with recirc keys in Aux Operator Shack)**

Caution ***IF offsite power is lost after SI reset, THEN manual action may be required to restart safeguards equipment.***

2 **Reset SI**

Locally reset SI using ATTACHMENT P

3 **Reset Containment Spray**

4 **Stop Safeguards Pumps For Train Going To Recirc:**

IF it is known that neither train of recirculation is available, THEN go to 1ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1

Train A -

- STOP 11 RHR pump
- IF both SI Pumps running, THEN STOP 11 SI pump
- IF both CS Pumps running, THEN STOP 11 CS pump and place in "PULLOUT"

-OR-

Train B -

- STOP 12 RHR pump
- IF both SI Pumps running, THEN STOP 12 SI pump

- IF both CS Pumps running, THEN STOP 12 CS pump and place in "PULLOUT"

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Note ***Completion of valve stroke is NOT required until specified by a step.***

5	**Close RWST To RHR Isolation Valve For Train Going To Recirc:** • Train A - CLOSE MV-32084 -OR- • Train B - CLOSE MV-32085	IF valve motion by switch or status lights can NOT be confirmed, THEN Either: • Return to step 4 if other train available -OR- • Go to 1ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1 if neither train available.

Caution ***IF RCS pressure is greater than SI pump shutoff head pressure, THEN the SI pumps SHALL be stopped.***

6	**Close SI Test Line To RWST Valves:** CLOSE - MV-32202 AND MV-32203	IF one valve closes, THEN go to Step 7. IF NOT, THEN locally close one valve.
7	**Verify RHR To Reactor Vessel Injection Valve Alignment:** MV-32064 AND MV-32065 - OPEN	Manually open valve(s).
8	**Align CC To RHR Heat Exchanger For Train Going To Recirc:** • Train A - OPEN MV-32093 -OR- • Train B - OPEN MV-32094	IF valve does NOT open, THEN Either: • Return to step 4 if other train available. -OR- • Locally open valve.

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	**Check Containment Level - GREATER THAN 2.25 FT.**	Check containment Sump B level greater than 82%. IF NOT, THEN go to 1ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
10	**Check If RHR Suction Can Be Aligned To Containment Sump:**	
	a. Verify RWST to RHR isolation valve for Train Going To Recirc - CLOSED: • Train A - MV-32084 -OR- • Train B - MV-32085	a. WHEN valve is closed, THEN continue with Step 10b. IF valve does NOT close, THEN Either: • Return to step 4 if other train available. -OR- • Go to 1ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1 if neither train available.
	b. Open Sump B to RHR isolation valves for Train Going To Recirc: • Train A - OPEN MV-32075 AND MV-32077 -OR- • Train B - OPEN MV-32076 AND MV-32078	b. IF valve motion by switch or status lights can NOT be confirmed, THEN Either: • Return to step 4 if other train available. -OR- • Go to 1ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1 if neither train available.

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
Δ11	**Check If Containment Spray Can Be Stopped:**	
	a. Containment spray pumps - ANY RUNNING	a. Go to Step 12.
	b. Containment pressure - LESS THAN 18 PSIG	b. Go to Step 12.
	c. Stop running CS pump(s) and place in "PULLOUT"	
12	**Stop Spent Fuel Pool Ventilation System.**	
	Note ***Stroke times for RHR suction valves from Sump B are approximately two minutes.***	
13	**Place Train In Low Head Recirculation Operation:**	
	a. Verify Sump B to RHR isolation valves for Train Going To Recirc-FULL OPEN: • Train A - MV-32075 AND MV-32077 -OR- • Train B - MV-32076 AND MV-32078	a. WHEN valves are full open, THEN continue with Step 13b. IF valves do NOT open, THEN Either: • Return to step 4 if other train available. -OR- • Go to 1ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1 if neither train available.

This Step continued on the next page.

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 13 continued from previous page)	
	b. Start RHR pump For Train Going To Recirc	b. IF pump can NOT be started, THEN Either: • Return to step 4 if other train available. -OR- • Go to 1ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1 if neither train available.
	c. Check for low head recirculation: 1) RCS pressure - LESS THAN 275 PSIG [575 PSIG] 2) RHR flow - GREATER THAN 1000 GPM: • 1FI-928 -OR- • 1FI-626	c. Go to Step 14.
	d. Stop the following pumps taking suction from RWST: 1) RHR Pump 2) Charging Pumps	
	e. Go To Step 15	

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Caution ***IF only one SI pump is running, THEN the SI pump must be restarted within 8 minutes to ensure core cooling is maintained.***

14 **Align High Head Recirculation:**

a. Check SI Pump Going to Recirc STOPPED:

a. Perform the following:

1) Verify RWST level - LESS THAN 20%

2) Perform actions of other procedures in effect while RWST level is greater than 20%.

3) WHEN RWST level is LESS THAN 20%, THEN Stop Running SI Pump and continue with step 14b.

b. Close SI pump suction valve for SI pump Going to Recirc:

- Train A - CLOSE MV-32162

-OR-

- Train B - CLOSE MV-32163

b. IF valve does NOT close, THEN Either:

- Return to step 4 if other train available.

-OR-

- Go to 1ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1 if neither train available.

This Step continued on the next page.

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 14 continued from previous page)	
	c. Open RHR supply for SI pump Going to Recirc: • Train A - OPEN MV-32206 -OR- • Train B - OPEN MV-32207	c. Perform the following: 1) Verify MV energized per ATTACHMENT K. 2) IF valve does NOT open, THEN perform the following: a) Open SI pump suction isolation valve: • MV-32162 -OR- • MV-32163 b) Start the SI pump. c) Go to 1ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.
	d. Check RWST level - LESS THAN 20%	d. Perform the following: 1) IF No SI pump is running, THEN go to Step 14e. 2) Perform actions of other procedures in effect while RWST level is greater than 20%. 3) WHEN RWST level is less than 20%, THEN go to Step 14e.

This Step continued on the next page.

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 14 continued from previous page)	
	e. Start SI pump Going To Recirc.	e. IF pump can NOT be started, THEN Either: • Return to step 4 if other train available. -OR- • Go to 1ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1 if neither train available.
	f. Check SI flow - FLOW INCREASE (1FI-925)	f. IF flow from the sump to RCS can NOT be established, THEN Either: • Stop SI pump and return to step 4 if other train available. -OR- • Go to 1ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1 if neither train available.
Δ15	**Check RWST Level - LESS THAN 8%** a. Immediately STOP all Pumps taking a suction from the RWST And Place In "PULLOUT": 1) RHR pumps 2) SI pumps 3) Containment Spray pumps 4) Charging pumps	Perform the following: • Initiate F3-17.2, LONG TERM CORE COOLING. • Perform actions of other procedures in effect while RWST level is greater than 8%. • WHEN RWST level less than 8%, THEN perform step15a.

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
Δ16	**Check Second RHR Train Available For Recirculation**	Go to Step 22. IF second train becomes available, THEN perform steps to align second train as advised by the TSC.
17	**Close RWST To RHR Isolation Valve For Second Train Going to Recirc:** • Train A - MV-32084 -OR- • Train B - MV-32085	IF valve motion by switch or status lights can NOT be confirmed, THEN go to Step 22.
18	**Align CC To RHR Heat Exchanger For Second Train Going to Recirc:** • Train A - Open MV-32093 -OR- • Train B - Open MV-32094	IF valve does NOT open, THEN go to Step 22.

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Note ***Stroke times for RHR suction valves from the RWST and Sump B are approximately two minutes.***

19 **Check If RHR Suction Can Be Aligned To Containment Sump:**

a. Verify RWST to RHR isolation valve for Second Train Going to Recirc - CLOSED:

- Train A - MV-32084

-OR-

- Train B - MV-32085

a. WHEN valve is closed, THEN continue with Step 19b.

IF valve does NOT close, THEN go to Step 22.

b. Open Sump B to RHR isolation valves for Second Train Going to Recirc:

- Train A - OPEN

MV-32075 AND MV-32077

-OR-

- Train B - OPEN

MV-32076 AND MV-32078

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	**Place RHR Second Train In Low Head Recirculation Operation:**	
	a. Verify Sump B to RHR isolation valves for Second Train Going to Recirc - FULL OPEN: • Train A - MV-32075 AND MV-32077 -OR- • Train B - MV-32076 AND MV-32078	a. WHEN valves are full open, THEN continue with Step 20b. IF valves do NOT open, THEN go to Step 22.
	b. Start RHR pump for Second Train Going to Recirc	b. IF pump can NOT be started, THEN go to Step 22.
	c. Check for low head recirculation: 1) RCS pressure - LESS THAN 275 PSIG [575 PSIG] 2) RHR flow - GREATER THAN 1000 GPM: • 1FI-928 -OR- • 1FI-626	c. Go to Step 21.
	d. Go To Step 22	

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21	**Align Second Train For High Head Recirculation:**	
	a. Close SI pump suction isolation valve for Second Train Going to Recirc: • Train A - MV-32162 -OR- • Train B - MV-32163	a. IF valve does NOT close, THEN go to Step 22.
	b. Open RHR supply for Second SI Pump Going to Recirc: • Train A - MV-32206 -OR- • Train B - MV-32207	b. Perform the following: 1) Verify MV energized per ATTACHMENT K. 2) IF valve does NOT open, THEN go to Step 22.
	c. Start second SI pump	c. IF pump can NOT be started, THEN go to Step 22.
	d. Check SI flow - FLOW INCREASE (1FI-925)	d. IF flow from the sump to RCS can NOT be established, THEN stop SI pump and go to Step 22.
22	**Check Cooling Water Header Pressures - BOTH GREATER THAN 70 PSIG**	Initiate C35 AOP1, LOSS OF PUMPING CAPACITY OR SUPPLY HEADER WITH SI. Continue with Step 23.

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Caution ***The SI Pump Room may be a Very High Radiation Area. Do not use stairwells into or out of the SI Pump Room.***

Note ***The long term Component Cooling alignment may be performed earlier than 20 hours based on dose assessment and personnel availability. The alignment SHALL be completed within 24 hours of the event.***

23 **Align Component Cooling For Long Term Operation:**

a. Check 20 hours has elapsed since event initiation

a. WHEN 20 hours has elapsed, THEN perform Steps 23b, 23c, 23d, 23e and 23f.

Continue with Step 24 while waiting for 20 hours to elapse.

b. Locally remove travel stops from CC heat exchanger cooling water outlet valves (1 7/16" socket and open-end wrench required):

- CV-31381, 11 CC HX CLG WTR OUTLET CV
- CV-31411, 12 CC HX CLG WTR OUTLET CV

c. Check RCP status - BOTH STOPPED

c. Stop both RCPs.

This Step continued on the next page.

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

(Step 23 continued from previous page)

d. Locally close breakers for CC RCP inlet/outlet valves:

- MCC 1L1-C1, 11 RC PMP CC INLT MV-32089 (SFGDS BLOCK 1-176) (715' J.2/5.2)
- MCC 1L1-C2, 11 RC PMP CC OUTL MV-32090 (SFGDS BLOCK 1-177)
- MCC 1L2-A1, 12 RC PMP CC INLT MV-32091 (SFGDS BLOCK 1-178) (715' J.4/6.4)
- MCC 1L2-A2, 12 RC PMP CC OUTL MV-32092 (SFGDS BLOCK 1-179)
- MCC 1K1-H5, 11/12 RC PMP CC INLT MV-32266 (695' G.2/5.2 North of RHR pit)
- MCC 1K2-D5, 11/12 RC PMP CC INLT MV-32267 (695' G.8/6.5 by charging pump rooms)

e. Locally close CC inlet to RCP motor valves:

- MV-32267, 11/12 RCP CC INLT MV, using CS-19101 (695' H.6/6.3 by elevator)
- MV-32266, 11/12 RCP CC INLT MV A, using CS-19100 (695' J.0/6.8 by VCT H2)

This Step continued on the next page.

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 23 continued from previous page)	
	f. Close CC outlet/inlet RCP containment isolation valves: • MV-32089/32090 using CS-46028 • MV-32091/32092 using CS-46031	
24	**Initiate F3-17.2, LONG TERM CORE COOLING**	
Δ25	**Verify ECCS Pumps Not Affected By Sump Blockage:** • ECCS pump flows - STABLE • ECCS pump pressures - STABLE	IF both trains are affected such that at least one train of recirculation flow can NOT be established or maintained, THEN go to 1ECA-1.3, RECIRCULATION SUMP BLOCKAGE, Step 1 IF only one train is affected, THEN take actions to protect the affected train as follows: b. STOP any cavitating SI pump. c. Attempt to adjust RHR flow control valve to establish RHR recirculation without cavitation. d. IF unable to establish RHR recirculation without cavitation, THEN STOP the affected RHR pump and initiate actions of F3-17.2, LONG TERM CORE COOLING
Δ26	**Monitor ECCS Leakage - NORMAL:** • Annulus Sump Alarms • RHR Pit Alarms • RHR Area Radiation Monitors • Unexplained Sump B level changes	Consult with TSC to identify and isolate leakage

INFORMATION PAGE FOR 1ES-1.2

1 RWST LO-LO LEVEL ALARM (47016-0104)

WHEN RWST level decreases to 8%, THEN immediately STOP all Pumps taking a suction from the RWST and place in "PULLOUT" as follows:

a. RHR Pump(s)
b. SI Pump(s)
c. CS Pump(s)
d. Charging Pumps

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	**Return To Procedure And Step In Effect**	

-END-

ATTACHMENT K

UNIT 1 ALIGNMENT FOR SWITCHOVER TO RECIRCULATION

1. **Obtain** "UNIT 1 RECIRC KEYS" in Aux Operator Shack _____

2. **Close** SI Pump shield door by placing 18849, U1 SI SHLD DOOR RELEASE to "CLOSE".(Located on wall Southwest of RHR pits) _____

3. **Align** RHR sump pump discharge valves (located above RHR Pits):

   - **Position** WL-87-1, RHR PIT SUMP #11 DISCHARGE, to "ANNULUS SUMP" _____
   - **Position** WL-87-2, RHR PIT SUMP #12 DISCHARGE, to "ANNULUS SUMP" _____

4. **Unlock** and energize the following 480V breakers:

   - **Place** MCC 1K1-E2 (BKR 111J-19), 11 RHR HX TO 11 SI PMP MV-32206 to “ON” (Located North of RHR pits) (Key #28) _____
   - **Place** MCC 1KA2-D1 (BKR 121B-34), 12 RHR HX TO 12 SI PUMP MV-32207 to “ON” (Located East of Aux Operator Shack) (Key #29) _____

5. **Position** WL-86-1, SAMPLE SINK TO CHEM DRAIN/RHR SUMP, to "CLOSED, Sample Sink Drains to 12 RHR Pit Sump". (Located halfway up the stairs by the Aux Bldg Operator shack) _____

6. **Open** “U1 DRAIN TRAP VENT”. (Located inside the Unit 1 Sample Hood in the Hot Lab) _____

7. **Stop** the Rad Waste Building Vent System using CS-5725012. (Located on Panel 57250, 695', Aux Building drop area South wall) _____

ATTACHMENT P

UNIT 1 LOCAL SI RESET

1. **Obtain** key for relay room racks 1ASG1 and 1BSG1 (Key hook #63) _____

2. IF Train A SI requires local reset, THEN **unlock** the back door (west side) of Safeguards Relay Rack 1ASG1 and perform the following:

   a. On Relay 1SIA-A1, **DEPRESS** Manual Reset Push Rod. _____

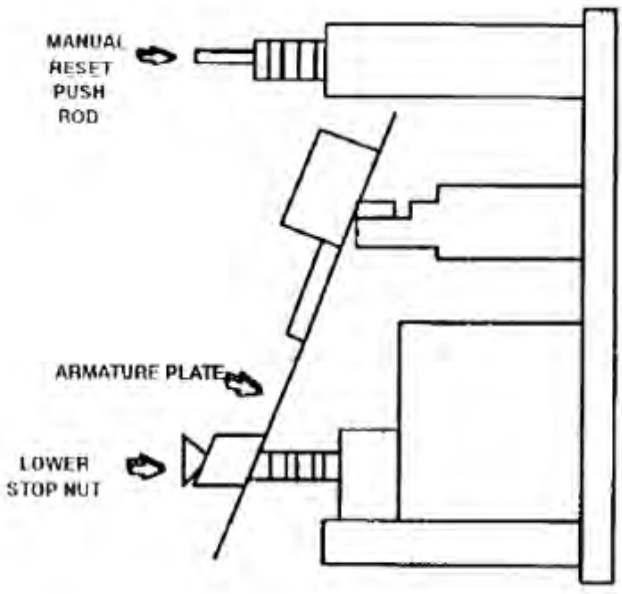
   b. On Relay 1SIA-A2, **DEPRESS** Manual Reset Push Rod. _____

3. IF Train B SI requires local reset, THEN **unlock** the back door (east side) of Safeguards Relay Rack 1BSG1 and perform the following:

   a. On Relay 1SIA-B1, **DEPRESS** Manual Reset Push Rod. _____

   b. On Relay 1SIA-B2, **DEPRESS** Manual Reset Push Rod. _____

The MG-6 relay is RESET when the armature plate is pulled out against the lower stop nut.



EMERGENCY NOTIFICATION REPORT FORM

1. REASON FOR CALL [A] Initial Report [B] Emergency Class Change [C] PAR Change [D] Release Status Change Only

2. STATUS
[A] ACTUAL EVENT
[B] DRILL/EXERCISE

3. AFFECTED STATION
[C] PRAIRIE ISLAND NUCLEAR GENERATING PLANT

4. ONSITE CLASSIFICATION
[A] UNUSUAL EVENT
[B] ALERT
[C] SITE AREA EMERGENCY
[D] GENERAL EMERGENCY
[E] RECOVERY
[F] TERMINATED

5. TIME & DATE OF CLASSIFICATION / PAR CHANGE / TERMINATION
[A] CLASSIFICATION TIME _____ DATE _____ EAL # _____
[B] PAR CHANGE TIME _____ DATE _____
[C] TERMINATION TIME _____ DATE _____
[D] RELEASE STATUS CHANGE ONLY

6. EVENT RELEASE STATUS
[A] NONE [B] OCCURRING [C] TERMINATED

7. TYPE OF RELEASE
[A] NOT APPLICABLE [B] AIRBORNE
[C] LIQUID

8. WIND DIRECTION (*Use current 15 minute average and Table 1 to choose currently affected downwind Sectors, if < 5 mph all sectors are affected.)*
FROM _____ DEGREES
DOWNWIND SECTORS: *A B C D E F G H J K L M N P Q R*
(*Circle currently affected sectors.*)

9. WIND SPEED & STABILITY CLASS (*Use current 15 minute average*.)
MILES/HR.: _____
STABILITY CLASS: *A B C D E F G*
unstable <= => stable

10. PRECAUTIONARY MEASURES and PROTECTIVE ACTION RECOMMENDATIONS (*Use Table 1 to choose affected downwind Sectors and geopolitical Subareas*.)
[A] NONE
[B] EVACUATE (or SHELTER) _____ SECTORS OUT TO _2_ MILES
EVACUATE (or SHELTER) _____ SECTORS FROM _2_ MILES TO _5_ MILES
EVACUATE (or SHELTER) _____ SECTORS FROM _5_ MILES TO _10_ MILES
Affected SUBAREAS: (*circle all that apply*) 2 5N 5E 5S 5W 10NW 10N 10NE 10E 10SE 10SW 10W
AND PUBLIC IN THOSE AFFECTED SUBAREAS TAKE KI IF AVAILABLE;
AND REMAINDER OF PLUME EPZ TO MONITOR RADIO/TV BROADCASTS FOR FURTHER INFORMATION.
(*Clarifying notes, if needed*)_____
[C] PRECAUTIONARY MEASURE FOR CASINO SHUTDOWN AND DISMISSAL OF STAFF AND PATRONS.
[D] PRECAUTIONARY MEASURE TO ADVISE CASINO AND RESIDENTS WITHIN A 2 MILE RADIUS TO STAY INDOORS AND CONTINUE TO MONITOR RADIO/TV BROADCASTS FOR FURTHER INFORMATION.
[E] OTHER: _____

11. ADDITIONAL INFORMATION (*Apply the EAL Gum Label or write the event descriptions based on the EAL. If PAR Change, write "None", "PAR Change" or other PAR information. If Release Status Change Only, specify time of change. If terminating, specify reason.)*

APPROVAL SIGNATURE
_____
EMERGENCY DIRECTOR/EMERGENCY MANAGER

12. EMERGENCY COMMUNICATOR (*Print Name*)
_____
(*Circle or indicate the appropriate callback number.*)
- Control Room Callback (612) 330-6893
- TSC Callback (651) 388-1121 Ext. 4369
- Other Callback _____
- Security Event SEC _____
- EOF Callback (651) 388-1121 Ext. 5241
- Backup EOF Callback (612) 330-5753

**Italic words provide guidance for the person completing this form. See Directions for more guidance on completing form*
.

ATTACHMENT A

NOTE:	**DO NOT FAX THIS PAGE TO STATE AND LOCAL AUTHORITIES**

DIRECTIONS FOR FILLING OUT THE FORM

The ED or EM SHALL approve the notification information. Form to be completed by: SM, SS, SEC, REC or RPSS. Yellow background items indicate Drill Exercise Performance (DEP) items. Items may be filled out in any order.

Section #1	**Select** "A", "B", "C" or "D" to indicate reason for this notification call to offsite agencies. **Choose** "A" for initial entry into an emergency classification **Choose** "B" for any subsequent change of emergency classification or termination **Choose** "C" for any change to previously issued PROTECTIVE ACTION RECOMMENDATIONS (PAR). **Choose** "D" for only those cases of a change in radioactive release status (i.e. status in box 6 is changed) with no PAR or classification change. Release Status Change Only notifications are not counted in DEP.
Section #2	**Select** "A" (Actual Event) for a real event or "B" (Drill/Exercise) for all other cases.
Section #3	"C" is already circled which indicates affected nuclear station. No further action is necessary in this block.
Section #4	**Select** the appropriate letter to indicate which classification is being declared. IF this is a PAR Change notification OR Release Status Change Only, THEN **select** the current classification.
Section #5	**Select** "A", "B", "C" or "D" as follows: **Choose** "A" for any Initial Report or Emergency Class Change. **Fill** in the appropriate time and date and EAL# from F3-2, as applicable. The classification time is the time of classification declaration. **Choose** "B" for any change to previously issued PROTECTIVE ACTION RECOMMENDATIONS. **Fill** in the appropriate time and date. PAR time is the time of PAR approval. Precautionary Measures are NOT considered PARs. **Choose** "C" for emergency classification termination **Choose** "D" for only those cases of a change in radioactive release status (i.e. status in box 6 is changed) with no PAR or classification change. Fill in time of release status change in Block 11..
Section #6	**Select** the appropriate letter "A", "B", or "C" to indicate whether a radioactive release is occurring. The definition of radioactive release is the release of radioactive material to the environment attributable to the emergency event confirmed by valid radiological monitor indication or a radiological survey and occurring at the time this form is signed. Use Figure 2 for guidance.
Section #7	**Use** Figure 2 to determine the appropriate letter to indicate whether there is an airborne or liquid radioactive release in progress. IF there is no release in progress OR the release is terminated, THEN **select** Not Applicable.
Section #8	**Use** the **current** 10 meter 15-minute average met data from the 10a sensor if reliable; OTHERWISE, **use** the 10b, 60a, 60b, or 22 meter tower sensor data. Most reliable meteorological (met) data is found on ERCS Met Summary display. **Access** met data via ERCS "Main Menu" > "Emergency Planning" > "EPZ Map and Met Summary" button. IF no met data is available, THEN **write** Met Not Available. 1. **Fill** the blank indicating the "From" wind direction. 2. **Select** only the **current** (at the time designated in Section #5) downwind affected sectors using guidance in Table 1.

ATTACHMENT A

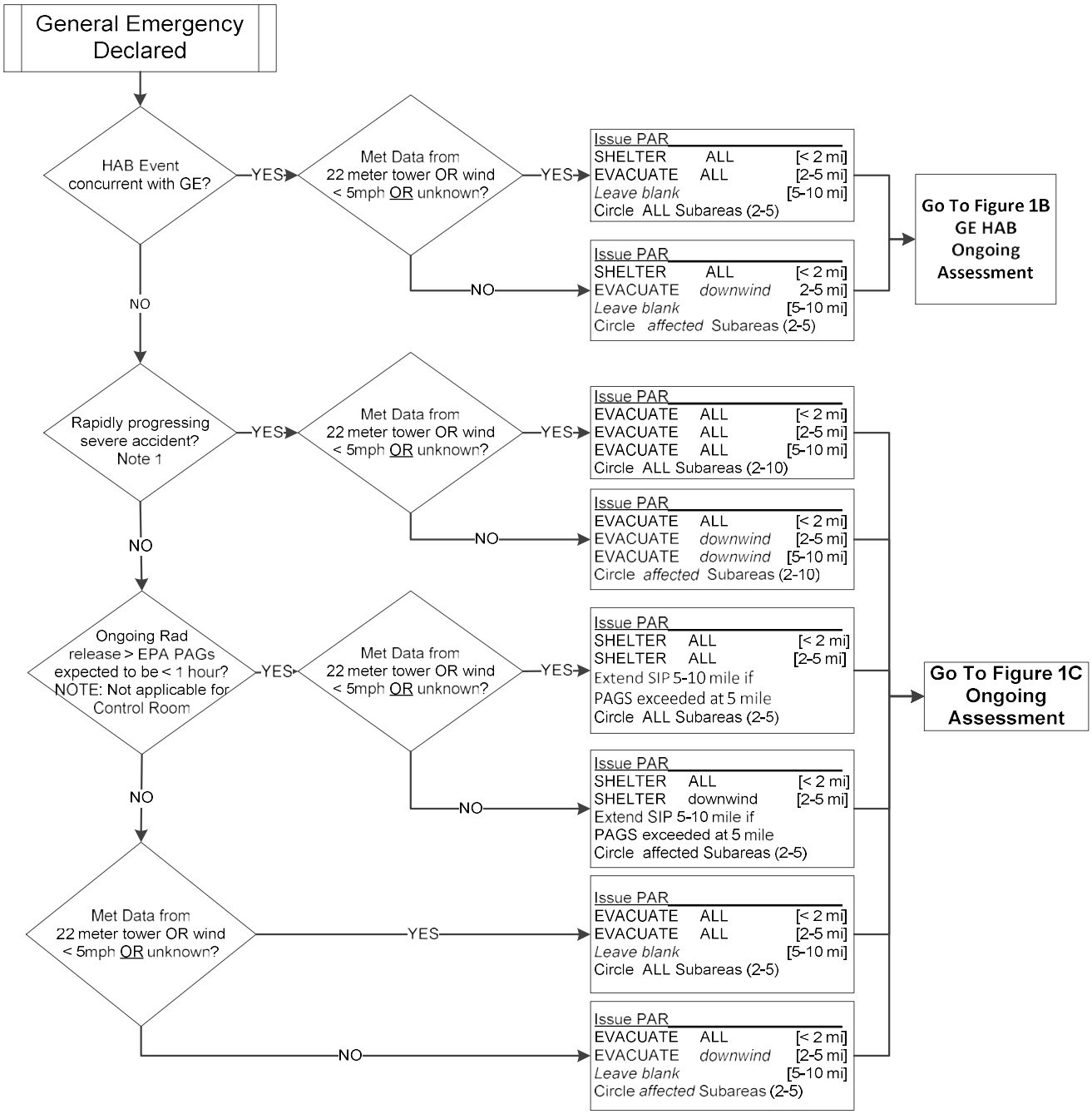
NOTE:	**DO NOT FAX THIS PAGE TO STATE AND LOCAL AUTHORITIES**

Section #9	**Use** the current 10 meter 15-minute average met data from the 10a sensor if reliable; OTHERWISE, **use** the 10b, 60a, 60b, or 22 meter tower sensor data. Most reliable meteorological (met) data is found on ERCS Met Summary display. **Access** met data via ERCS "Main Menu" > "Emergency Planning" > "EPZ Map and Met Summary" button. IF no met data is available, THEN **write** Met Not Available. 1. **Fill** the blank indicating the current wind speed. 2. **Select** the appropriate stability class letter.
Section #10	**Use** Figure 1 and Table 1 to determine the appropriate PAR with affected downwind sectors and geopolitical subareas. 1. IF declaring an NUE OR ALERT a. **Circle** [D] if Alert declared for a HAB event, OR b. **Circle** [A] "NONE" 2. IF declaring a Site Area Emergency THEN either: a. **Circle** [D] if SAE declared for a HAB event, OR b. **Circle** [C] if EAL RS1.1, RS1.2 or RS1.3 conditions are met OR c. **Circle** [A] "NONE" 3. IF declaring a General Emergency or PAR change THEN: a. **Circle** [B] b. **Select** "Evacuate" or "Shelter" c. **Circle** ALL Affected SUBAREAS applicable from table 1: **(including "2")** d. IF this is a PAR change, THEN **include** any previously chosen affected sectors and subareas with the new affected sectors and subareas in the PAR e. DO NOT include [C] or [D] since Precautionary Measures are NOT considered PARs. 4. IF the PAR change needs any clarification such as describing additional sectors or distances, THEN **include** the explanation in the "Clarifying notes" area 5. Once a PAR has been implemented by state or local authorities it should not be rescinded or revised because of the potential for changing conditions and causing confusion.
Section #11	1. IF classifying an event, THEN **apply** the corresponding prepared EAL gum label OR **select** the EAL description given in F3-2. 2. IF making a PAR change, THEN **write** "None", "PAR Change" or other applicable information related to the PAR. 3. IF making a Release Status Change Only, THEN **indicate** the approximate time of the change in status. 4. IF terminating, THEN **specify** reason for termination.
Section #12	The emergency communicator **SHALL**: 1. **Print** your name and **circle** or **indicate** the applicable callback number. 2. **Conduct** the 15-minute offsite emergency notifications using the single front page information.

ATTACHMENT A

NOTE:	**DO NOT FAX THIS PAGE TO STATE AND LOCAL AUTHORITIES**

Figure 1A Protective Action Recommendations

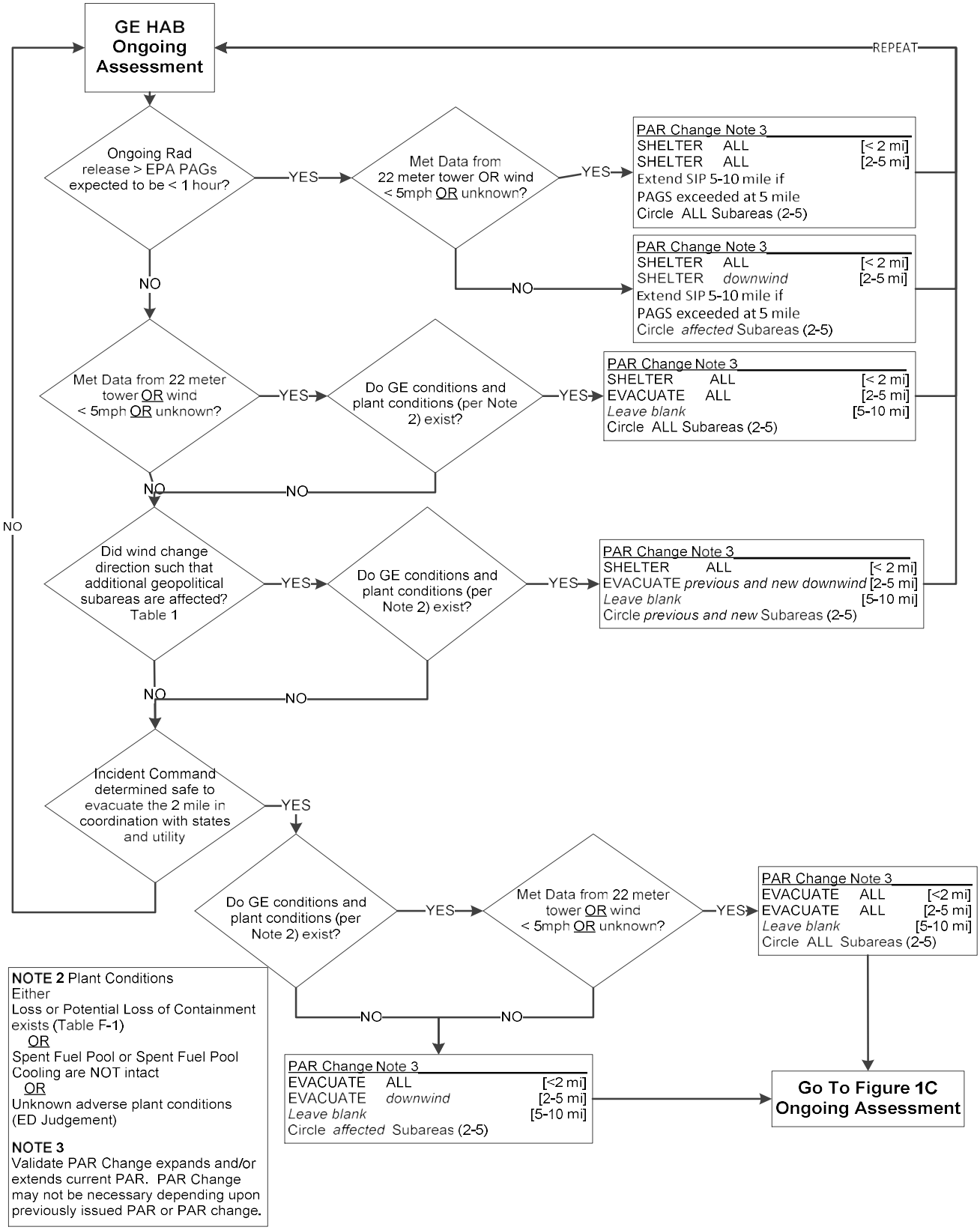


NOTE 1
All of the following
1. This PAR is the initial after a General Emergency has been declared
   AND
2. There is LOSS of the containment barrier per the Emergency Action Levels
   AND
3. Either of the following:
   a. Greater than or equal to Containment High Range Radiation Monitor Potential Loss Threshold (20% Clad Damage) i.e. 1(2) R-48 or 49 reading > 800 R/hr
      OR
   b. An Offsite Dose Estimate indicates greater than PAGs at the site boundary is occurring or is likely to occur in an hour.

ATTACHMENT A

NOTE:	**DO NOT FAX THIS PAGE TO STATE AND LOCAL AUTHORITIES**

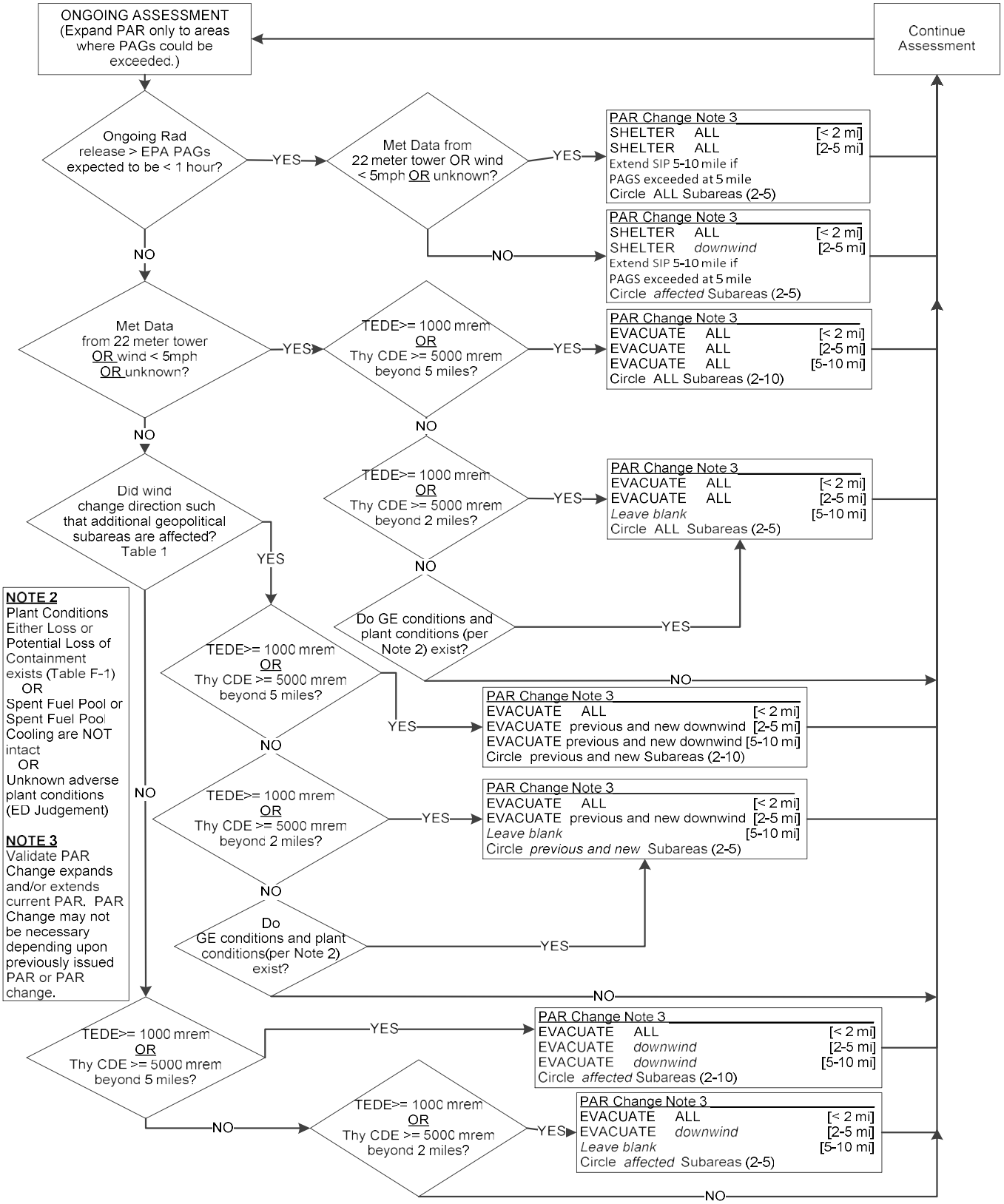
Figure 1B Protective Action Recommendations



ATTACHMENT A

NOTE:	**DO NOT FAX THIS PAGE TO STATE AND LOCAL AUTHORITIES**

Figure 1C Protective Action Recommendations



ATTACHMENT A

NOTE:	**DO NOT FAX THIS PAGE TO STATE AND LOCAL AUTHORITIES**

Supporting Information for the use of Figure 1:

1. **Usage:**

   a. Figure 1A should be used to determine appropriate PAR for the initial General Emergency Declaration

   b. Figure 1B is used during on going assessment when HAB event is concurrent with GE, until Incident Command allows for evacuation

   c. Figure 1C is used during on going assessment during non-HAB events or after Incident Command allows for evacuation

2. **Impediments to Evacuation** – PINGP only needs to consider Shelter-In-Place during a Hostile Action Based Event as an Impediment to Evacuation. This is in accordance with NUREG-0654 Supplement 3 potential Impediments to Evacuation and has been reviewed and agreed upon by the Offsite Response Agencies.

3. **PAR Template:**

   Figures 1A, 1B and 1C all use similar templates to assist in determining how to complete Section #10. The blocks state at the top whether it is an initial PAR (figure 1A only) or a PAR Change (figures 1B and 1C) followed by four lines of amplifying information which correspond to Section 10 [B] of the PINGP 577. Note that *Italicized* entries may require manual entry.

Issue PAR or PAR Change	
SHELTER *or* EVACUATE - ALL	SECTORS OUT TO 2 MILES
SHELTER *or* EVACUATE - ALL or *downwind (previous and new downwind)*	SECTORS FROM 2 MILES TO 5 MILES
leave blank or EVACUATE - ALL or *downwind (previous and new downwind)*	SECTORS FROM 5 MILES TO 10 MILES
Circle ALL or *affected* Subareas (2-5) or (2-10)	

Examples:

Initial GE declaration wind speed < 5 mph

Issue PAR
EVACUATE - ALL
EVACUATE - ALL
leave blank
Circle or ALL Subareas (2-5)

PAR Change needed due to wind shift affecting additional geopolitical subareas and GE conditions still exist:

PAR Change
EVACUATE - ALL
EVACUATE - *previous and new downwind*
leave blank
Circle *previous and new downwind* Subareas (2-5)

ATTACHMENT A

Figure 2 Determination of a Release in Progress

NOTE:	**DO NOT FAX THIS PAGE TO STATE AND LOCAL AUTHORITIES**
NOTE:	**A loss of all three fission product barriers is an airborne release.**

Release in Progress means any radiological release (Particulate, Iodine or Noble Gas) attributable to the emergency event, confirmed by a valid radiological monitor indication or a radiological survey (in-plant, on-site, or off-site) or determined by REC/ED/RPSS/EM and occurring at the time this form is approved.

Source Term
Radioactive Material (Gaseous, Liquid or Solid) is available for release as a result of or is attributed to the Classified Event.

YES → **Monitored Pathway to the Environment**
A Pathway to the environment exists AND there is a valid increase, not attributable to shine, on an effluent monitor associated with that pathway.

NO → **Un-Monitored Pathway to the Environment**
An Un-Monitored Release Pathway to the environment is confirmed.

YES → Yes, there is a "Release in Progress"

NO → No, there is NOT a "Release in Progress"

NO → No, there is NOT a "Release in Progress"

Notes on "Source Term"
The Magnitude of the Radioactive Material available for release does not need to be quantified. That is, the source term may be of any size.

Notes on "Un-Monitored Release Pathway"
1) Any outdoor tank with known radioactivity (even if only tritium) that loses inventory to the environment as a result of the classified event, is a "Release in Progress".
2) A resin spill outdoors, contaminated trash spill, or damage that opens a building or system containing radioactive materials and exposes these materials to the environment constitutes an "Unmonitored Release Pathway." This pathway combined with environmental radioactivity confirmed by radiological survey or determined by REC/ED RPSS/EM will constitute a "Release in Progress."

"Release in Progress" Examples
1) SGTR until isolated and secondary systems verified NO Radioactive Material present.
2) LOCA in CTMT and neither train of CTMT Isolation actuated.

Notes on "Pathway to the Environment"
1) By itself, Containment design leak rate does not constitute a pathway to the environment.
2) A release to the Containment Atmosphere with Containment Isolation verified satisfactory, does not constitute a pathway to the environment. Some effluent monitors may show an increase due to shine from a release to the Containment Atmosphere this does not constitute a pathway to the environment.
3) For Steam Generator Tube leaks or Ruptures, the pathway to the environment is considered isolated when the cooldown to a primary system temperature < 200°F is completed. Cooldown on a ruptured steam generator is considered a loss of containment boundary.
4) Effluent Monitors include:
   a) R-15's Air Ejector Radiation Monitor
   b) R-18 Waste Effluent Liquid Monitor
   c) R-19's SG Blowdown Radiation Monitor
   d) R-21 Circ Water Discharge Radiation Monitor
   e) R-22's Shield Building Vent Radiation Monitors
   f) R-25 Spent Fuel Pool Vent Radiation Monitor
   g) R-30's Aux Building Vent Radiation Monitor
   h) R-31 Spent Fuel Pool Vent Radiation Monitor
   i) R-35 Rad Waste Building Vent Radiation Monitor
   j) R-37's Aux Building Vent Radiation Monitor
   k) R-50's High Range Stack Gas Monitor
   l) R-51's Steam Line Radiation Monitor
   m) R-52's Steam Line Radiation Monitor
   n) Steam Release Computer

ATTACHMENT A

NOTE:	**DO NOT FAX THIS PAGE TO STATE AND LOCAL AUTHORITIES**

Table 1
SELECTING GEOPOLITICAL SUBAREAS

Choose geopolitical subareas corresponding to the current wind direction (or affected downwind sectors) and the desired downwind distance one needs to apply the Protective Action Recommendations.

	AFFECTED DOWNWIND SECTORS	**AFFECTED GEOPOLITICAL SUBAREAS**		
		2 MILES	**5 MILES**	**10 MILES**
IF WIND < 5 MPH OR FROM 22 M MET TOWER OR NO MET DATA AVAILABLE	ALL	2	5N, 5E, 5S, 5W	10NW, 10N, 10NE, 10E, 10SE, 10SW, 10W

FOR WIND ≥ 5 MPH, WIND FROM (DEGREES)	**AFFECTED DOWNWIND SECTORS**	**AFFECTED GEOPOLITICAL SUBAREAS**		
		2 MILES	**5 MILES**	**10 MILES**
348.75 - 11.25	GHJKL	2	5S, 5W	10SE, 10SW
11.25 - 33.75	HJKLM	2	5S, 5W	10SE, 10SW, 10W
33.75 - 56.25	JKLMN	2	5S, 5W	10SE, 10SW, 10W
56.25 - 78.75	KLMNP	2	5S, 5W	10SW, 10W
78.75 - 101.25	LMNPQ	2	5W	10SW, 10W
101.25 - 123.75	MNPQR	2	5W, 5N	10W, 10NW
123.75 - 146.25	NPQRA	2	5W, 5N	10W, 10NW, 10N
146.25 - 168.75	PQRAB	2	5W, 5N	10W, 10NW, 10N, 10NE
168.75 - 191.25	QRABC	2	5W, 5N, 5E	10W, 10NW, 10N, 10NE
191.25 - 213.75	RABCD	2	5N, 5E	10NW, 10N, 10NE, 10E
213.75 - 236.25	ABCDE	2	5N, 5E	10NW, 10N, 10NE, 10E
236.25 - 258.75	BCDEF	2	5N, 5E	10N, 10NE, 10E
258.75 - 281.25	CDEFG	2	5N, 5E, 5S	10NE, 10E, 10SE
281.25 - 303.75	DEFGH	2	5N, 5E, 5S	10E, 10SE
303.75 - 326.25	EFGHJ	2	5E, 5S	10E, 10SE
326.25 - 348.75	FGHJK	2	5E, 5S	10E, 10SE, 10SW

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Caution

- ***IF total feed flow is less than 200 gpm due to operator action, THEN this procedure should not be performed.***
- ***Feed flow should not be reestablished to any faulted SG if a non-faulted SG is available.***

1 **Check If Secondary Heat Sink Is Required:**

a. RCS pressure - GREATER THAN ANY INTACT SG PRESSURE

a. Return to procedure and step in effect.

b. RCS hot leg temperature - GREATER THAN 350°F

b. Attempt to place RHR System in service per C15 while continuing in this procedure.

IF adequate cooling with RHR System established, THEN return to procedure and step in effect.

Δ 2 **Check If Bleed And Feed Is Required:**

a. BOTH SG wide range levels - LESS THAN 13% [17%]

a. Go to Step 3.

b. Stop BOTH RCPs

c. Go to Step 11.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Caution ***IF CST level decreases to less than 12,500 gallons, THEN alternate water sources for AFW pumps will be necessary per 1C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.***

Δ 3 **Attempt To Establish AFW Flow To At Least One SG:**

a. Check SG blowdown isolation valves - CLOSED

a. Manually close valves.

b. Check control room indications for cause of AFW failure:

- CST level
- AFW pump power supply
- AFW valve alignment
- TD AFW pump overspeed trip
- AFW pump low suction or discharge pressure trip

c. Attempt to restore AFW flow using 11 or 12 AFW Pump.

c. Attempt to restore AFW flow using 21 MDAFWP per 1C28.1.

This Step continued on the next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

(Step 3 continued from previous page)

d. Check total flow to SGs - GREATER THAN 200 GPM

d. Perform the following:

1) IF feed flow to at least one SG NOT verified, THEN:

a) Dispatch operator to locally restore AFW flow per C28.1, AUXILIARY FEEDWATER SYSTEM or C28.1 AOPs

b) Go to Step 4.

2) IF any feed flow to at least one SG is verified, THEN:

a) Maintain flow to restore narrow range level to greater than 7% [Wide Range 50%]

b) WHEN narrow range level greater than 7% [Wide Range 50%], THEN return to guideline and step in effect.

c) Go to Step 4.

e. Return to procedure and step in effect

4 **Stop BOTH RCPs**

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Caution ***IF offsite power is lost after SI reset, THEN manual action may be required to restart safeguards equipment.***

5 **Attempt To Establish Main FW Flow To At Least One SG:**

a. Reset SI

a. Locally reset SI using ATTACHMENT P

b. Check Condensate System - IN SERVICE

b. Attempt to place Condensate System in service.

IF Condensate System can NOT be placed in service, THEN go to Step 9.

c. Check FW containment isolation valves - OPEN

c. Perform the following:

1) Reset containment isolation if necessary.

2) Verify main feed reg and bypass valves in "MANUAL" position AND closed.

3) Open FW containment isolation valves (MV-32023 and MV-32024).

IF no FW containment isolation valve can be opened, THEN go to Step 9.

d. Establish main FW flow:

1) Depress all four A and B FW bypass reset pushbuttons

2) Start one main FW pump

2) Go to Step 7.

3) Control flow with FW bypass valves

3) Locally control flow with main feed reg valve.

IF feed flow can NOT be established through the MFRV or bypass valves, THEN go to Step 9.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	**Check SG Levels:**	
	a. Narrow range level in at least one SG - GREATER THAN 7% [Wide Range 50%]	a. IF feed flow to at least one SG verified, THEN maintain flow to restore narrow range level to greater than 7% [Wide Range 50%]. IF feed flow NOT verified, THEN go to Step 7.
	b. Return to procedure and step in effect	

Caution ***IF conditions deteriorate following block of automatic SI actuation, THEN manual SI actuation may be required based on subcooling and pressurizer level.***

7	**Attempt To Establish Feed Flow From Condensate System:**	
	a. Check SI pumps - BOTH STOPPED	a. Go to Step 7d.
	b. Depressurize RCS to less than 1950 psig:	
	1) Check letdown - IN SERVICE	1) Use one PRZR PORV AND go to Step 7c. IF NOT, THEN use auxiliary spray AND go to Step 7c.
	2) Use auxiliary spray	2) Use one PRZR PORV.
	c. Block automatic SI	
	1) **Turn** the Pressurizer SI unblock-block switches to BLOCK and **release:** • **CS-46409**, PRZR SI UNBLOCK-BLOCK TRN A • **CS-46423**, PRZR SI UNBLOCK-BLOCK TRN B	

This Step continued on the next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 7 continued from previous page)	
	d. Depressurize one SG to less than 380 psig:	
	1) Check Condensate System - IN SERVICE	1) Attempt to place Condensate System in service.
	2) CLOSE the MSIV from the SG not being depressurized.	2) Manually or locally dump steam using SG PORV and go to Step 7e.
	3) Dump steam to condenser at maximum rate	3) Manually or locally dump steam using SG PORV. IF NOT, THEN go to Step 10.
	e. Establish condensate flow:	
	1) Locally open one main FW pump discharge isolation valve	
	2) Control flow with FW bypass valves	2) Locally control flow with main feed reg valve IF feed flow can NOT be established, THEN go to Step 10.
8	**Check SG Levels:**	
	a. Narrow range level in at least one SG - GREATER THAN 7% [Wide Range 50%]	a. IF feed flow to at least one SG verified, THEN maintain flow to restore narrow range level to greater than 7% [Wide Range 50%]. IF feed flow NOT verified, THEN go to Step 9.
	b. Return to procedure and step in effect	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	Note • ***Low pressure feedwater source should not be used unless other sources are unavailable.***	
	• ***Bleed and feed should not be initiated due to low level in SGs being depressurized per Attachment N, unless core exit temperatures are above 547°F and increasing. Step 9 should be repeated if core exit temperatures increase.***	
9	**Attempt To Establish Feed Flow From Any Available Low Pressure Source:**	
	a. Initiate ATTACHMENT N	
	b. Continue with step 10.	
10	**Check For Loss Of Secondary Heat Sink:**	Return to Step 1.
	a. Wide range level in both SGs - LESS THAN <u>OR</u> EQUAL TO 13% [17%]	
	Caution ***Steps 11 through 16 must be performed quickly in order to establish RCS heat removal by RCS bleed and feed.***	
11	**Actuate SI**	
12	**Verify RCS Feed Path:**	
	a. Check SI pumps - AT LEAST ONE RUNNING	a. Manually start pumps and align valves as necessary. <u>IF</u> at least one SI pump is running, <u>THEN</u> go to step 13. <u>IF</u> <u>NOT</u>, <u>THEN</u> continue attempts to start pumps and align valves and return to Step 3.
	Note ***It is not necessary to reset SI until after the bleed path is established.***	
13	**Reset Containment Isolation**	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	**Establish Instrument Air To Containment**	
15	**Establish RCS Bleed Path:**	
	a. Verify power to PRZR PORV block valves - AVAILABLE	a. Restore power to block valves.
	b. Verify PRZR PORV block valves - BOTH OPEN	b. Open both block valves.
	c. Open both PRZR PORVs	
16	**Verify Adequate RCS Bleed Path:** • PRZR PORVs - BOTH OPEN • PRZR PORV block valves - BOTH OPEN	Perform the following: a. Open RCS vents: SV-37035 SV-37036 SV-37037 SV-37038 SV-37039 OR SV-37040

Caution ***IF offsite power is lost after SI reset, THEN manual action may be required to restart safeguards equipment.***

17	**Reset SI**	Locally reset SI using ATTACHMENT P
18	**Perform Attachment L Of 1E-0, REACTOR TRIP OR SAFETY INJECTION, While Continuing With This Procedure**	

Caution ***The RCS bleed path must be maintained even if RCS pressure remains greater than SI pump shutoff head.***

19	**Maintain RCS Heat Removal:** • Maintain SI flow • Maintain PRZR PORVs - BOTH OPEN	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Note

- ***Diesel generator lock out annunciators (47024-0703 and 47024-0706) AND power from offsite sources (1R and CT11) can be used when determining if a Unit 1 source is available.***
- ***IF both safeguards buses are available, THEN it is preferable to attempt energizing Bus 16 first.***

6 **Attempt To Restore Power To Any Available Safeguards Bus From Unit 1 Source:**

a. Energize available bus with diesel generator:

1) Start diesel generator

1) Check any Unit 1 Source available.

IF no Unit 1 source is available, THEN go to Step 7.

2) Verify safeguards bus automatically energized

2) Manually energize bus from any available Unit 1 source:

a) Place desired source breaker MAN/AUTO switch to "MANUAL".

b) Place synchroscope select switch to desired source position.

c) Close desired source breaker.

b. Check safeguards buses - AT LEAST ONE ENERGIZED

b. Go to Step 7.

c. Start one charging pump

d. Notify Engineering to inspect RCP thermal barrier CC piping

e. Return to procedure and step in effect and implement FR procedures as necessary

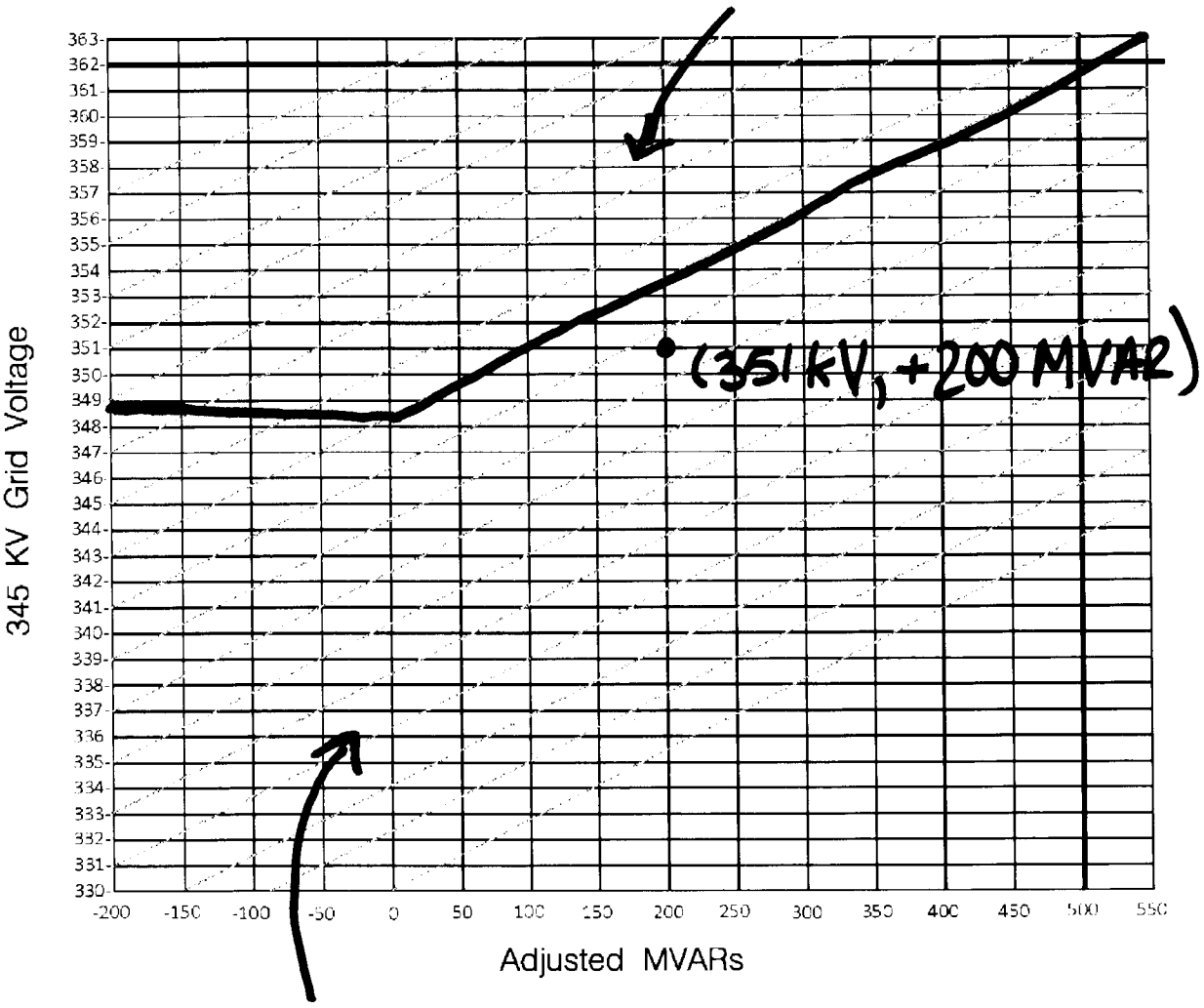
STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	**Attempt To Restore Power To Any Available Safeguards Bus From Unit 2:**	
	a. Check bus tie breakers for either bus - AVAILABLE:	
	1) SI actuated annunciator 47014-0604 - OFF	1) Reset Unit 1 SI.
	2) Unit 2 SI Pumps - BOTH OFF	2) Go to Step 8.
	3) Corresponding Unit 2 bus - ENERGIZED	3) Go to Step 8.
	b. Place source breakers for available bus to "PULLOUT":	
	1) 1R source	
	2) CT11 source	
	3) DG source	
	c. Check Unit 1 SI pump breaker(s) - OPEN	c. Manually open breaker(s).
	d. Close 4KV bus tie breakers for available bus:	d. Go to Step 8.
	1) Unit 2 bus tie breaker	
	2) Unit 1 bus tie breaker	
	e. Check safeguards buses - AT LEAST ONE ENERGIZED	e. Go to Step 8.
	f. Start one charging pump	
	g. Notify Engineering to inspect RCP thermal barrier CC piping	
	h. Return to procedure and step in effect and implement FR procedures as necessary	

Figure 5 345 kV Grid Operating Curves - All 345 kV Lines in Service, Template

Setpoint 101.1 % 348.6 kV (from Table 1)

NOTE:	**With both generators in service, the adjusted MVAR received can be extrapolated to -400 MVAR.**

Track Operating Point ***ACCEPTABLE REGION***



UNACCEPTABLE REGION

Curve Applies:

From: _____ (Date, Time)
To: _____ (Date, Time)

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources-Operating

LCO 3.8.1 The following AC electrical sources shall be OPERABLE:

a. Two paths between the offsite transmission grid and the onsite 4 kV Safeguards Distribution System; and

b. Two diesel generators (DGs) capable of supplying the onsite 4 kV Safeguards Distribution System.

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

ACTIONS

----------NOTE----------
LCO 3.0.4.b is not applicable to DGs.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required path inoperable.	A.1 Perform SR 3.8.1.1 for the OPERABLE path. AND	1 hour AND Once per 8 hours thereafter

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 Restore path to OPERABLE status.	7 days AND 21 days from discovery of failure to meet LCO
B. One DG inoperable.	B.1 Perform SR 3.8.1.1 for the paths.	1 hour AND Once per 8 hours thereafter
	AND	
	B.2 Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)
	AND	

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.3.1 Determine OPERABLE DG is not inoperable due to common cause failure. OR B.3.2 Perform SR 3.8.1.2 for OPERABLE DG. AND B.4 Restore DG to OPERABLE status.	24 hours 24 hours 14 days AND 21 days from discovery of failure to meet LCO

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Two paths inoperable.	C.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable. AND C.2 Restore one path to OPERABLE status.	12 hours from discovery of Condition C concurrent with inoperability of redundant required features 24 hours
D. One path inoperable. AND One DG inoperable.	----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems-Operating," when Condition D is entered with no AC power source to either train. ---------- D.1 Restore path to OPERABLE status. OR D.2 Restore DG to OPERABLE status.	 12 hours 12 hours

Table 2.2 Radioactive Liquid Effluent Monitoring Instrumentation

With less than the minimum number of radioactive liquid effluent monitoring instrumentation channels FUNCTIONAL, take the actions directed in Table 2.2. Restore the non-functional instrumentation to FUNCTIONAL status within 30 days. If instrumentation is not restored within 30 days, explain in the next Annual Radioactive Effluent Release Report, why this non-functionality was not corrected in a timely manner.

INSTRUMENT	MINIMUM CHANNELS FUNCTIONAL	APPLICABILITY	ACTION
1. Gross Radioactivity Monitors Providing Automatic Termination of Release			
a. Liquid Radwaste Effluent Line	1	During releases	1
b. Steam Generator Blowdown Effluent Line	1/Unit	During releases	2
2. Flow Rate Measurement Devices			
a. Liquid Radwaste Effluent Line	1	During releases requiring throttling of flow	4
b. Steam Generator Blowdown Flow	1/Gen	During releases	4
3. Continuous Composite Samplers			
a. Each Turbine Building Sump Effluent Line	1/Unit	During releases	3
4. Discharge Canal Monitor	1	At all times	6
5. Tank Level Monitor			
a. Condensate Storage Tanks	1/Unit	When containing radioactive material	5
b. Temporary Outdoor Tanks Holding Radioactive Liquid	1/Tank	When tanks are in use	5
6. Discharge Canal Flow System (Daily determination and following changes in flow)	NA	At all times	

Table 2.2 Radioactive Liquid Effluent Monitoring Instrumentation

Table Notations

ACTION 1 With the number of channels FUNCTIONAL less than required by the Minimum Channels FUNCTIONAL requirement, effluent releases via this pathway may continue, provided that prior to initiating a release:

a. At least two independent samples are analyzed in accordance with Specification 2.2.1, and

b. At least two technically qualified members of the Facility Staff independently verify the release rate calculations and discharge line valving.

Otherwise, suspend release of radioactive effluents via this pathway.

ACTION 2 With the number of channels FUNCTIONAL less than required by the Minimum Channels FUNCTIONAL requirement, effluent releases via this pathway may continue provided grab samples are analyzed for radioactivity at a lower limit of detection of not more than that specified in Table 2.1 for Principal Gamma Emitters.

1. At least once per 12 hours when the specific activity of the secondary coolant is $\geq$0.01 µCi/gram DOSE EQUIVALENT I-131, or
2. At least once per 24 hours when the specific activity of the secondary coolant is <0.01 µCi/gram DOSE EQUIVALENT I-131.

ACTION 3 With the number of channels FUNCTIONAL less than required by the Minimum Channels FUNCTIONAL requirement, effluent releases via this pathway may continue provided that at least once per 12 hours, grab samples are collected and saved for weekly composition and analysis in accordance with Table 2.1.

ACTION 4 With the number of channels FUNCTIONAL less than required by the Minimum Channels FUNCTIONAL requirement, effluent releases via this pathway may continue provided that the flow rate is estimated at least once per four (4) hours during actual releases. Pump curves may be used to estimate flow.

ACTION 5 With the number of channels FUNCTIONAL less than required by the Minimum Channels FUNCTIONAL requirement, effluent releases via this pathway may continue provided that tank liquid level is estimated during all liquid additions.

ACTION 6 With the number of channels FUNCTIONAL less than required by the Minimum Channels FUNCTIONAL requirement, effluent releases via this pathway may continue provided that, at least once per 12 hours, grab samples are collected and analyzed for gamma emitters.

C	LOSS OF COOLING WATER RETURN HEADER	NUMBER: C35 AOP6
		REV: 14
		Page 1 of 20

REFERENCE USE
• ***Procedure segments may be performed from memory.***
• ***Use the procedure to verify segments are complete.***
• ***Mark off steps within segment before continuing.***
• ***Procedure should be available at the work location.***

TABLE OF CONTENTS

LIST OF FIGURES

C	LOSS OF COOLING WATER RETURN HEADER	NUMBER: C35 AOP6
		REV: 14
		Page 3 of 20

1.0 PURPOSE

This procedure describes the symptoms and the actions to be taken in the event of a blockage or failure of the cooling water return header.

NOTE:	**This AOP is for both units. The Shift Supervisor of the affected unit SHALL be responsible for implementation of this AOP.**

2.0 PROCEDURES

2.1 Symptoms

2.1.1 Containment fan coil cooling water low flow alarms.

2.1.2 High containment fan coil cooling water outlet pressure.

2.1.3 Decrease in cooling water flow.

2.1.4 Increase in cooling water pressure.

2.1.5 Reported leakage or flooding from return header.

2.1.6 Inadequate cooling of various components.

2.2 Automatic Actions

NONE

2.3 Immediate Manual Actions

NONE

CAUTION:	**IF ADEQUATE COOLING WATER FLOW CANNOT BE MAINTAINED TO PREVENT EQUIPMENT DAMAGE DUE TO OVERHEATING, THEN ENTER C35 AOP1 OR C35 AOP2 TO SHUTDOWN EQUIPMENT AND ISOLATE THE SUPPLY HEADER.**

2.4 Determine Appropriate Procedure Section for Plant Conditions

2.4.1 For major leakage in the return header (flooding concern), **go** to Section 2.5. _____

2.4.2 For minor leakage in the return header, **go** to Section 2.6. _____

2.4.3 For blockage of the return header, **go** to Section 2.7. _____

2.5 Major Leakage of the Return Header (flooding concern)

2.5.1 **Notify** the Turbine Building and/or Auxiliary Building operators of the leakage and **instruct** them to investigate. _____

2.5.2 **Determine** if the leak is in the Aux Building or Turbine Building, upstream or downstream of **MV-32332** or **MV-32334**, 11 or 21 AUX BLDG CLG WTR RTRN HDR ISOL MVs. _____

2.5.3 **Verify** local evacuation of the affected area (Turbine Building / Auxiliary Building) has been initiated per F3-9, Emergency Evacuation. _____

2.5.4 WHEN the location of the leak is determined, THEN **isolate** per the appropriate Step listed below:

- A Header upstream of **MV-32332**, **perform** Step 2.5.5. _____
- B Header upstream of **MV-32334**, **perform** Step 2.5.6. _____
- A Header downstream of **MV-32332**, **perform** Step 2.5.7. _____
- B Header downstream of **MV-32334**, **perform** Step 2.5.8. _____

NOTE:	To efficiently isolate a leaking or ruptured return header, the following steps may be performed out of written order and concurrently if necessary.

2.5.5 IF the leak is upstream of **MV-32332**, 11 AUX BLDG CLG WTR RTRN HDR ISOL MV, THEN **isolate** flow in A Header as follows:

A. IF **MV-32334**, 21 AUX BLDG CLG WTR RTRN HDR ISOL MV, is CLOSED AND **MV-32329**, LOOP A/B CLG WTR RTRN HDR XOVER MV B, is OPEN to provide a Loop B return header flow path, THEN **OPEN MV-32038,** CLG WTR DUMP MV, using **CS-46042**. _____

B. **Verify MV-32322**, LOOP A/B CLG WTR RTRN HDR XOVR MV A, is CLOSED using **CS-46034**. _____

C. **Verify**, 12, 14, 22 and 24 CFCUs aligned to "GAP/SUPPORT" position and running in "FAST" speed per 1C19.2 [2C19.2], Alternating Containment Ventilation Equipment. _____

D. **CLOSE** the cooling water return isolation valves for A Train FCUs:

- **MV-32133**, 11 FC CLG WTR RTRN ISOL MV B, using **CS-46014**. _____
- **MV-32139**, 13 FC CLG WTR RTRN ISOL MV B, using **CS-46015**. _____
- **MV-32148**, 21 FC CLG WTR RTRN ISOL MV B, using **CS-46545**. _____
- **MV-32154**, 23 FC CLG WTR RTRN ISOL MV B, using **CS-46546**. _____

E. **Start** 12 CC Pump using **CS-46037**. _____

(Step 2.5.5 continued from previous page…)

NOTE:	When stopping the CC pump, hold the control switch in the "STOP" position until CC System pressure stabilizes above 75 psig.

F. **Stop** 11 CC Pump using **CS-46036**. _____

G. **CLOSE MV-32145**, 11 CC HX CLG WTR INLT, using **CS-46044**. _____

H. **Start** 22 CC Pump using **CS-46540**. _____

NOTE:	When stopping the CC pump, hold the control switch in the "STOP" position until CC System pressure stabilizes above 75 psig.

I. **Stop** 21 CC Pump using **CS-46539**. _____

J. **CLOSE MV-32160**, 21 CC HX CLG WTR INLT, using **CS-46517**. _____

K. **Start** 122 Control Room Chiller, using **CS-46076**. _____

L. **Stop** 121 Control Room Chiller using **CS-46068** and **place** in "PULLOUT." _____

M. **Place CS-46935**, D1 DSL GEN START/STOP, in "PULLOUT." _____

N. **Place MCC 1K1-F3** (**BKR 111J-28**), 11 AUX BLDG CLG WTR RTRN HDR ISOL MV-32332, to "ON." _____

O. **CLOSE MV-32332**, 11 AUX BLDG CLG WTR RTRN HDR ISOL MV, using **CS-46045**. _____

(Step 2.5.5 continued from previous page. . .)

P. Locally **isolate** other Aux Bldg cooling water loads:

- Area Heat Removal System _____
- Pump motor unit coolers _____
- 11 SGB HX _____

Q. IF conditions permit, THEN **place** in **"**OFF" the breakers for the motor valves CLOSED in Step 2.5.5.

- **MCC 1T1-A4**, LOOP A/B CLG WTR RTRN HDR MV-32322. _____
- **MCC 1LA1-C3**, 13 FCU CLG WTR RTRN ISOL MV-32139. _____
- **MCC 2LA1-B3**, 23 FCU CLG WTR OUTLET ISOL B MV-32154. _____
- **MCC 1L1-D1**, 11 FCU CLG WTR RTRN ISOL MV-32133. _____
- **MCC 2L1-C1**, 21 FCU CLG WTR RTRN ISOL B MV-32148. _____
- **MCC 1K1-B3**, 11 CC HX CLG WTR MV-32145. _____
- **MCC 2K1-B3**, 21 CC HX CLG WTR INLET MV-32160. _____
- **MCC 1K1-F3**, 11 AUX BLDG CLG WTR RTRN HDR ISOL MV-32332. _____

NOTE:	To efficiently isolate a leaking or ruptured return header, the following steps may be performed out of written order and concurrently if necessary.

2.5.6 IF the leak is upstream of **MV-32334**, 21 AUX BLDG CLG WTR RTRN HDR ISOL MV, THEN **isolate** flow in B Header as follows:

A. IF **MV-32332**, 11 AUX BLDG CLG WTR RTRN HDR ISOL MV, is CLOSED AND **MV-32322**, LOOP A/B CLG WTR RTRN HDR XOVER MV A, is OPEN to provide Loop A a return header flow path, THEN **OPEN MV-32038**, CLG WTR DUMP MV, using **CS-46042**. _____

B. **Verify MV-32329**, LOOP A/B CLG WTR RTRN HDR XOVR MV B, is CLOSED using **CS-46516**. _____

C. **Verify**, 11, 13, 21 and 23 CFCUs aligned to "GAP/SUPPORT" position and running in "FAST" speed per 1C19.2 [2C19.2], Alternating Containment Ventilation Equipment.. _____

D. **CLOSE** the cooling water return isolation valves for B Train FCUs:

- **MV-32136**, 12 FC CLG WTR RTRN ISOL MV B, using **CS-46016**. _____
- **MV-32142**, 14 FC CLG WTR RTRN ISOL MV B, using **CS-46017**. _____
- **MV-32151**, 22 FC CLG WTR RTRN ISOL MV B, using **CS-46547**. _____
- **MV-32157**, 24 FC CLG WTR RTRN ISOL MV B, using **CS-46548**. _____

E. **Start** 11 CC Pump using **CS-46036**. _____

(Step 2.5.6 continued from previous page. . .)

NOTE:	When stopping the CC pump, hold the control switch in the "STOP" position until CC System pressure stabilizes above 75 psig.

F. **Stop** 12 CC Pump using **CS-46037**. _____

G. **CLOSE MV-32146**, 12 CC HX CLG WTR INLT, using **CS-46047**. _____

H. **Start** 21 CC Pump using **CS-46539**. _____

NOTE:	When stopping the CC pump, hold the control switch in the "STOP" position until CC System pressure stabilizes above 75 psig

I. **Stop** 22 CC Pump using **CS-46540**. _____

J. **CLOSE MV-32161**, 22 CC HX CLG WTR INLT, using **CS-46520**. _____

K. **Start** 121 Control Room Chiller using **CS-46068**. _____

L. **Stop** 122 Control Room Chiller using **CS-46076.** _____

M. **Place CS-46076** in "PULLOUT." _____

N. **Place CS-46930**, D2 DSL GEN START/STOP, in "PULLOUT." _____

O. **Place MCC 2K2-B3** (**BKR 221J-3**), 21 AUX BLDG CLG WTR RTRN HDR ISOL MV-32334, to "ON." _____

P. **CLOSE MV-32334**, 21 AUX BLDG CLG WTR RTRN HDR ISOL MV, using **CS-46573**. _____

(Step 2.5.6 continued from previous page. . .)

Q. Locally **isolate** other Aux Bldg cooling water loads:

- Area Heat Removal System _____
- Pump motor unit coolers _____
- 21 SGB HX _____

R. IF conditions permit, THEN **place** in **"**OFF" the breakers for the motor valves CLOSED in Step 2.5.6.

- **MCC 1T2-A4**, LOOP A/B CLG WTR RTRN HDR XOVR MV-32329. _____
- **MCC 2LA2-A4**, 24 FCU CLG WTR RTRN ISOL B MV-32157. _____
- **MCC 1L2-B2**, 12 FCU CLG WTR RTRN ISOL MV-32136. _____
- **MCC 1L2-E3**, 14 FCU CLG WTR RTRN ISOL MV-32142. _____
- **MCC 2L2-B2**, 22 FCU CLG WTR RTRN ISOL B MV-32151. _____
- **MCC 1K2-A5**, 12 CC HT EXGR CLG WTR MV-32146. _____
- **MCC 2K2-D5**, 22 CC HX CLG WTR INLET MV-32161. _____
- **MCC 2K2-D3**, 21 AUX BLDG CLG WTR RTRN HDR ISOL MV-32334. _____

NOTE:	To efficiently isolate a leaking or ruptured return header, the following steps may be performed out of written order and concurrently if necessary.

2.5.7 IF the leak is downstream of **MV-32332**, 11AUX BLDG CLG WTR RTRN HDR ISOL MV, THEN **isolate** flow in A Header as follows:

A. **OPEN MV-32322**, LOOP A/B CLG WTR RTRN HDR XOVER VLV A, using **CS-46034**.

NOTE:	If available, Loop B Cooing Water Return Header is the preferred flow path.

B. **Align** Loop A Cooling Water Return Header using one of the following return header flow paths: (**NA** path not used).

- To align to Loop B Cooling Water Return Header, **OPEN MV-32329**, LOOP A/B CLG WTR RTRN HDR XOVER VLV B, using **CS-46516**

OR

- To align to cooling water dump to grade, **OPEN MV-32038**, CLG WTR DUMP MV, using **CS-46042**.

C. **Place MCC 1K1-F3** (**BKR 111J-28**), 11 AUX BLDG CLG WTR RTRN HDR ISOL MV-32332, to “ON.”

D. **CLOSE MV-32332**, 11 AUX BLDG CLG WTR RTRN HDR ISOL MV, using **CS-46045**.

E. **Trip** the Unit 1 Reactor, THEN **initiate** 1E-0, Reactor Trip or Safety Injection, AND **complete** the remaining steps of this procedure.

(Step 2.5.7 continued from previous page. . .)

F. **Stop** the Unit 1 feedwater pumps and **place** the following switches in "PULLOUT"

- **CS-46418**, 11 FW PMP _____
- **CS-46419**, 12 FW PMP _____

G. **Place** Unit 1 Condensate pumps in "MANUAL":

- **CS-46435**, 11 COND PUMP MANUAL/STBY _____
- **CS-46436**, 12 COND PUMP MANUAL/STBY _____
- **CS-46437**, 13 COND PUMP MANUAL/STBY _____

H. **Stop** the Unit 1 condensate pumps and **place** the following switches in "PULLOUT"

- **CS-46410**, 11 CD PMP _____
- **CS-46411**, 12 CD PMP _____
- **CS-46412**, 13 CD PMP _____

I. **Stop** the Unit 1 heater drain pumps and **place** the following switches in "PULLOUT"

- **CS-46481**, 11 HD PMP START/STOP CS _____
- **CS-46482**, 12 HD PMP START/STOP CS _____
- **CS-46483**, 13 HD PMP START/STOP CS _____

J. **CLOSE MV-32031**, 1 TURB BLDG CLG WTR HDR, using **CS-46038**. _____

K. **OPEN MV-32349**, UNIT 1 A CDSR VACUUM BKR, and **MV-32052**, UNIT 1 B CDSR VACUUM BKR, using **CS-46397**. _____

L. **Purge** hydrogen from Unit 1 Generator per 1C22.1 AOP1, Loss of Turbine-Generator Seal Oil System. _____

M. **CLOSE MV-32371**, 11/12 TURB OIL CLR CLG WTR B-P, using **CS-46041**. _____

NOTE:	To efficiently isolate a leaking or ruptured return header, the following steps may be performed out of written order and concurrently if necessary.

2.5.8 IF the leak is downstream of **MV-32334**, 21 AUX BLDG CLG WTR RTRN HDR ISOL MV, THEN **isolate** flow in B Header as follows:

A. **OPEN MV-32329**, LOOP A/B CLG WTR RTRN HDR XOVER VLV B, using **CS-46516**. _____

NOTE:	If available, Loop A Cooling Water Return Header is the preferred flow path.

B. **Align** Loop B Cooling Water Return Header using one of the following return header flow paths: (**NA** path not used).

- To align to Loop A Cooling Water Return Header, **OPEN MV-32322**, LOOP A/B CLG WTR RTRN HDR XOVER VLV A, using **CS-46034** _____

OR

- To align to Cooling Water Dump to Grade, **OPEN MV-32038**, CLG WTR DUMP MV, using **CS-46042**. _____

C. **Place MCC 2K2-B3** (**BKR 221J-3**), 21 AUX BLDG CLG WTR RTRN HDR ISOL MV-32334, to "ON." _____

D. **CLOSE MV-32334**, 21 AUX BLDG CLG WTR RTRN HDR ISOL MV, using **CS-46573**. _____

E. **Trip** the Unit 2 Reactor, THEN **initiate** 2E-0, Reactor Trip or Safety Injection, AND **complete** the remaining steps of this procedure. _____

(Step 2.5.8 continued from previous page. . .)

F. **Stop** the Unit 2 feedwater pumps, and **place** the following switches in "PULLOUT"

- **CS-46779**, 21 FW PMP _____
- **CS-46780**, 22 FW PMP _____

G. **Place** Unit 2 Condensate pumps in "MANUAL":

- **CS-46846**, 21 CONDENSATE PMP SEL _____
- **CS-46847**, 22 CONDENSATE PMP SEL _____
- **CS-46848**, 23 CONDENSATE PMP SEL _____

H. **Stop** the Unit 2 condensate pumps, and **place** the following switches in "PULLOUT"

- **CS-46787**, 21 CD PMP _____
- **CS-46788**, 22 CD PMP _____
- **CS-46789**, 23 CD PMP _____

I. **Stop** the Unit 2 heater drain pumps, and **place** the following switches in "PULLOUT"

- **CS-46872**, 21 HD PMP START/STOP CS _____
- **CS-46873**, 22 HD PMP START/STOP CS _____
- **CS-46874**, 23 HD PMP START/STOP CS _____

J. **CLOSE MV-32033**, 2 TURB BLDG CLG WTR HDR, using **CS-46515**. _____

K. **OPEN MV-32350**, UNIT 2 A CDSR VACUUM BKR, and **MV-32053**, UNIT 2 B CDSR VACUUM BKR, using **CS-46794**. _____

L. **Purge** hydrogen from Unit 2 Generator per 2C22.1 AOP1, Loss of Turbine-Generator Seal Oil System. _____

M. **CLOSE MV-32372**, 21/22 TURB OIL CLR CLG WTR B-P, using **CS-46518**. _____

(Step 2.5.8 continued from previous page. . .)

N. **Stop** 11 and 21 Containment Chiller units, per C37.13, Containment and Auxiliary Building Cooling System. _____

O. **CLOSE CL-114-1**, 11/21 CNTMT & AUX BLDG CHLR CLG WTR SPLY. _____

2.5.9 IF **MV-32038**, CLG WTR DUMP MV, was OPENED, THEN **inspect** the west side of the plant and adjacent buildings to assess any flood damage. _____

2.5.10 **Go** to Section 2.8. _____

2.6 Minor Leakage of the Return Header

2.6.1 **Determine** if the leak is on the header side or the component side of the component outlet isolation valve. _____

2.6.2 **Notify** the Turbine Building and/or Auxiliary Building operators of the leakage and **instruct** them to investigate. _____

2.6.3 IF the leak is on the component side of the isolation valve AND the units can operate with the component isolated, THEN **isolate** the supply and return for the affected component. _____

2.6.4 IF the component is needed for plant operation OR the leak is in the main return header, THEN **consult** with engineering staff and H10.2, Temporary Non-Code Repair of ASME Code Class 1, 2, or 3 Piping, to evaluate continued operation with the leak. _____

2.6.5 **Consult** with plant engineering and H10.2 to initiate temporary repairs to the leak. _____

2.6.6 WHEN temporary repairs have been completed AND after the completion of an engineering evaluation per H10.2, THEN **return** the affected component or header to normal operation. _____

2.7 Blockage of the Return Header

2.7.1 **Identify** the blocked header if the fan coil units are on cooling water:

A. **Check** for low flow conditions on 11, 13, 21, and 23 Fan Coil Units. _____

B. IF flow is low AND FCU outlet pressure is high THEN, A Return Header is blocked. _____

C. **Check** for low flow conditions on 12, 14, 22, and 24 Fan Coil Units. _____

D. IF flow is low AND FCU outlet pressure is high THEN, B Return Header is blocked. _____

2.7.2 **Identify** the blocked header if the fan coil units are on chilled water:

A. For A Header:

1. Loop A Supply Header reduced flow
2. Loop A Supply Header pressure increase
3. 11 CC HX low flow or high temperature
4. 21 CC HX low flow or high temperature
5. 11 bus duct cooling low flow
6. Unit 1 turbine oil high temperature _____

B. For B Header:

1. Loop B Supply Header reduced flow
2. Loop B Supply Header pressure increase
3. 12 CC HX low flow or high temperature
4. 22 CC HX low flow or high temperature
5. 21 bus duct cooling low flow
6. Unit 2 turbine oil high temperature _____

2.7.3 **Establish** discharge flow path:

A. **OPEN MV-32322**, LOOP A/B CLG WTR RTRN HDR XOVER VLV A, using **CS-46034**. _____

B. **OPEN MV-32329**, LOOP A/B CLG WTR RTRN HDR XOVER VLV B, using **CS-46516**. _____

C. **Monitor** FCU cooling water flows and heat exchanger temperatures. IF flow is low OR temperature cannot be maintained, THEN:

1. **CLOSE** the cooling water crossover valve for the unaffected header in order to allow flow on the blocked header through the other crossover valve and out the dump valve:

- **MV-32322**, LOOP A/B CLG WTR RTRN HDR ISOL XOVER VLV A, using **CS-46034**. _____

OR

- **MV-32329**, LOOP A/B CLG WTR RTRN HDR ISOL XOVER VLV B, using **CS-46516**. _____

2. **OPEN MV-32038**, CLG WTR DUMP MV, using **CS-46042**. _____

3. **Inspect** the west side of the plant and adjacent buildings to assess any flood damage. _____

2.7.4 **Go** to Section 2.8. _____

2.8 Recovery Actions

2.8.1 **Refer** to the appropriate T.S. for Loss of a Cooling Water Header or inoperability of safeguards equipment. _____

2.8.2 **Consult** with plant engineering staff for additional guidance. _____

3.0 ATTACHMENTS

Figure 1 - Simplified Cooling Water System Flow Drawing

4.0 REFERENCES

4.1 Developmental References

NONE

4.2 Implementing References

4.2.1 1E-0, Reactor Trip or Safety Injection

4.2.2 1C22.1 AOP1, Loss of Turbine-Generator Seal Oil System

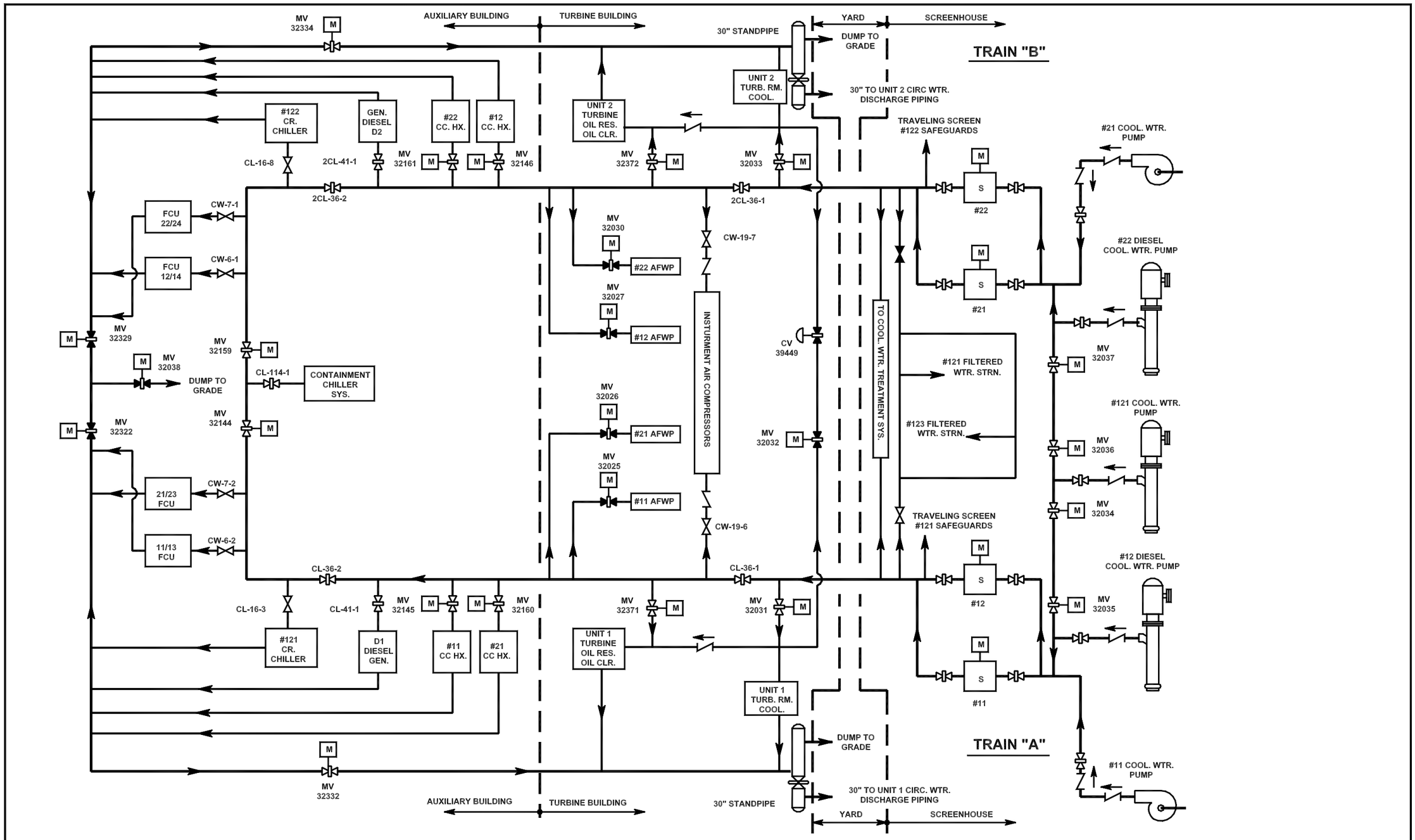
4.2.3 2E-0, Reactor Trip or Safety Injection

4.2.4 2C22.1 AOP1, Loss of Turbine-Generator Seal Oil System

4.2.5 H10.2, Temporary Non-Code Repair of ASME Code Class 1, 2, or 3 Piping

4.2.6 C37.13, Containment and Auxiliary Building Cooling System

Figure 1Simplified Cooling Water Flow Drawing



PRAIRIE ISLAND NUCLEAR PLANT RED WING, MINNESOTA	SIMPLIFIED COOLING WATER FLOW DIAG.	DRAWN BY: KORY KREISLER DATE: 3-25-01	C35 AOP6

Attachment A
Immediate Local Evacuation Prior to Classification

a. **DETERMINE** assembly points using the table below as general guidance.

LOCAL EVACUATION FROM THESE AREAS	NORMAL WORK HOURS AND OUTAGE ASSEMBLY AREA FOR ACCOUNTABILITY	OFF HOURS NON-OUTAGE ASSEMBLY AREA FOR ACCOUNTABILITY
Containment/Spent Fuel Pool	Dress Out Area	Dress Out Area
Aux Bldg	Access Control HP Office	Operational Support Center (OSC) or Security Building (Guardhouse)
Old Admin Turb Bldg New Admin NPD SBO Office Trailers Contractor Fab Shop Warehouse # 1 Contractor Trailers	Initiate Plant Evacuation and go to Step c.	

b. IF NOT evacuating plant, THEN **proceed** as follows:

i. **SOUND** the EVACUATION ALARM.

ii. **ANNOUNCE** the following over the plant page.

"ATTENTION ALL PLANT PERSONNEL. THERE IS A _____ (hazard)

OCCURING IN _____ (specify affected area). ALL PERSONNEL SHOULD

EVACUATE THE _____ (specify affected area) USING THE NEAREST SAFE EXIT

AND ASSEMBLE AT THE _____ (assembly area)

iii. **REPEAT** the announcement.

Attachment A
Immediate Local Evacuation Prior to Classification

CAUTION:	**IF HAZARDOUS WIND CONDITIONS EXIST ONSITE, CONSIDER DELAYING PLANT EVACUATION UNTIL IT IS SAFE FOR PLANT PERSONNEL ACCORDING TO AB-2 - TORNADO / SEVERE THUNDERSTORM / HIGH WINDS PROCEDURE.**

c. IF initiating a Plant Evacuation, THEN **proceed** as follows:

i. **Sound** the evacuation siren (5 seconds).

ii. **Announce** the following on the PA system:

NOTE:	**During drills, the announcement should begin and end with "THIS IS A DRILL".**

INITIAL TIME

"ATTENTION ALL PLANT PERSONNEL, THERE IS A _____
(hazard)

OCCURING IN _____. ALL PERSONNEL
(specify affected area)

SHOULD EVACUATE AND ASSEMBLE AT THE DISTRIBUTION CENTER.

iii. **Repeat** the announcement.

d. **DIRECT** security (4318) to conduct Personnel Accountability using F3-10 - Personnel Accountability procedure as guidance.

_____ _____ **e.** **Direct** the SEC to start the completion of the notification report form (If desired, one may use the electronic PINGP 577 - Emergency Notification Report Form, which is available via PI Emergency Planning Web page. Reference F3-5 - Emergency Notifications procedure).

5. The CRM risk meter performs real time integration of ICDP/ILERP and displays the date at which the next risk management action level will be reached. When CDF/LERF is below the CDF/LERF RESET value, cumulative risk is not tracked, and therefore time spent in the configuration is unlimited.

Table 1: Risk Management Thresholds, Action Levels, Approval and Required Actions

CD/ LER Risk Threshold	Risk Management Action Level	Risk Management Action	Approval Authority
ICDP < 1E-6 ILERP < 1E-7	GREEN	Normal Work Controls	N/A
1E-6 ≤ ICDP < 5E-6 1E-7 ≤ ILERP < 5E-7	YELLOW	Implement Level 1 Risk Management Actions	Shift Manager
5E-6 ≤ ICDP < 1E-5 5E-7 ≤ ILERP < 1E-6	ORANGE	Implement Level 2 Risk Management Actions	Plant Manager
ICDP ≥ 1E-5 ILERP ≥ 1E-6 CDF > 1E-3 LERF > 1E-4	RED	Configuration not entered voluntarily	No voluntary entry

Table 2: CRM Software, PRF Risk Meter Guidance

PRF Region	Guidance
1	Below minimum CDF/LERF threshold
2	***Greater than*** 3 days to RMA YELLOW*
3	***Less than*** 3 days to RMA YELLOW*
4	RMA RED, maximum CDF/LERF exceeded

*From start of evolution, assuming constant PRF

6. Fire risk is presented separately from ICDP/ICLERP as monitored SFATS, or safety-function-assessment-tree. The fire risk is computed through quantitative evaluation of the separate FPRA (Fire PRA) model and translated to a Fire Risk Action Level. When the fire risk safety function shows an elevated risk, additional fire risk insights are considered and FRMA's (Fire RMA's) are considered implemented.

7. The Status Panel “Fire Risk Duration” buttons track the duration of configurations which enter into the YELLOW fire-risk region for CD and LER. After 72 hours, in either condition additional RMA's are required.

C	LOSS OF INSTRUMENT AIR	NUMBER: C34 AOP1 REV: 20 Page 1 of 36

CONTINUOUS USE
• ***Continuous use of procedure required.*** • ***Read each step prior to performing.*** • ***Mark off steps as they are completed.*** • ***Procedure SHALL be at the work location.***

PORC REVIEW DATE:	APPROVAL:
4/21/2016	**PCR #: 01537153**

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ATTACHMENTS

1.0 PURPOSE

This procedure provides guidance to assist in responding to a partial or complete loss of the Instrument Air supply.

Since the Instrument Air System is routed throughout all areas of the plant and relatively exposed, the potential for localized areas of air supply pressure loss is high if malfunctions or line breakage occurs. The developmental philosophy used in writing this procedure is to accomplish the following:

1.1 Verify the operation of or restore the air supply system.

1.2 Identify and isolate leakage.

1.3 Identify affected systems and mitigate the effect.

2.0 PROCEDURES

2.1 Symptoms

2.1.1 Complete Loss of Instrument Air

- Annunciator **47023-0502**, INSTR AIR HEADER LO PRESS.
- High air flow indication on Unit 1 or Unit 2 Instrument Air flow indicators.
- Standby air compressor auto/start.
- Low pressure indication on Unit 1 / Unit 2 Instrument Air headers, Auxiliary Building headers, Reactor Building headers, OR Screenhouse Instrument Air headers.
- Annunciator **47023-0101**, 121 AIR COMPRESSOR TROUBLE
- Annunciator **47023-0102**, 122 AIR COMPRESSOR TROUBLE
- Annunciator **47023-0103**, 123 AIR COMPRESSOR TROUBLE

M **2.1.2 Loss of Instrument Air to Containment**

NOTE:	**CV-31740 or CV-31741 failing CLOSED only affects IA to Unit 1 Containment.** **CV-31742 or CV-31743 failing CLOSED only affects IA to Unit 2 Containment.**

- ERCS Alarm OR valve CLOSED for:
  - **CV-31740** [**CV-31742**], 1[2] RX BLDG INSTR AIR ISOL CV

    OR
  - **CV-31741** [**CV-31743**], 1[2] RX BLDG INSTR AIR ISOL CV
- Loss of Letdown due to:
  - Letdown Isolation CV(s) failing CLOSED

    OR
  - Letdown Orifice CV(s) failing CLOSED
- Pressurizer level **INCREASING**
- **Increased** RCP stator temperature due to damper repositioning to DOME position with associated FCU in FAST speed.

2.2 Automatic Actions

2.2.1 Loss of Instrument Air to Entire System

- Standby Instrument Air Compressors sequence ON as Instrument Air Pressure decreases. ALL available Compressors will be running if pressure is below 88 psig.
- **MV-32318**, SERVICE AIR HDR ISOL VLV, CLOSES at 85 psig.
- **CV-31960** [**CV-31961**], 121 [122] INSTR AIR DRYER PRG EXHT ISOL CV, CLOSES at 82 psig.
- IF 121 Air Compressor is running, THEN **MV-32314**, INSTR AIR HDR ISOL VLV A, CLOSES at 80 psig.
- IF 123 Air Compressor is running, THEN, **MV-32315**, INSTR AIR HDR ISOL VLV B, CLOSES at 80 psig.
- IF the associated unit air header pressure decreases to 78 psig, THEN **MV-32362** [**MV-32363**], 121 [122] FILTER DRYER BYPASS, OPENS.

M

2.2.2 Loss of Instrument Air to Containment

NOTE:	**ALL Air Operated Control Valves with accumulators have a limited number of strokes.**

- ALL affected Unit's Air Operated Dampers and Control Valves in Containment without accumulators Reposition to Fail Position.
- The following will occur:
  - Loss of Letdown
  - Loss of Pressurizer Spray (Bypass will remain Throttled)
  - Loss of Charging to Regen HX
  - Loss of Excess Letdown

2.3 Immediate Manual Actions

NONE

2.4 Subsequent Manual Actions

2.4.1 IF a manual OR automatic reactor trip occurs during the performance of this procedure, THEN **initiate** 1[2]E-0, Reactor Trip or Safety Injection, as appropriate, AND **complete** the remaining steps of this procedure. _____

2.4.2 **Announce** over the plant paging system:

"ATTENTION ALL PLANT PERSONNEL. WE ARE EXPERIENCING ABNORMAL INSTRUMENT AIR PRESSURE. PLEASE STOP ALL USE OF STATION AIR UNTIL FURTHER NOTICE." _____

2.4.3 **Repeat** the announcement. _____

2.4.4 **Determine** extent of Instrument Air Loss and **perform** appropriate section:

√	Symptoms	Perform
	Loss of Instrument Air to Entire System • **47023-0502**, INSTR AIR HEADER LO PRESS, ILLUMINATED • Low pressure indicated on Unit 1[2] Instrument Air Headers • Low Pressure on Aux Building Header • High Air Flow Unit 1[2] Instrument Air Header	2.4.5
	Loss of Instrument Air to Unit 1 Containment ERCS or Control Board Indicates • **CV-31740**, 1 RX BLDG INSTR AIR ISOL CV, CLOSED • **CV-31741**, 1 RX BLDG INSTR AIR ISOL CV, CLOSED	2.5
	Loss of Instrument Air to Unit 2 Containment ERCS or Control Board Indicates • **CV-31742**, 2 RX BLDG INSTR AIR ISOL CV, CLOSED • **CV-31743**, 2 RX BLDG INSTR AIR ISOL CV, CLOSED	2.6

2.4.5 IF a Loss of Instrument Air to Entire System has occurred, THEN **verify** the following automatic actions have occurred.

- Standby Instrument Air Compressors sequence ON as Instrument Air Pressure decreases. ALL available Compressors will be running if pressure is below 88 psig.
- **MV-32318**, SERVICE AIR HDR ISOL VLV, CLOSES at 85 psig.
- **CV-31960** [**CV-31961**], 121 [122] INSTR AIR DRYER PRG EXHT ISOL CV, CLOSES at 82 psig.
- IF 121 Air Compressor is running, THEN **MV-32314**, INSTR AIR HDR ISOL VLV A, CLOSES at 80 psig.
- IF 123 Air Compressor is running, THEN, **MV-32315**, INSTR AIR HDR ISOL VLV B, CLOSES at 80 psig.
- IF the associated unit air header pressure decreases to 78 psig, THEN **MV-32362** [**MV-32363**], 121 [122] FILTER DRYER BYPASS, OPENS.

2.4.6 Locally **verify** proper operation of 124 & 125 Station Air compressors.

NOTE:	**The intent of the following step is to isolate the purge exhaust lines even if the dryer is operating properly. This will prevent a loss of ~100 CFM even under normal dryer operation.**

2.4.7 Manually **isolate** air dryers purge exhaust lines:

A. 121 Air Dryer, **CLOSE** either of the following:

1. **SA-65-1**, 121 INSTR AIR DRYER PURGE EXHT MANUAL ISOL. _____

   OR

2. **CV-31960**, 121 INSTR AIR DRYER PRG EXHT ISOL CV, by performing the following:

   a. **Place CS-7055301**, 121 INSTR AIR DRYER PRG EXHT PS 16480 B-P CS, in "MANUAL" _____

   b. **Place CS-7055302**, 121 INSTR AIR DRYER PRG EXHT CV-31960 OP/CL CS, to "CLOSE" _____

B. 122 Air Dryer, **CLOSE** either of the following:

1. **SA-65-2,** 122 INSTR AIR DRYER PURGE EXHT MANUAL ISOL _____

   OR

2. **CV-31961**, 122 INSTR AIR DRYER PRG EXHT ISOL CV, by performing the following:

   a. **Place CS-7055401**, 122 INSTR AIR DRYER PRG EXHT PS 16481 B-P CS, in "MANUAL" _____

   b. **Place CS-7055402**, 122 INSTR AIR DRYER PRG EXHT CV-31961 OP/CL CS, to "CLOSE" _____

2.4.8 While continuing with this procedure **perform** the following:

A. **Dispatch** operators to identify location of leak(s) using Figure 1 and Attachment A as guidance. _____

B. IF leaks are identified, THEN **refer** to the Air Junction Box Data Book OR Passport Reports Production/Work Management/WM-0109 Air Supply Report for isolation points and affected equipment lists. _____

C. WHEN the effects of isolating the air supply to the affected systems and components is understood, THEN **isolate** the air leak at the nearest available isolation valve. _____

2.4.9 Locally **verify** proper compressor and air dryer operation. _____

NOTE:	**The following step will supply air from 124/125 Air Compressors to the Instrument Air header between MV-32314 and MV-32315, either of which may have automatically CLOSED. A determination is necessary, depending on existing conditions, whether or not an attempt to REOPEN these valves is appropriate.**

2.4.10 **OPEN CP-40-7**, STATION AIR RECEIVER X-CONN TO INSTRUMENT AIR. _____

2.4.11 IF desired, THEN **OPEN** or **verify** OPEN **MV-32314** OR **MV-32315** using **CS-46129** and **CS-46130**, respectively. _____

N

NOTE:	**Valves shown in Attachment B are supplied through accumulators and will not immediately fail to their loss of air position.**

2.4.12 IF excessive air flow continues, THEN **perform** the following:

A. **Dispatch** operators to search for instrument air leaks. _____

B. WHILE continuing with this procedure, **refer** to Attachment A and Attachment C for guidance in mitigating the consequence of the malfunction. _____

C. WHEN leaks are identified, THEN **refer** to the Air Junction Box Data Book OR Passport Reports Production/Work Management/WM-0109 Air Supply Report for isolation points and affected equipment lists. _____

D. WHEN the effects of isolating the air supply to the affected systems and components is understood, THEN **isolate** the air leak at the nearest available isolation valve. _____

2.4.13 **Continue** to Section 2.7. _____

2.5 Loss of Instrument Air to Unit 1 Containment

NOTE:	**IF only CV-31740, 1 RX BLDG INSTR AIR ISOL CV, has failed, THEN consider bypassing with notice of enforcement discretion per FP-R-LIC-05.**

N

NOTE:	**Valves shown in Attachment B are supplied through accumulators and will not immediately fail to their loss of air position.**

2.5.1 **Refer** to Attachment C for guidance AND **continue** in this procedure. _____

2.5.2 **Verify** Reactor Makeup Controller in "AUTO". _____

2.5.3 IF VCT level is less than 17%, THEN **verify** automatic makeup has initiated. _____

2.5.4 **Verify** the following Letdown Orifice Isolation valves are CLOSED:

- **CV-31325**, 11 LETDOWN ORIFICE ISOL CV A, using **CS-46170** (40 gpm). _____
- **CV-31326**, 11 LETDOWN ORIFICE ISOL CV B, using **CS-46171** (40 gpm) _____
- **CV-31327**, 11 LETDOWN ORIFICE ISOL CV C, using **CS-46174** (80 gpm) _____

2.5.5 **Verify** the following Letdown Isolation valves are CLOSED:

- **CV-31226**, U1 LTDN LINE ISOL TRN A CV, using **CS-46165**. _____
- **CV-31255**, U1 LTDN LINE ISOL TRN B CV, using **CS-46133**. _____

2.5.6 **Verify CV-31328**, 11 REGEN HX CHG LINE TO RCS CV, failed CLOSED using **CS-46296**. _____

2.5.7 **Place** speed control for all operating charging pumps in "MANUAL". _____

2.5.8 IF two charging pumps are running, THEN **stop** one of the pumps as follows:

A. **Adjust** speed of charging pump to remain in service as necessary to maintain a seal injection flow of 6-10 gpm to each RCP. _____

B. **Reduce** speed of charging pump to be secured to minimum. _____

C. WHEN speed of charging pump to be secured is at minimum, THEN **stop** the desired charging pump. _____

2.5.9 IF only one charging pump is running, THEN **adjust** charging pump speed to maintain seal injection flow of 6-10 gpm to each RCP. _____

2.5.10 **Verify** pressurizer heaters group 1C is ON. _____

2.5.11 **Verify** the following pressurizer heaters are OFF:

- Group 1A _____
- Group 1B _____
- Group 1D _____
- Group 1E _____

2.5.12 **Place 1HC431K**, PRZR PRESS MASTER CONTROL, to "MANUAL". _____

NOTE:	**57.5% output on 1HC431K places group 1C HTRs to minimum.**

2.5.13 **Adjust 1HC431K** to approximately 57.5%. _____

CAUTION:	**EXCEEDING 2335 PSIG WILL LIFT THE PRZR PORV.**

2.5.14 Manually **cycle** pressurizer heaters ON and OFF OR **adjust 1HC431K**, PRZR PRESS MASTER CONTROL, as needed to maintain Pressurizer Pressure between 2200-2300 psig. _____

NOTE:	**PRT Rupture Disk will rupture after approximately three letdowns using the RCS Head Vent SVs when PRT pressure reaches approximately 100 psig.**

2.5.15 **Enter** 1C12.1 AOP4, Alternate Letdown Flowpaths, and Maintain Pressurizer Level Band of 30-50% while continuing this procedure. _____

NOTE:	**With only one charging pump in operation and in minimum speed to maintain 6-10 gpm seal injection to each RCP, the continuous boration affects will be delayed. Maximum flow rate will be approximately 12 gpm.**

CAUTION:	**WITH NO LETDOWN TO VCT, MANUAL MAKE-UPS TO THE VCT WILL NEED TO BE PERFORMED IN CONJUNCTION WITH CONTINUOUS BORATION DURING CONTROLLED SHUTDOWN.**

2.5.16 **Perform** a controlled shutdown using 1C1.4, Unit 1 Power Operation, while continuing with this procedure. _____

2.5.17 **Refer** to Attachment C for further guidance. _____

NOTE:	**With the associated FCU running in FAST speed, the damper will attempt to reposition to DOME but will NOT reposition due to the air force. This may aid in cooling the RCP Stators. Refer to C47015-0506[0507], 11[12] RCP Bearing/Stator Hi Temp, for actions required for high stator temperatures.**

2.5.18 **Monitor** RCP Stator Temperatures. _____

2.5.19 **Refer** to TS 3.4.16, RCS Leakage Detection Instrumentation, due to 1R11/12 sample path isolated. _____

2.5.20 **Refer** to TS 3.4.14, RCS Operational LEAKAGE, due to RCS Leakage from RCS Head Vent to PRT with the PRT Rupture Disc Ruptured. _____

2.5.21 IF the Rupture disk fails, THEN **enter** TS 3.0.3 as required by TS LCO 3.4.16 CONDITION D, due to inabilility of Sump A timers to identify RCS leakage. _____

2.5.22 **Refer** to TS 3.6.3, Containment Isolation Valves, due to failure of **CV-31740**, 1 RX BLDG INSTR AIR ISOL CV, OR **CV-31741**, 1 RX BLDG INSTR AIR ISOL CV. _____

2.5.23 **Continue** to Section 2.7. _____

2.6 Loss of Instrument Air to Unit 2 Containment

NOTE:	**IF only CV-31742, 2 RX BLDG INSTR AIR ISOL CV, has failed, THEN consider bypassing with notice of enforcement discretion per FP-R-LIC-05.**

N

NOTE:	**Valves shown in Attachment B are supplied through accumulators and will not immediately fail to their loss of air position.**

2.6.1 **Refer** to Attachment C for guidance AND **continue** in this procedure. _____

2.6.2 **Verify** Reactor Makeup Controller in "AUTO". _____

2.6.3 IF VCT level is less than 17%, THEN **verify** automatic makeup has initiated. _____

2.6.4 **Verify** the following Letdown Orifice Isolation valves are CLOSED:

- **CV-31347**, 21 LETDOWN ORIFICE ISOL CV A, using **CS-49522** (40 gpm). _____
- **CV-31348**, 21 LETDOWN ORIFICE ISOL CV B, using **CS-49521** (40 gpm). _____
- **CV-31349**, 21 LETDOWN ORIFICE ISOL CV C, using **CS-49537** (80 gpm). _____

2.6.5 **Verify** the following Letdown Isolation valves are CLOSED:

- **CV-31230**, U2 LTDN LINE ISOL TRN A CV, using **CS-49536** _____
- **CV-31279**, U2 LTDN LINE ISOL TRN B CV, using **CS-49667**. _____

2.6.6 **Verify CV-31420**, 21 REGEN HX CHG LINE TO RCS CV, failed CLOSED using **CS-49578**. _____

2.6.7 **Place** speed control for all operating charging pumps in "MANUAL". _____

2.6.8 IF two charging pumps are running, THEN **stop** one of the pumps as follows:

A. **Adjust** speed of charging pump to remain in service as necessary to maintain a seal injection flow of 6-10 gpm to each RCP. _____

B. **Reduce** speed of charging pump to be secured to minimum. _____

C. WHEN speed of charging pump to be secured is at minimum, THEN stop the charging pump. _____

2.6.9 IF only one charging pump is running, THEN **adjust** charging pump speed to maintain seal injection flow of 6-10 gpm to each RCP. _____

2.6.10 **Verify** pressurizer heaters group 2C is ON. _____

2.6.11 **Verify** the following pressurizer heaters are OFF:

- Group 2A _____
- Group 2B _____
- Group 2D _____
- Group 2E _____

2.6.12 **Place 2HC431K**, PRZR PRESS MASTER CONTROL, to "MANUAL". _____

NOTE:	**57.5% output on 2HC431K places group 2C HTRs to minimum.**

2.6.13 **Adjust 2HC431K** to approximately 57.5%. _____

CAUTION:	**EXCEEDING 2335 PSIG WILL LIFT THE PRZR PORV.**

2.6.14 Manually **cycle** pressurizer heaters ON and OFF OR adjust **2HC431K**, PRZR PRESS MASTER CONTROL, as needed to maintain Pressurizer Pressure between 2200-2300 psig. _____

NOTE:	PRT Rupture Disk will rupture after approximately three letdowns using the RCS Head Vent SVs when PRT pressure reaches approximately 100 psig.

2.6.15 **Enter** 2C12.1 AOP4, Alternate Letdown Flowpaths, and Maintain Pressurizer Level Band of 30-50% while continuing this procedure. _____

NOTE:	With only one charging pump in operation and in minimum speed to maintain 6-10 gpm seal injection to each RCP, the continuous boration affects will be delayed. Maximum flow rate will be approximately 12 gpm

CAUTION:	WITH NO LETDOWN TO VCT, MANUAL MAKE-UPS TO THE VCT WILL NEED TO BE PERFORMED IN CONJUNCTION WITH CONTINUOUS BORATION DURING CONTROLLED SHUTDOWN.

2.6.16 **Perform** a controlled shutdown using 2C1.4, Unit 2 Power Operation, while continuing with this procedure. _____

2.6.17 **Refer** to Attachment C for further guidance. _____

NOTE:	With the associated FCU running in FAST speed, the damper will attempt to reposition to DOME but will not reposition due to the air force. This may aid in cooling the RCP Stators. Refer to C47515-0506[0507], 21[22] RCP Bearing/Stator Hi Temp, for actions requird for high stator temperatures.

2.6.18 **Monitor** RCP Stator Temperatures. _____

2.6.19 **Refer** to TS 3.4.16, RCS Leakage Detection Instrumentation, due to 1R11/12 sample path isolated. _____

2.6.20 **Refer** to TS 3.4.14, RCS Operational LEAKAGE, due to RCS Leakage from RCS Head Vent to PRT with the PRT Rupture Disc Ruptured. _____

2.6.21 IF the Rupture disk fails, THEN **enter** TS 3.0.3 as required by TS LCO 3.4.16 CONDITION D, due to inabilility of Sump A timers to identify RCS leakage. _____

2.6.22 **Refer** to TS 3.6.3, Containment Isolation Valves, due to failure of **CV-31740**, 1 RX BLDG INSTR AIR ISOL CV, OR **CV-31741**, 1 RX BLDG INSTR AIR ISOL CV. _____

2.6.23 **Continue** to Section 2.7. _____

2.7 Recovery Actions

2.7.1 **Refer** to Attachment A and Attachment C for guidance in mitigating the consequences of a loss of air to individual systems or components. _____

2.7.2 **Refer** to Air Junction Box Data Book or Passport Reports Production/Work Management/WM-0109 Air Supply Report for isolation points and equipment response lists. _____

2.7.3 **Restore** air compressors and dryers to their normal operating configuration per C34 and C1.1.34-1[2]. Actions necessary to restore the air system to normal are dependent on the degree and nature of the system degradation. _____

2.7.4 IF either or both the MSIVs have failed CLOSED, THEN **place** the control switch for the affected valve(s) in the "CLOSE" position to prevent an inadvertent OPENING.

Unit 1

- **CS-46158**, A MN STM LINE ISOL _____
- **CS-46159**, B MN STM LINE ISOL _____

Unit 2

- **CS-49620**, A MN STM LINE ISOL _____
- **CS-49621**, B MN STM LINE ISOL _____

Figure 1 Simplified IA Diagram