UPDATED P.I. OPNS

UNIT 1
LOSS OF ALL SAFEGUARDS AC POWER

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LOSS OF ALL SAFEGUARDS AC POWER

A. PURPOSE

This procedure provides actions to respond to a loss of all safeguards AC power.

B. ENTRY CONDITIONS

1. Transition entry from:

   1E-0, Step 3
   Anytime power is lost to both safeguards buses after completion of 1E-0, Step 3

C. ATTACHMENTS:

ATTACHMENT E: SG Wide Range Level - Adverse Conditions
ATTACHMENT G: Unit 1 Containment Isolation Valve Locations

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	NOTE *CSF Status Trees should be monitored for information only. FR procedures SHALL NOT be implemented.*	
1	Check If RCS Is Isolated:	
	a. PRZR PORVs - CLOSED	a. IF PRZR pressure less than 2335 psig, THEN close PORVs.
	b. Letdown isolation valves (CV-31255 and CV-31226) - CLOSED	b. Close valves.
	c. Excess letdown isolation valve (CV-31330) - CLOSED	c. Close valves.
2	Verify AFW Flow - GREATER THAN 200 GPM	Perform the following: a. Verify TD AFW pump running. IF NOT, THEN start TD AFW pump. IF pump can NOT be started, THEN locally start pump by opening steam supply valve (CV-31998) per C28.1 AOP3, AUX FEEDWATER SYSTEM OPERATION WHEN AC POWER IS LOST. b. Verify proper safeguard alignment of AFW valves. IF NOT, THEN locally align valves, as necessary.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE *The conditions of the plant during this procedure may involve the Emergency Plan. A recommendation should be made to the Shift Manager OR Unaffected Unit Shift Supervisor to consider classification per F3-2.*

3 Perform Notifications:

- Announce "Unit 1 Reactor Trip"
- Notify Shift Manager and SEC
- Establish continuous communication with NRC within 1 hour

Caution *Diesel generators SHALL NOT be run unless cooling water is available to ensure continued diesel generator operation.*

4	Check Cooling Water Pressure, Loop A AND Loop B - GREATER THAN 25 PSIG	Restore cooling water pressure per C35 AOP2, LOSS OF PUMPING CAPACITY OR HEADER WITHOUT SI.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	Attempt To Restore Power To Safeguard Bus 16:	
	a. Check Bus 16 load rejection lights (Green) - LIT	a. Go to Step 6.
	b. Manually energize Bus 16 using any available unit one power supply	b. Manually start D2 diesel generator using control board switch.
	c. Check Bus 16 - ENERGIZED	c. Manually energize Bus 16 from D2 diesel generator. IF unable to energize Bus 16, THEN go to Step 6.
	d. Return to procedure and step in effect	
6	Attempt To Restore Power To Safeguard Bus 15:	
	a. Check Bus 15 load rejection lights (Green) - LIT	a. Go to Step 7.
	b. Manually energize Bus 15 using any available unit one power supply	b. Manually start D1 diesel generator using control board switch.
	c. Check Bus 15 - ENERGIZED	c. Manually energize Bus 15 from D1 diesel generator. IF unable to energize Bus 15, THEN go to Step 7.
	d. Return to procedure and step in effect	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Check Bus Tie Breakers Available To Power Unit One Safeguards Buses.	
	a. Unit one SI ACTUATED annunciator 47014-0604 - NOT LIT	a. Reset unit one SI.
	b. Unit two SI ACTUATED annunciator 47514-0604 - NOT LIT	b. Go to Step 10.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Energize Safeguards Bus 16 From Unit 2 Safeguards Bus 26 As Follows:	
	a. Check Bus 16 load rejection lights (Green) - LIT	a. Go to Step 9.
	b. Check Bus 26 - ENERGIZED	b. Go to Step 9.
	c. Place Bus 16 source breakers in pullout position:	
	• Bkr 16-2, source from 1RY AUX XFMR	
	• Bkr 16-8, source from CT11 XFMR	
	• Bkr 16-9, source from D2 diesel generator	
	d. Check 12 SI Pump breaker - OPEN	d. Open 12 SI Pump breaker.
	e. Close Breaker 26-1, Bus 26 Bus Tie to Bus 16	e. Go to Step 9.
	f. Close Breaker 16-10, Bus 16 Bus Tie to Bus 26	f. Go to Step 9.
	g. Return to procedure and step in effect	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Energize Safeguards Bus 15 From Unit 2 Safeguards Bus 25 As Follows:	
	a. Check Bus 15 load rejection lights (Green) - LIT	a. Go to Step 10.
	b. Check Bus 25 - ENERGIZED	b. Go to Step 10.
	c. Place Bus 15 source breakers in pullout position:	
	• Bkr 15-3, source from 1RY AUX XFMR	
	• Bkr 15-7, source from CT11 XFMR	
	• Bkr 15-2, source from D1 diesel generator	
	d. Check 11 SI Pump breaker - OPEN	d. Open 11 SI Pump breaker.
	e. Close Breaker 25-17, Bus 25 Bus Tie to Bus 15	e. Go to Step 10.
	f. Close Breaker 15-8, Bus 15 Bus Tie to Bus 25	f. Go to Step 10.
	g. Return to procedure and step in effect	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Caution *WHEN power is restored to any safeguards bus, THEN recovery actions should continue starting with Step 34.*

10 Place Following Equipment Switches In Pullout Position

- MD AFW pump
- Gps A & B PRZR heaters (Off position)
- RHR pumps
- SI pumps
- CS pumps
- Containment FCUs (Off position)
- CC pumps
- Control room chillers and fans
- 121 and 122 air compressors

11 Place Bus 15 AND Bus 16 Voltage Restoration Selector Switches In Manual

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12	Attempt To Restore Power To Safeguard Bus 16:	
	a. Manually energize Bus 16 using any available unit one power supply	a. Manually start D2 diesel generator using control board switch.
	b. Check Bus 16 - ENERGIZED	b. Manually energize Bus 16 from D2 diesel generator. IF unable to energize Bus 16, THEN go to Step 13.
	c. Go to Step 34	
13	Attempt To Restore Power To Safeguard Bus 15:	
	a. Manually energize Bus 15 using any available unit one power supply	a. Manually start D1 diesel generator using control board switch.
	b. Check Bus 15 - ENERGIZED	b. Manually energize Bus 15 from D1 diesel generator. IF unable to energize Bus 15, THEN go to Step 14.
	c. Go to Step 34	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Check Bus Tie Breakers Available To Power Unit One Safeguards Buses.	
	a. Unit one SI ACTUATED annunciator 47014-0604 - NOT LIT	a. Reset unit one SI.
	b. Unit two SI ACTUATED annunciator 47514-0604 - NOT LIT	b. Go to Step 17.
15	Energize Safeguards Bus 16 From Unit 2 Safeguards Bus 26 As Follows:	
	a. Check Bus 26 - ENERGIZED	a. Go to Step 16.
	b. Place Bus 16 source breakers in pullout position:	
	• Bkr 16-2, source from 1RY AUX XFMR	
	• Bkr 16-8, source from CT11 XFMR	
	• Bkr 16-9, source from D2 diesel generator	
	c. Close Breaker 26-1, Bus 26 Bus Tie to Bus 16	c. Go to Step 16.
	d. Close Breaker 16-10, Bus 16 Bus Tie to Bus 26	d. Go to Step 16.
	e. Go to Step 34	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16	Energize Safeguards Bus 15 From Unit 2 Safeguards Bus 25 As Follows:	
	a. Check Bus 25 - ENERGIZED	a. Go to Step 17.
	b. Place Bus 15 source breakers in pullout position:	
	• Bkr 15-3, source from 1RY AUX XFMR	
	• Bkr 15-7, source from CT11 XFMR	
	• Bkr 15-2, source from D1 diesel generator	
	c. Close Breaker 25-17, Bus 25 Bus Tie to Bus 15	c. Go to Step 17.
	d. Close Breaker 15-8, Bus 15 Bus Tie to Bus 25	d. Go to Step 17.
	e. Go to Step 34	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	NOTE *IF a unit 2 safeguards bus becomes available as a power source for a unit 1 safeguards bus, THEN SI must be reset and power recovered per Step 15 or 16 of this procedure.*	
17	Assign Personnel To Attempt To Start Diesel Generators Using Local Actions While Proceeding With Isolation Of The RCS Beginning At Step 18.	
	a. Place diesel generator control switches in pullout	
	b. Dispatch an operator to locally reset shutdown relays AND THEN locally reset 86 lockout relays	
	c. Manually actuate SI	
	d. Place diesel generator control switches in normal	
	e. Verify at least one diesel generator starts	e. Attempt to start diesel generators using control switches. IF no diesel generator starts, THEN manually start a diesel generator locally per 1C20.7, D1/D2 DIESEL GENERATORS.
	f. Manually energize one safeguards bus from running diesel generator	f. Continue attempts to restore power to one safeguards bus using any available power source.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18	Dispatch Personnel To Locally Close Valves To Isolate RCP Seals: • RCP seal return isolation valve (MV-32166) - CLOSED • RCP seal injection throttle valves (VC-14-1 and VC-14-2) - CLOSED • RCP CC return isolation valves (CC-16-3 and CC-16-2) - CLOSED	
19	Check If CST Is Isolated From Hotwell: a. Condenser normal makeup: • Hotwell isolation valve (CV-31121) - CLOSED • Flow indication - ZERO	a. Manually or locally close valve.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	Check SG Status:	
	a. MSIVs and bypass valves - CLOSED	a. Manually or locally close valves.
	b. Main feed reg and bypass valves - CLOSED	b. Manually close valves. IF NOT, THEN locally close isolation valves (MV-32023 and MV-32024).
	c. SGB flow control valves (CV-31414 and CV-31415) - CLOSED • Flow indication - ZERO	c. Manually close valve. IF NOT, THEN locally close SGB containment isolation valves (MV-32044 and MV-32058).
	Caution *A faulted or ruptured SG that is isolated should remain isolated. Steam supply to the TD AFW pump SHALL be maintained from at least one SG.*	
21	Check If SGs Are Not Faulted:	
	a. Check SG pressures: • NO SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER • NO SG COMPLETELY DEPRESSURIZED	a. Isolate faulted SG(s): 1) Locally isolate AFW flow. 2) Locally close steam supply valve to TD AFW pump. 3) Verify SG PORV closed. IF NOT, THEN manually close.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	Check If SG Tubes Are Not Ruptured: • Condenser air ejector radiation - NORMAL • SGB radiation - NORMAL • Main steamline radiation - NORMAL	Attempt to identify ruptured SG(s). Continue with Step 23. WHEN ruptured SG identified, THEN isolate ruptured SG(s): • Locally isolate AFW flow. • Locally close steam supply valve to TD AFW pump. • WHEN SG pressure less than 1050 psig, THEN verify SG PORV closed. IF NOT, THEN manually close.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Caution *IF CST level decreases to less than 5000 gallons, THEN alternate water sources for AFW pumps will be necessary per C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.*

23 Check Intact SG Levels:

a. Narrow range level - BETWEEN 10% AND 50% [ATTACHMENT E]

a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 10% [ATTACHMENT E] in at least one SG.

b. Locally control feed flow to maintain narrow range level

b. IF narrow range level in a SG continues to increase with feed flow stopped, THEN:

1) Isolate feed flow to that SG.

2) Isolate steam supply to TD AFW pump from that SG.

24 Deenergize Non-Essential DC Bus Loads:

- Containment emergency lighting panel (Panel EM1-5 Circuit 4, located in 12 Battery Room)

25 Dispatch Personnel To Perform The Following:

- Open doors on Foxboro instrument racks
- Periodic checks of 11 and 12 DC Battery voltage

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26	Establish Battery Room Cooling • Contact security to provide door guards AND block open all Battery Room doors, including fire doors between Battery Rooms • Arrange for firewatches at the Battery Rooms	
27	Check CST Level - GREATER THAN 5000 GALLONS	Switch to alternate AFW supply per C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

Caution

- *SG pressures should not be decreased to less than 170 psig to prevent injection of accumulator nitrogen into the RCS.*
- *SG narrow range level should be maintained greater than 10% [ATTACHMENT E] in at least one intact SG. IF level cannot be maintained, THEN SG depressurization should be stopped until level is restored in at least one SG.*

NOTE

- *The SG(s) should be depressurized at maximum rate to minimize RCS inventory loss.*
- *PRZR level may be lost and reactor vessel upper head voiding may occur due to depressurizion of SG(s). Depressurization should not be stopped to prevent these occurrences.*

28 Depressurize Intact SG(s) To 270 PSIG:

This Step continued on the next page.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 28 continued from previous page)	
	a. Check SG narrow range levels - GREATER THAN 10% [ATTACHMENT E]	a. Perform the following: 1) Locally maintain maximum AFW flow until narrow range level greater than 10% [ATTACHMENT E] in at least one SG. 2) WHEN narrow range level greater than 10% [ATTACHMENT F] in at least one SG, THEN do Steps 28b, 28c, 28d and 28e. 3) Continue with Step 29.
	b. Manually dump steam at maximum rate using SG PORVs	b. Locally dump steam using SG PORVs.
	c. Check RCS cold leg temperatures - GREATER THAN 280°F	c. Perform the following: 1) Control SG PORVs to stop SG depressurization. 2) Go to Step 29.
	d. Check SG pressures - LESS THAN 270 PSIG	d. WHEN SG pressures decreases to less than 270 psig, THEN do Step 28e. Continue with Step 29.
	e. Manually control SG PORVs to maintain SG pressures at 270 psig	e. Locally throttle SG PORVs to maintain SG pressure at 270 psig.

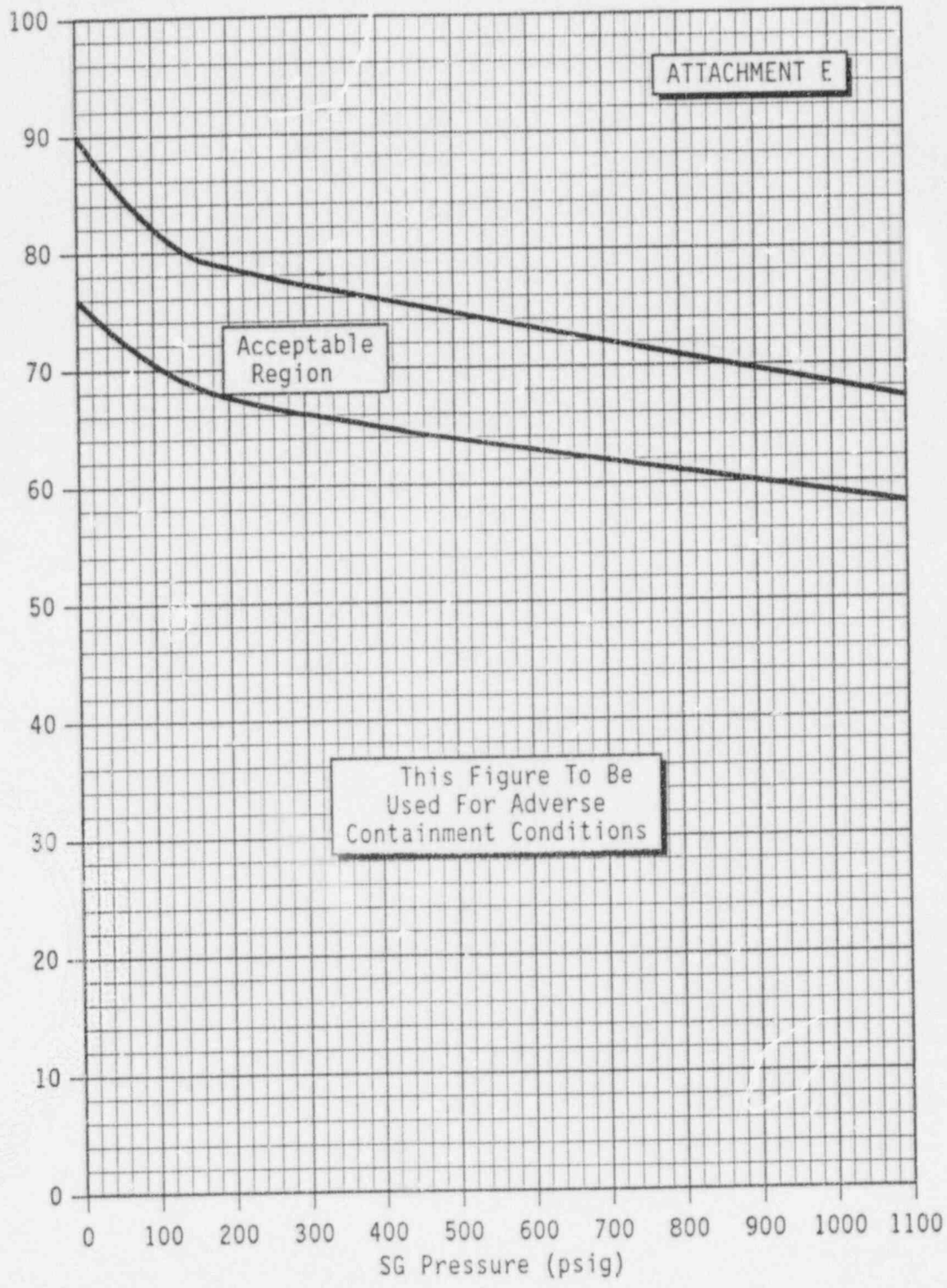
STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	NOTE *IF adverse containment environment exists, THEN the Neutron Flux Monitoring System should be used to verify reactor subcritical.*	
29	Check Reactor Subcritical: • Intermediate range channels - ZERO OR NEGATIVE STARTUP RATE • Source range channels - ZERO OR NEGATIVE STARTUP RATE	Control SG PORVs to stop depressurization and allow RCS to heatup.
30	Check SI Signal Status:	
	a. SI - HAS BEEN ACTUATED	a. WHEN SI actuated, THEN do Steps 30b and 31. Go to Step 32.
	b. Reset SI	
31	Verify Containment Isolation:	
	a. Containment isolation - ACTUATED	a. Manually actuate containment isolation.
	b. Containment isolation valves - CLOSED	b. Manually or locally close valves. Refer to ATTACHMENT G for containment isolation valve locations.
32	Check Containment Radiation - LESS THAN 10 R/HR	Manually close containment isolation valves, as necessary. IF valves can NOT be manually closed, THEN locally close valves.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
33	Check If AC Emergency Power Is Restored:	
	a. Check safeguard buses - AT LEAST ONE ENERGIZED	a. Continue to control RCS conditions and monitor plant status: 1) Check status of local actions: • AC power restoration. • RCP seal isolation. • DC power supply. • Containment isolation, if required. 2) Check BAST temperature greater than 160°F. IF NOT, THEN consult plant engineering staff for method to reduce boron concentration. 3) Return to Step 21.
34	Stabilize SG Pressures:	
	a. SG depressurization in progress	a. Go to Step 35.
	b. Manually control SG PORVs to maintain existing SG pressure	b. Locally throttle SG PORVs.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35	Check Following Equipment Loaded On Safeguard Bus: a. 480 volt buses: • Bus 111 and 112 -OR- • Bus 121 and 122 b. Battery charger c. Instrument buses: • Bus 111 and 113 -OR- • Bus 112 and 114 d. Dispatch personnel to locally restore power to containment emergency lighting (Panel EM1-5, Circuit 4, located in 12 Battery Room e. Start one air compressor f. Consult engineering staff to consider repowering opposite train, 480V MCCs using alternate power supply alignments.	Manually load, as necessary.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
36	Select Recovery Procedure:	
	a. Check RCS subcooling based on core exit T/Cs - GREATER THAN 20°F [80°F]	a. Go to 1ECA-0.2, LOSS OF ALL SAFEGUARDS AC POWER RECOVERY WITH SI REQUIRED, Step 1.
	b. Check PRZR level - GREATER THAN 5% [28%]	b. Go to 1ECA-0.2, LOSS OF ALL SAFEGUARDS AC POWER RECOVERY WITH SI REQUIRED, Step 1.
	c. Go to 1ECA-0.1, LOSS OF ALL SAFEGUARDS AC POWER RECOVERY WITHOUT SI REQUIRED, Step 1	

-END-



ATTACHMENT E
Wide Range SG Level
For Controlling Inventory

ATTACHMENT G

UNIT 1 CONTAINMENT ISOLATION VALVE LOCATIONS

	VALVE	TITLE	LOCATION
1	CV31318	PRT TO GAS ANAL ISOL	L.3/6.8/720.5
2	CV31319	PRT TO GAS ANAL ISOL	L.3/6.8/720.5
3	CV31221	PRT N2 SUPPLY ISOL	J.5/5.8/725
4	CV31321	RMU TO PRT & RCP STANDPIPE	K.0/3.4/725
5	CV31339	LTDN LINE CNTMT ISOL	L.8/6.8/728
6	CV31438	SUMP A DISCH ISOL	L.6/6.8/720
7	CV31439	SUMP A DISCH ISOL	L.6/6.9/720
8	CV31436	RCDT PMPS DISCH ISOL	L.7/6.8/720
9	CV31437	RCDT PMPS DISCH ISOL	L.7/6.9/720
10	CV31545	RCDT TO GAS ANAL ISOL	L.7/6.8/720
11	CV31546	RCDT TO GAS ANAL ISOL	L.7/6.8/720
12	CV31434	RCDT TO VENT HDR ISOL	L.4/6.7/720.5
13	CV31435	RCDT TO VENT HDR ISOL	L.4/6.8/720.5
14	CV31402	11 SGBD SMPL ISOL	K.7/6.9/719
15	CV31403	12 SGBD SMPL ISOL	K.7/6.9/719
16	CV31750	CNTMT AIR SMPL ISOL - OUT	K.1/6.2/761
17	CV31022	CNTMT AIR SMPL ISOL - IN	K.3/6.4/761
18	CV31740	INST AIR SPLY ISOL UNIT ONE CNTMT	L.6/6.8/720
19	CV31440	ACC N2 SPLY ISOL	K.1/6.3/761
20	MV32044	11 SGBD ISOL	J.8/6.0/729.5
21	MV32058	12 SGBD ISOL	J.6/5.8/729.5

ATTACHMENT G

UNIT 1 CONTAINMENT ISOLATION VALVE LOCATIONS

	VALVE	TITLE	LOCATION
22	MV32023	FW TO 11 SG ISOL	N.5/6.2/741
23	MV32024	FW TO 12 SG ISOL	J.5/5.8/740
24	MV32401	PRZR STM SMPL ISOL	L.4/6.8/720
25	MV32403	PRZR LIQ SMPL ISOL	K.3/3.2/721
26	MV32405	RCS LOOP B HOT LEG ISOL	J.6/5.8/725
27	MV32095	CC TO EXCESS LTDN HX ISOL	J.7/5.8/720.5
28	MV32166	RCP SEAL WTR RTRN ISOL	L.5/6.8/720

BACKGROUND INFORMATION FOR

1ECA-0.0, LOSS OF ALL SAFEGUARDS AC POWER

SUMMARY FOR 1ECA-0.0

The objective of 1ECA-0.0 is to mitigate deterioration of RCS conditions while AC emergency power is not available. Upon entry into 1ECA-0.0, certain initial actions are performed regardless of the duration of the AC power outage. Following the loss of AC power, optimal recovery cannot be initiated until AC power is restored to at least one safeguard bus. Consequently, the major objective following initial actions is to restore AC emergency power as soon as possible. Tests and analysis have shown that the non-SBO units emergency diesel power is available and the interconnecting bus ties can be closed within ten minutes of the realization that an SBO condition exists. The operator proceeds to maintain plant conditions until AC power is restored. By minimizing RCS inventory loss and maintaining a secondary heat sink the operator can extend the time to core uncovery. Following restoration of AC power, the operator is instructed to stabilize SG pressure and evaluate the status of the energized safeguard bus. These actions verify that certain select equipment has automatically loaded on the safeguard bus and provides the operator with information that will aid him in loading subsequent equipment on the energized AC emergency bus in the recovery procedures. The operator then selects the appropriate recovery procedure based on existing RCS conditions.

BASIS FOR ACTIONS IN 1ECA-0.0

Note Procedure Steps, Step 1

This procedure has priority over all FR procedures and is written to implicitly monitor and maintain critical safety functions. This priority is necessary since all FR procedures are written on the premise that at least one safeguard bus is energized.

Procedure Steps, Step 1

A check for RCS isolation is included to ensure that RCS inventory loss is minimized. The valves listed are those in major RCS outflow lines that could contribute to rapid RCS inventory depletion. If any valve is open, the operator should attempt to close the valve.

Following completion of this step, the only RCS inventory leakage path should be the RCP controlled leakage seals

Procedure Steps, Step 2

Following loss of all AC power, the steam supply valve to the TD AFW pump should automatically open and the pump should start to supply AFW to the SGs. All AFW valves should be in or should fail to their proper emergency positions to support TD AFW pump operation.

Step 2 verifies greater than 200 gpm AFW flow which is sufficient to ensure that an effective secondary heat sink can be maintained. If this flow is not verified, the RNO column instructs the operator to check the status of the TD AFW pump and AFW valves in order to establish the required flow. If attempts to start the pump from the control room fail, the operator is instructed to locally start the pump by opening the steam supply control valve.

Note Procedure Steps, Step 3

Prompts the operator to consider the need for event classification per the Emergency Action Level guidelines in F3-2.

Procedure Steps, Step 3

This step notifies in-plant operators of reactor trip so that necessary actions are initiated to place support systems in the required post-trip condition. The operator is directed to notify directly certain required support personnel. He is also directed to establish communications with the NRC within the specific time frame.

Caution Procedure Steps, Step 4

This caution serves to remind the operator the cooling water is required for diesel generator operation. It should be noted that only one diesel cooling water pump is needed to supply both diesel generators. This is true provided that any of the loop isolation valves (A,B,C, and D) are not closed as is the case in this step. This ability is a design criterion for the cooling water system.

Procedure Steps, Step 4

The operator verifies that cooling water pressure is adequate to support diesel generator operation. If not, then the operator is directed to 035 AOP2, LOSS OF PUMPING CAPACITY OR HEADER WITHOUT SI to either reduce cooling water load or restore pumping capacity as necessary.

Procedure Steps, Step 5

Bus 16 is the first choice for repowering as it supplies the motor driven auziliary feedwater pump.

The operator is directed to check the Bus 16 load rejection lights lit to verify the appropriate load rejection relays have operated. This will assure that block loading will not occur when the bus is repowered. If load rejection has not occurred, the operator is directed to Step 6 to check the condition of Bus 15.

This step addresses Bus 16 power restoration from the control room using a unit one power source. First choice for power is an offsite source. If none is available, manual starting of the diesel generator is attempted.

When a diesel starts it should be allowed to automatically load onto the bus; thus, there is no reason to place equipment CSs in pullout. If the safeguard bus does not automatically load from the diesel, attempts should be made to close the diesel generator breaker using the control switch.

If AC power is restored, the operator returns to the procedure and step in effect prior to entering 1ECA-0.0. If power is not restored, the operator goes to the next step for additional actions to restore AC emergency power.

Procedure Steps, Step 6

An attempt is made to restore Bus 15 in the same manner as attempted for Bus 16. If unsuccessful, the next choice for power is from a unit 2 safeguards bus using the bus tie breakers.

Procedure Steps, Step 7

Since the unit bus tie breakers are interlocked open by a safety injection signal, it is necessary to verify that neither unit has an SI before attempting to close them. If a unit 1 safety injection signal is present, the operator is directed to reset the SI to allow closure of the bus tie breakers. If a Unit 2 SI signal is present, the bus tie breakers are not available and further attempts to restore power using a unit 1 source are necessary.

Procedure Steps, Step 8

Once all attempts to restore power to a safeguards bus from the Control Room from the diesel generators have failed, the operator is directed to restore power from Unit 2 safeguards Bus 26.

The source breakers are placed in pullout to prevent the possible paralleling of D6 with another recovered power source. The SI pump breaker is verified open to insure the SI pump (which is not load rejected) does not start as the bus is repowered through the bus tie breakers.

Procedure Steps, Step 9

If unable to restore Bus 16 through the bus tie breakers, a similar attempt is made to restore Bus 15. If unsuccessful, in this attempt all possible options have been exhausted using load sequencer circuitry.

Caution Procedure Steps, Step 10

Until AC power is restored, plant conditions will deteriorate due to RCP seal leakage. To minimize the deterioration of plant conditions, recovery actions should be started as soon as AC power is restored, starting with Step 34. 1ECA-0.0 is written such that Step 34 can be entered from any step that follows this caution. 1ECA-0.0, 1ECA-0.1 and 1ECA-0.2 are written to establish the appropriate systems operation and alignments before transitioning the operator to other procedures.

Procedure Steps, Step 10

If the load sequencer is not functioning properly, the more likely a plant condition may develop wherein automatic start of equipment upon AC power restoration may have detrimental effects on the restored safeguard bus, the automatically started equipment or other plant equipment. Consequently, this step instructs the operator to defeat automatic loading of all large loads prior to attempting to restore power to a bus..

Defeating automatic blackout or SI loading of as many large loads as practical is intended to avoid potential overload of the energized safeguard bus. This action permits the operator to evaluate the status of the restored safeguards bus and sequence loads onto the bus consistent with bus status and plant conditions. Small loads, such as 480 volt buses, are permitted to automatically load on the restored safeguard bus. These small loads will aid the operator in diagnosing plant status. Restricting automatic loading to this equipment limits the initial demand on the safeguards bus.

Procedure Steps, Step 11

At this point in the procedure it is assumed that automatic voltage restoration has failed due to some malfunction in the automatic circuitry. Futher attempts to repower a safeguards bus will be conducted manually.

Procedure Steps, Step 12

This step addresses Bus 16 power restoration from the Control Room using a unit one power source. First choice for power is an offsite source. If none is available, manual starting of the diesel generator is attempted.

If AC power is restored, the operator proceeds to Step 34. If power is not restored, the operator goes to the next step for additional actions to restore AC emergency power.

Procedure Steps, Step 13

An attempt is made to restore Bus 15 in the same manner as attempted for Bus 16. If unsuccessful, the next choice for power is from a unit 2 safeguards bus using the bus tie breakers.

Procedure Steps, Step 14

Since the unit bus tie breakers are interlocked open by a safety injection signal, it is necessary to verify that neither unit has an SI before attempting to close them. If a unit 1 safety injection signal is present, the operator is directed to reset the SI to allow closure of the Bus Tie breakers. If a Unit 2 SI signal is present, the Bus Tie breakers are not available and further attempts to restore power using a unit 1 source are necessary.

Procedure Steps, Step 15

Once all attempts to restore power to a safeguards bus from the Control Room from the diesel generators have failed, the operator is directed to restore power from Unit 2 safeguards Bus 26.

The source breakers are placed in pullout to prevent the possible paralleling of D6 with another recovered power source.

Procedure Steps, Step 16

If unable to restore Bus 16 through the bus tie breakers, a similar attempt is made to restore Bus 15. If unsuccessful, all possible options for repowering a safeguards bus have been exhausted from the Control Room.

Note Procedure Steps, Step 17

If an SI signal exists, the Bus Tie breaker for the unit with the SI signal is prevented from closing by an interlock.

Procedure Steps, Step 17

Once all attempts to restore power to a safeguards bus from the Control Room have failed, manual actions outside the Control Room to start a diesel generator are required.

The operator is directed to place the diesel control switches in pullout, locally reset shutdown and 86 lockout relays, and manually initiate SI. The operator than places the diesel control switches to normal and the diesels should start. The control switches are placed in pullout to preclude re-actuation of the shutdown and 86 lockout relays if a mechanical fault is present. An automatic start signal is present from the bus under voltage and will start the diesels when the 86 lockout relay is reset. Caution must be exercised when operating diesel generators with the mechanical trips blocked with actual malfunctions occurring. It may be determined that intermittent operation of the diesel may be the best long term approach.

If the diesel generators fail to start from the SI signal, the operator is directed to start a diesel manually per 1C20.7. Attempts should be made to start D1 diesel generator isolated from the control room if local starting fails as well.

Since these local actions will take considerable time to accomplish attention must be directed towards isolation of the RCS to mitigate the consequences of a sustained loss of safegaurds power. The operator is directed to proceed with Step 18 while continuing attempts to restore power to one safeguards bus.

If still unable to restore power to a safeguards bus, the operator is directed to continue efforts to restore power using any available power source.

Procedure Steps, Step 18

This step groups three actions, with different purposes, aimed at isolating the RCP seals. Isolating the seal return line prevents seal leakage from filling the volume control tank. Isolating the RCP seal injection lines prepares the plant for recovery while protecting the RCPs from seal and shaft damage that may occur when a charging pump is started as part of the recovery. With the RCP seal injection lines isolated, a charging pump can be started without concern for cold seal injection flow thermally shocking the RCPs.

Isolating the RCP CC return outside containment prepares the plant for recovery while protecting the CC system from steam formation due to RCP thermal barrier heating. Following the loss of all AC power, hot reactor coolant will gradually replace the normally cool seal injection water in the RCP seal area. As the hot reactor coolant leaks up the RCP shaft, the water in the thermal barrier will heat up and potentially form steam in the thermal barrier and in the CC lines adjacent to the thermal barrier. Subsequent automatic start of the CC pump would deliver CC flow to the thermal barrier, flushing steam into the CC system. If abnormal RCP seal leakage had developed in a pump, the abnormally high leakage rate could exceed the cooling capacity of the CC flow to that pump thermal barrier and tend to generate more steam in the RCP thermal barrier CC return lines. Isolating these lines prevents the potential introduction of this steam into the main portion of the CC system on CC pump start. This keeps the main portion of the CC system available for cooling equipment necessary for recovery of the plant when AC power is restored.

Procedure Steps, Step 19

The operator should verify that a dedicated supply of AFW exists for delivery to the SGs. However, following loss of all AC power, the CST may remain unisolated from the condenser hotwell and be capable of draining through unisolated lines to the condenser hotwell. This Step isolates the CST to preserve AFW inventory for continued SG heat removal.

Procedure Steps, Step 20

The SGs are checked to ensure optimal use of AFW for SG heat removal. MSIVs and bypass valves, main feed and bypass valves and SGB isolation valves are verified closed. If the valves are not closed, the operator is given alternative methods of isolating the lines.

Caution Procedure Steps, Step 21

Subsequent procedure steps address 1) isolating faulted or ruptured SGs and 2) controlling level and pressure in the intact SGs. This maximizes operator control of secondary pressure and minimizes radioactivity release to the environment.

Since the only source of makeup to the SGs is the TD AFW pump, steam supply must be maintained to the pump from at least one SG even if both SGs are either ruptured or faulted.

Procedure Steps, Step 21

If either SG is diagnosed to be faulted, it is isolated so that it will not affect subsequent recovery operations to depressurize and stabilize the RCS at conditions consistent with minimizing RCS inventory loss. Isolation of the faulted SG is consistent with 1E-2 and addresses the possibility of a loss of secondary coolant concurrent with the loss of all AC power.

Procedure Steps, Step 22

If condenser air ejector, SGB or main steamline radiation is detected, the operator is instructed to attempt to identify and isolate a ruptured SG. Actual identification and isolation of a SGTR may not be accomplished until the operator attempts to control AFW flow to maintain SG level. Isolation of the ruptured SG is consistent with 1E-3 and addresses the possibility of a SGTR concurrent with the loss of all AC power. Secondary depressurization will function to terminate radioactive steam release from the ruptured SG.

Caution Procedure Steps, Step 23

When CST level decreases below 5000 gallons, inadequate suction pressure may result in AFW pump trip. An alternate suction source should be provided.

Procedure Steps, Step 23

Intact SG levels are checked to verify adequate heat sink. Maximum AFW flow should be maintained until narrow range level is established in at least one SG. Maximum flow is maintained to restore narrow range level as soon as possible after reactor trip so that secondary depressurization (which requires narrow range level in at least one SG) can be performed as soon as possible. Once level is in the narrow range, AFW flow should be controlled to maintain narrow range level.

If SG level in one SG continues to increase after AFW flow to the SG is isolated, a SGTR may exist. The ruptured SG should be isolated to minimize release of radioactive steam.

Procedure Steps, Step 24

Following loss of all AC power, the station batteries are the only source of electrical power. The station batteries supply the DC buses and the AC vital instrument buses. Since AC emergency power is not available to charge the station batteries, battery power supply must be conserved to permit monitoring and control of the plant until AC power can be restored. The operator is instructed to shed the specified loads to extend battery life.

Procedure Steps, Step 25

Since there is no forced cooling in the control room, the need to ensure that the Foxboro instrument racks do not become excessively hot and cause random instrumentation failures, the doors are opened to enhance rack cooling.

Control room must be made aware of DC battery status. There is no indication in the control room of the DC voltage on the battery. Therefore, periodic voltage checks are initiated.

Procedure Steps, Step 26

Interim battery room cooling is necessary until power can be restored to the non-safeguards buses which power the battery room cooling systems.

Procedure Steps, Step 27

The CST level is checked to ensure an adequate long term AFW supply. If CST level is low, an alternate water supply should be aligned per C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUX FEEDWATER PUMP SUCTION.

1st Caution Procedure Steps, Step 28

SGs should be depressurized to maximize delivery (into the RCS) of the water contained in the SI accumulators while minimizing the delivery of nitrogen. Maintaining SG pressures above a value that prevents introduction of a significant volume of nitrogen into the RCS ensures that accumulator nitrogen will not impede natural circulation.

2nd Caution Procedure Steps, Step 28

During the rapid depressurization performed in Step 23, SG level could drop out of the narrow range resulting in a loss of adequate heat sink. If this situation occurs, the depressurization should be stopped and AFW flow reestablished until SG narrow range level is restored.

1st Note Procedure Steps, Step 28

The intact SGs should be depressurized as quickly as possible, to minimize RCS inventory loss, but within the constraint of controllability. Controllability is required to ensure that SG pressures do not undershoot the specified limit. In this case maximum rate means SG PORVs full open and should not be limited by the Tech Spec RCS cooldown limit of 100°F/hr.

2nd Note Procedure Steps, Step 28

Loss of PRZR level and reactor vessel upper head voiding may result from the rapid depressurization of the intact SGs. Such a condition is anticipated and should not interfere with operator actions in Step 23 to depressurize the SGs to reduce RCS pressure and temperature and to minimize RCS inventory loss out of the RCP seals.

Procedure Steps, Step 28

This step depressurizes the SGs, thereby reducing RCS temperature and pressure to reduce RCP seal leakage and minimize RCS inventory loss. During SG depressurization, SG level must be maintained above the top of the SG U-tubes in at least one SG. Maintaining the U-tubes covered in at least one SG will ensure that sufficient heat transfer capability exists to remove heat from the RCS via either natural circulation or reflux boiling after the RCS saturates.

The preferred method to perform the depressurization in Step 23 is to use all intact SGs, however, if the level in one SG is nearing 10%, it is acceptable to isolate that SG while depressurizing the other. This will allow continued depressurization while avoiding the potential loss of secondary heat sink. If the depressurization is performed with one intact SG isolated, the isolated intact SG should eventually be unisolated and depressurized once the concern for losing level no longer exists.

Once depressurization is initiated, maintenance of a specific rate is not critical. The depressurization rate should be sufficiently fast to expeditiously reduce RCS pressures, but not so fast the SG pressures cannot be controlled. It is important that the depressurization not reduce SG pressures in an uncontrolled manner that undershoots the pressure limit, thus permitting potential introduction of nitrogen from the accumulators into the RCS.

During SG depressurization, AFW flow may have to be increased to maintain the required SG narrow range level. Control of AFW flow will have to be performed locally.

RCS cold leg temperatures should be monitored during SG depressurization to ensure that the depressurization does not impose a challenge to the Integrity Critical Safety Function. The SG depressurization should not result in a challenge to the Integrity CSF since the resultant RCS cold leg temperatures should not approach the temperature limit at which a challenge would exist.

Once the target SG pressure is reached, the SG PORVs and AFW flow should be controlled to maintain SG pressure at the target value until AC power is restored.

Note Procedure Steps, Step 29

The operator is reminded that normal instrumentation for monitoring reactor power is not reliable under adverse containment conditions and alternate environmentally qualified instrumentation should be used.

Procedure Steps, Step 29

This step checks for a zero or negative startup rate on the intermediate and source range channels. If a positive SUR is detected, secondary depressurization should be terminated and RCS temperature be allowed to increase to shut down the reactor. This step addresses the criticality concern associated with SG depressurization.

Procedure Steps, Step 30

The secondary depressurization initiated in Step 28 will result in SI actuation, if not already actuated, on low PRZR pressure or low steamline pressure. The operator should check SI actuation status and reset SI. This reset action is consistent with the procedure philosophy of defeating automatic loading of the safeguard bus upon AC power restoration, thus permitting the operator to manually load SI equipment as instructed in the recovery procedures.

Procedure Steps, Step 31

This step requires the operator to verify containment isolation is actuated and that CI valves are closed. Any valves that are not closed should be closed by manual or local operator action. Isolating containment at this time is consistent with the intent of the SI signal and functions to prepare the plant for mitigation of potential radioactivity release.

Procedure Steps, Step 32

All containment penetrations should be isolated if containment radiation indicates a potential inadequate core cooling condition. This step ensures that radioactivity release from the plant is minimized by directing the operator to isolate all penetrations following detection of significant radioactivity in containment. Any valves that are not closed should be closed manually or locally.

Procedure Steps, Step 33

At this point, the operator can do no more to prevent core damage until AC power is restored. This step functions as a transition between maintaining the plant without AC power and plant recovery with AC power. If the operator determines that AC power is restored to one safeguard bus, he should proceed to Step 34 to start recovery of the plant.

If it is determined that AC power is not restored, the operator is directed to control RCS pressure and temperature and monitor plant status in preparation for eventual plant recovery.

Procedure Steps, Step 34

Following restoration of AC power to one safeguard bus, the operator should stabilize plant conditions while selecting the appropriate recovery procedure. If a SG depressurization is in progress when AC power is restored, this step directs the operator to stabilize SG pressures at the pressure existing when AC power is restored.

Procedure Steps, Step 35

The operator should verify that the 480V safeguard buses have assumed essential loads that are energized simultaneously with the bus. If the essential loads do not automatically load, the operator should manually load them on the bus.

The operator is directed to consult with the Tech. Support Center to consider repowering the opposite trains 480V safeguards MCCs using alternate power supply alignments. The Tech. Support Center at this time will be able to analyze power distribution and bus loading requirements and recommend appropriate actions.

Procedure Steps, Step 36

This step provides the criteria by which the operator determines which recovery procedure actions to implement. The criteria are the existence of RCS subcooling and the existence of PRZR level. Two recovery procedures are provided based on these criteria, 1ECA-0.1 and 1ECA-0.2.

If the operator determines that all criteria are satisfied, 1ECA-0.1 should be implemented to attempt plant recovery utilizing normal operational systems. If any criterion is not satisfied, 1ECA-0.2 should be implemented to recover the plant using safeguard systems. By providing two recovery options, the operator is provided with flexibility in recovery of the plant based on the status of RCS conditions when AC power is restored.