FIELD COPY EXISTS **Effective Date: 8/21/08**

CATEGORY II

STATION BLACKOUT //LOSS OF OFFSITE POWER// DIESEL GENERATOR MALFUNCTION

1.0 SYMPTOMS

1.1 Alarms

- 500KV SWITCHYARD TROUBLE
- 500KV CKT SWITCHES MALFUNCTION
- 13.8KV BUS LOCKOUT RELAY TRIP
- STA SERVICE TRANSFORMER TRBL
- 7.2KV SYS INCOMING BRKR MALF
- 4.16KV SYS INCOMING BRKR MALF
- USS FEEDER BRK
- TURBINE GENERATOR TRIP
- TCV FAST CLOSURE
- RPS TRIP SYS A(B) OUT OF SVCE
- DIESEL GEN PNL A/B/C/D C422
- DIESEL ENG PNL A/B/C/D C423
- DIESEL GEN BRKR MALF

1.2 AC equipment trip/malfunction alarms

1.3 NSSSS alarms

1.4 Loss of normal lighting

1.5 Failure of the EDGs (EDGs) to start or auto-transfer to the class 1E Busses.

2.0 AUTOMATIC ACTIONS

2.1 Reactor Scram

2.2 Turbine Generator Trip

2.3 NSSSS Isolation/MSIV Closure

2.4 EDGs start and load sequencing begins

3.0 IMMEDIATE OPERATOR ACTIONS

3.1 IF the EDG fails to start automatically,
THEN **START**
AND **LOAD** as necessary.

4.0 SUBSEQUENT OPERATOR ACTIONS

4.1 **ENSURE** all appropriate automatic and immediate actions are completed. ____

NOTE

The flashing TRIP push-button on the infeeds for the 4.16Kv Vital 1E Busses, IF acknowledged, will prevent the EDG from loading. **[CD-675F]**

4.2 **PRESS** the AUTO CLOSE BLOCK enabling push-buttons on all 4.16 Kv Vital 1E Infeed Bkrs NOT already enabled. **[CD-675F]** ____

4.3 **USE** either of the following to determine Rod Position (EOPs require rods to be inserted to or beyond position 02): **[CD-675F]**

- Process Computer ____
- CRIDS ____
- 4 Rod Display ____
- SPDS ____

4.4 **Emergency Diesel Operation [CD-675F]**

4.4.1. **ENSURE** that EDGs load to the 4.16Kv Vital 1E Busses. ____

4.4.2. IF __ an EDG fails to start and load onto its associated bus, THEN **DISPATCH** an operator to the EDG Remote Control Panels on D/G El. 130' to investigate. ____

4.4.3. IF __ the EDG trips with initiation signal present, THEN **PERFORM** the following to restart:

A. **DETERMINE** reason for EDG trip AND **CORRECT** the malfunction. ____

NOTE

SFR and SDR Relays are located inside the right hand door of Panel A (B, C, D) 421 Local Engine Control Panel.

Each relay has a blue button in the center of the relay.

- IF__ the blue button is out (3/8”), then the relay is de-energized.
- IF__ the blue button is in (1/8”), then the relay is energized.

B. **ENSURE** the 86 Lock-Out Relays (located on A (B, C, D) 422 Diesel Gen. Panel) are reset, Start Failure Relay (SFR) and Shutdown Relay (SDR) are de-energized, and DC Power Engine Speed Circuit 3 is energized. (Located on A (B, C, D) 421 Local Engine Control Panel.) ____

C. **ENSURE** EDG speed indicator reads < 125 rpm. ____

4.4.4. IF __ EDG fails to start or trips during a test, THEN **INVESTIGATE** malfunction AND **REFER TO** Technical Specification 3.8.1. ____

4.4.5. IF __ EDG fails to start from Control Room, THEN **START** from Remote or Local Control Panel. (Key 51, RE1095, in Work Control Key Cabinet.) ____

NOTE

Manual loading and unloading of the 4.16Kv Vital 1E Busses can be done either from the Switchgear/USS or from the Control Room. (Table 5.1 for LOP Sequencer or Table 5.2 for LOCA Sequencer.)

4.4.6. IF __ a Load Sequencer malfunctions, THEN **OPEN** the two feed breakers inside back of panel 1A (B, C, D) C428 to isolate the Load Sequencer. ____

4.4.7. IF __ an EDG failure(s) result in a loss of Ventilation System(s), THEN **ENTER** HC.OP-AB.HVAC-0001(Q), HVAC. ____

4.5 **Total Loss Of Offsite And Onsite AC Power**

CAUTION

HPCI and RCIC take suction from CST or the Torus. Heated Torus water should only be used if CST water is unavailable and sufficient NPSH is available, or as directed by HC.OP-EO.ZZ-0101(Q). Sustained SRV openings should be utilized during pressure control operations to minimize containment instrument gas losses. [CD-675F]

NOTE

During a Station Blackout, the possibility of heat stress in the Main Control Room and other areas exists. The practice of stay time should be considered.
(Reference Health and Safety Manual)

4.5.1. **PERFORM** the following to control Reactor pressure/level: [**CD-675F**]

A. **MAINTAIN** Reactor pressure and level control WITH HPCI, RCIC and SRVs. ____

B. **DEPRESSURIZE** the Reactor at a cooldown rate of <100° F per hour. ____

C. IF __ an entry condition exists, THEN **FOLLOW** HC.OP-EO.ZZ-0101(Q) OR HC.OP-AB.ZZ-0000(Q), Reactor Scram. ____

4.5.2. **IMPLEMENT** the HCGS Emergency Plan. [**CD-675F**] ____

NOTE

Steps 4.5.3 through 4.5.56 are performed to limit heatup of the respective areas. These actions are assumed to be performed within the first 30 minutes of the station blackout and may be performed utilizing any qualified personnel. [**CD-675F**]

Implementation Kit for HC.OP-AB.ZZ-0135 is located in the Control Room EOP drawer.

Portable ELUs (Emergency Lighting Units) are located on elevation 54' of the Diesel Building for use during Station Blackout recovery as necessary.

4.5.3. **IMPLEMENT** Attachment 1, Control Room HVAC Actions. **[CD-675F]** ____

4.5.4. **IMPLEMENT** Attachment 2, Aux Building Actions. **[CD-675F]** ____

4.5.5. **IMPLEMENT** Attachment 3, Radwaste Building Actions. **[CD-675F]** ____

4.5.6. **IMPLEMENT** Attachment 4, Additional Aux Building Actions. (non 30 minute requirement) ____

4.5.7. **CONTACT** Security and Fire Protection and **INFORM** them that the following Fire/Security Doors in the Aux Building will be opened.

• Main Control Room	5510B, 5510C	____
Security door	510B, 510C	____
• Lower Relay Room	5318C	____
• 163' Aux	5615, 5613A	____
• Inverter Room 137'	5525A, 5501A, 5501B	____
Security door	501A, 501B	____
• Inverter Room 124'	5447, 5448	____

4.5.8. **BYPASS** HPCI and RCIC high temperature isolation trips with switches at the following panels: (Key 172, PA2235, in Work Control Key Cabinet for all switches) [**CD-675F**] ____

A.	HPCI at	Panel P-620, Switch B21B-S6A	____
		Panel P-641, Switch B21B-S6C	____
B.	RCIC at	Panel P-621, Switch B21B-S5B	____
		Panel P-640, Switch B21B-S5D	____

4.5.9. WHEN ___ approximately 30 minutes has elapsed, AND RCIC can provide required make up alone,
THEN **PERFORM** the following: **[CD-675F]**

A. **SHUTDOWN** HPCI. ____

B. **MINIMIZE** the operation of the SRV's. ____

4.5.10. **EVALUATE** keepfill requirements
AND **PERFORM** the following to restore keepfill as necessary:

A. **START** an ECCS Pump. ____

OR

B. **RESTORE** power to applicable Jockey Pump
AND **RETURN** to service to support keepfill. ____

OR

C. **CONSIDER** an alternate method to supply keepfill
(for example: Fire Water). ____

CAUTION

HPCI and RCIC valve operations should be minimized to conserve the batteries. [CD-675F]

4.5.11. **MONITOR** HPCI and RCIC Room area temperatures. [**CD-675F**] ____

A. IF __ RCIC room temperature approaches 160°F,
THEN **START** HPCI
AND **SHUTDOWN** RCIC to cool room temperatures. ____

B. IF __ HPCI room temperature approaches 160°F,
THEN **START** RCIC
AND **SHUTDOWN** HPCI to cool room temperatures. ____

C. **CONSIDER** portable engine driven blowers to augment natural circulation. ____

D. **MONITOR** Reactor Building temperatures for entry conditions into HC.OP-EO.ZZ-0103/4 (Q). ____

4.5.12. **MONITOR** 1E Battery voltage and non-1E Battery voltage for minimum design voltages of 108/210V. (**SEE** Table 5.3).
[CD-675F] ____

NOTE

Containment isolation valves in penetrations 3" and larger are closed to limit potential release to the environment in case of possible fuel damage. IF HPCI and/or RCIC are providing RPV injection, then the HPCI/RCIC Steam Supply valves may be left open. [**CD-675F**]

During a Station Blackout, the possibility of heat stress exists and the practice of stay time should be considered. (Reference Health and Safety Manual)

4.5.13. IF__ the blackout condition persists, AND fuel damage appears imminent,
THEN **CLOSE** Containment Isolation Valves listed in Table 5.5, Containment Isolation Valves. ____

4.6 IF__ a LOCA has occurred concurrent with the LOP,
THEN **ENSURE** the Non-Class 1E loads fed off the class 1E Busses were de-energized. [**CD-675F**] ____

4.7 WHEN__ EDGs become available and LOP OR LOP/LOCA sequencing is complete,
THEN **PERFORM** the following:

NOTE

HPCI and RCIC should continue to be used to control reactor pressure and level. [**CD-675F**]

4.7.1. **PRESS** the flashing TRIP push-buttons on energized 1E Busses and all Non-1E Busses. ____

CAUTION

Securing or placing ECCS in manual mode is warranted, only if either of the following can be verified by at least 2 independent indications: [CD-675F]

- **Confirmation of misoperation in automatic mode**
  OR
- **Assurance of adequate core cooling**

4.7.2. IF __ a LOCA signal exists and RHR and Core Spray Pumps are NOT required for adequate core cooling,
THEN **STOP** RHR and Core Spray Pumps. [**CD-675F**] ____

NOTE

The following equipment should automatically load on the D/G within 95 seconds of the D/G Breaker closing. IF the Load Sequencer malfunctions, then Feed Breakers inside the Panel 1A (B, C, D) C428 should be opened to isolate the Load Sequencer. Desired loads may then be placed on the D/G manually from the Switchgear/USS or the Control Room. (Table 5.1 presents sequencer listings)

4.7.3. **ENSURE** the following equipment is operating: [**CD-675F**]

- SSWS Pumps ____
- SACS Pumps ____
- Ventilation Systems ____
  - Control Room Supply ____
  - Control Equipment Room Supply ____
  - Rx Bldg. Equipment Area Cooling ____
  - Aux bldg. D/G Area HVAC ____
  - Aux Bldg. Control Area HVAC ____
  - Primary Containment Ventilation System ____

NOTE

IF SACS is running in a degraded condition, i.e. a single pump operating in both loops, introducing SACS flow to a RHR Hx may cause pump runout (Pump trip at approx. 15,820 gpm on low Differential pressure). Under this condition, system flows should be adjusted as required to preserve SACS System operation.

4.7.4. **ESTABLISH** Suppression Pool Cooling, as required, as follows:

A. Prior to establishing SACS flow to a RHR Hx, **ENSURE** adequate flow margin exists. ____

B. System loads may be reduced using the following options: (based on accessibility and plant conditions)

- **THROTTLE** EG-HV-2512A (B) RHR HX SACS RTN ISLN to establish SACS cooling to RHR Hx while maintaining SACS flows within system capabilities. ____
- **MONITOR** SACS System flow and Selectively **REDUCE** system loads as necessary using the following list while maintaining proper SACS system flows: [**CD-223H**] ____
  - RHR Hx (8650 gpm for SACS at 100F, 6920 gpm for SACS at 95F)
  - Fuel Pool Heat Exchangers (1000 gpm)
  - Diesel Generator Coolers (800 gpm) (IF inoperative or disabled)
  - Diesel Generator Room Coolers (260 gpm) (IF inoperative or disabled)
  - ECCS Pump Room Coolers:

    (RHR Pump 78 gpm)
    (RHR Pump/Hx Rm 89 gpm)
    (CS 68 gpm)
    (RCIC 13 gpm)
    (HPCI 35 gpm)
  - FRVS Coolers (380 gpm EACH for three operating units, 340 gpm EACH for four operating units)
  - Control Room Chillers (1588 gpm)
  - TSC Chiller (408 gpm)

Continued next page

4.7.4 (Continued)

C. **PLACE** A (B) RHR in Suppression Pool Cooling, IAW HC.OP-SO.BC-0001(Q), AND **CONTROL** Containment parameters IAW HC.OP-EO.ZZ-0102(Q), (IF an entry condition exists). **[CD-675F]** ____

CAUTION

Prior to isolating RCIC, Rx makeup with Control Rod Drive or Condensate Transfer Pumps should be available.

4.7.5. **ISOLATE** RCIC at 65 psig. ____

4.7.6. Closely **MONITOR** Diesel Generator load AND **MINIMIZE** equipment operation. ____

CAUTION

WHEN automatic loading sequence following a LOP or LOCA is complete, then Non-Class 1E loads may be started when required to support performance of the Emergency Operating Procedures or as determined by the SM/CRS to mitigate the consequences of an emergency.

Individual Emergency diesel loads may be added as follows:

- **Only ONE load may be added at a time.**
- **Loading must be verified to be below 100%. (4430 Kw @ 0.8 power factor)**

4.7.7. IF __ desired to re-energize any of the restorable Non-1E loads shed during a LOCA/LOP, THEN **PERFORM** the following: [**CD-837X, CD-461Y**]

A. **PRESS** the TRIP OVRD AND **VERIFY** the LOCA TRIP OVER RIDDEN light is illuminated. ____

B. **PRESS** the associated CLOSE button. ____

4.7.8. IF __ the LOP is a result of momentary transient, THEN **OPERATE** the EDGs until the SM is assured the cause of the transient is corrected. [**CD-650E, CD-675F**] ____

A. **ENSURE** the EDGs are running in ISOCHRONOUS MODE. ____

B. IF __ the EDGs are NOT running in ISOCHRONOUS MODE, THEN **PERFORM** the following:

1. **RAISE** frequency to 60 Hz. ____
2. **PRESS** AND **HOLD** for 1 sec the ISOCHRONOUS MODE push-button. ____
3. **RELEASE** the ISOCHRONOUS MODE push-button. ____
4. **ENSURE** the ISOCHRONOUS MODE light is illuminated. ____

4.7.9. **START** the following equipment as load permits: [**CD-675F**] ____

A. CRD Pump ____

B. Primary Containment Instrument Gas Compressor (IF Drywell temperatures are > 135°F, the PCIG suction should be re-aligned to Reactor Building air. (Compressor trips at 160°F suction temperature)) [**CD-651E**] ____

C. Fuel Pool Cooling Pump ____

NOTE

IF Emergency Instrument Air Compressor (EIAC) fails to Auto start, THEN HC.OP-AB.COMP-0001(Q), Instrument And/Or Service Air, should be reviewed.

4.7.10. **ENSURE** the EIAC Auto starts at an Instrument Air Header Pressure of 85 psig decreasing. [**CD-675F**] ____

4.8 **ENSURE** the Reactor Recirculation MG Oil Pumps, RFPT Oil Pumps, Turbine Emergency Bearing Oil Pumps, and Emergency Seal Oil Pump start. ____

4.9 **IMPLEMENT** the HCGS Emergency Plan. [**CD-675F**] ____

4.10 IF HPCI operation is NOT required for RPV level OR pressure control, THEN **SHUTDOWN** HPCI. [**CD-675F**] ____

4.11 IF offsite power is unavailable as indicated by low OR NO voltage on all 3 incoming lines, (5015, 5037 Salem, 5023 New Freedom) OR upon instruction from the System Operator,
THEN **PERFORM** the switching identified in Table 5.4. [**CD-675F**] ____

4.12 **REQUEST** the Salem SM to energize Hope Creek Bus Section 20X via the Salem 5037 tie line from Salem No. 3 Unit OR any energized 500Kv line into the Salem Switchyard AND **COORDINATE** loading with the Salem SM to minimize the potential for overloading or tripping (Salem Unit 3). [**CD-675F**] ____

4.13 **MINIMIZE** the operation of the SRVs. [**CD-675F**] ____

4.14 IF the Diesel Operated Fire Pump (00P521) is not required to support Station emergency actions, THEN **DIRECT** Fire Protection to secure the pump manually and evaluate the position of the Hope Creek to Salem Fire Cross Tie Valves for possible re-alignment. ____

NOTE

Shutdown Cooling will not be available due to loss of power to BBHV-F031A/B and loss of RPS bus power to BCHV-F008, F009, and F015A/B isolation logic.

4.15 IF RPV cooldown, AND depressurization are determined to be required, THEN **REFER TO** one of the following:
[**CD-675F, CD-602X**]

- HC.OP-IO.ZZ-0004(Q) Attachment 6 ____

  OR

- HC.OP-IO.ZZ-0007(Q) (Section 5.3) ____

  OR

- HC.OP-EO.ZZ-0101(Q) (IF entered) ____

  OR

- HC.OP-AB.ZZ-0000(Q) (IF entered) ____

4.16 WHEN there are indications of a full or partial 500KV System restoration, THEN **CONTACT** System Operator to verify stability of the 500Kv lines, 5015, New Freedom 5023, and/or Salem 5037. [**CD-675F**] ____

CAUTION

Perform only Section 4.17 OR 4.18. Do NOT perform both sections.

4.17 WHEN power is available to Hope Creek 500Kv Bus Section 20X, THEN **PERFORM** the following to re-energize the Switchyard services: ____

4.17.1. **CLOSE** circuit breakers listed in Attachment 3. ____

4.17.2. **CLOSE** 500Kv Circuit Switch 2T60 from the switchyard blockhouse. ____

4.17.3. **CLOSE** 13.8Kv Breaker BS 4-5 locally at the breaker. ____

4.17.4. **CLOSE** 13Kv breaker BS 2-3 locally at the breaker. ____

4.17.5. **DIRECT** the Control Room to restore power to the 1E busses from 1BX501 per Section 4.19 in parallel with the remainder of this section. ____

4.17.6. **OPEN** SLP 2 Transformer Main Breaker. (PAX2-2G) ____

4.17.7. **CLOSE** Switchyard Switchgear Tie Breaker PAX1-PAX2. (PAX1-2C, at PAX-1 SWGR) ____

CAUTION

Re-energizing Bailey Logic Cabinets should be coordinated with I&C to prevent loss of individual Bailey circuits due to transient overload.

I&C should be consulted with prior to closing breakers on the following panels:

1AJ484	**1BJ484**	**1CJ484**
1DJ484	**1CJ492**	**1DJ492**

4.17.8. **CLOSE** circuit breakers listed in Attachment 2. ____

4.17.9. Do NOT perform Section 4.18. ____

CAUTION

Perform only Section 4.17 OR 4.18. Do NOT perform both sections.

4.18 To energize the 13Kv yard from bus section 10X, **PERFORM** the following:

4.18.1. **CLOSE** circuit breakers listed in Attachment 3. ____

4.18.2. **CLOSE** 500Kv Circuit Switch 3T60 from the switchyard blockhouse. ____

4.18.3. **CLOSE** 13.8Kv Breaker BS 9-0 locally at the breaker. ____

4.18.4. **CLOSE** 13Kv breaker BS 7-8 locally at the breaker. ____

4.18.5. **DIRECT** the Control Room to restore power to the 1E busses from 1AX501 per Section 4.19 in parallel with the remainder of this section. ____

4.18.6. **OPEN** SLP 1 Transformer Main Breaker. (PAX1-2B) ____

4.18.7. **CLOSE** Switchyard Switchgear Tie Breaker PAX1-PAX2. (PAX1-2C, at PAX-1 SWGR) ____

CAUTION

Re-energizing Bailey Logic Cabinets should be coordinated with I&C to prevent loss of individual Bailey circuits due to transient overload.

I&C should be consulted with prior to closing breakers on the following panels:

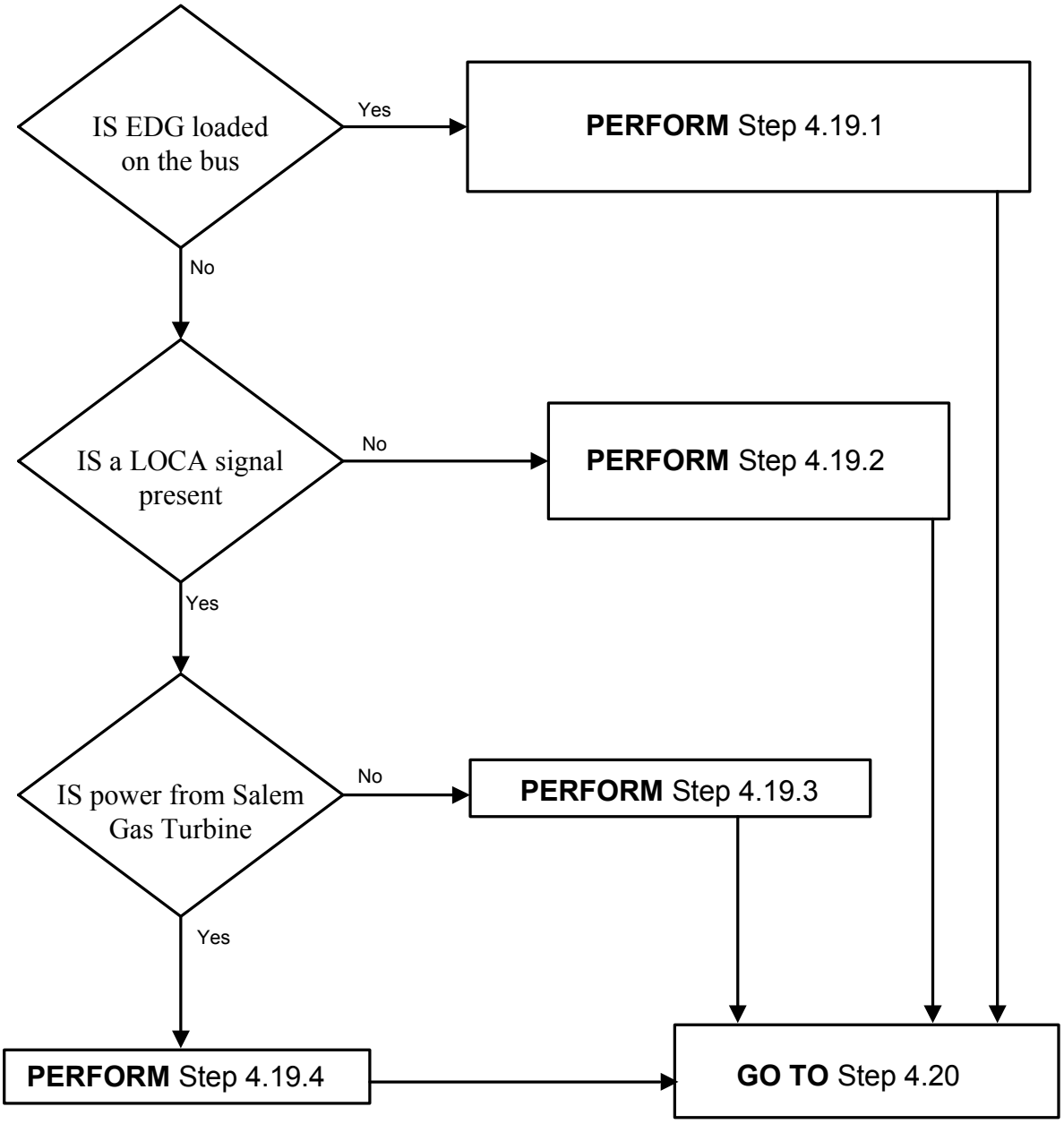
1AJ484 1BJ484 1CJ484

1DJ484 1CJ492 1DJ492

4.18.8. **CLOSE** circuit breakers listed in Attachment 2. ____

4.18.9. Do NOT perform Section 4.17. ____

4.19 When power has been restored to the 13kV switchyard transformers, **RESTORE** offsite power to the 1E 4KV busses as per the following flow chart:
[CD-675F]



4.19.1. EDG is loaded on the bus, **PERFORM** the following:

NOTE

Emergency load sequencer keys in Work Control Key Cabinet:
- Key 86, GEK594 or EB0001 (Sequencer A)
- Key 87, CAT60 or EB0001 (Sequencer B)
- Key 88, GEK592 or EB0001 (Sequencer C)
- Key 89, GEK591 or EB0001 (Sequencer D)

A. I F Core Spray initiation logic was tripped, AND was reset, THEN **RESET** Emergency Load sequencers using WCC keys. ____

B. I F LOCA conditions do not exist, THEN **ENSURE** Core Spray initiation logics (LOCA signal to EDGs) are reset by verifying the "Logic A (B, C, D) Initiation" lamps are extinguished. ____

C. **SHIFT** the busses from the Diesel Generator Breaker to the Normal Supply Breakers IAW HC.OP-SO.PB-0001(Q). ____

D. **PROCEED** to Section 4.20. ____

4.19.2. LOCA signal is NOT present, **PERFORM** the following:

NOTE

The following step defeats the PSIS signal.

A. **OPEN** both LOAD SEQUENCER POWER SUPPLY BREAKERS (located lower right hand side (back) of Panel 1A (B, C, D) C428) to de-energize DIESEL GEN LOAD SEQUENCER PNL. ____

B. **CLOSE** the 1E infeed breaker from the energized 13kV yard transformer (1AX501 or 1BX501). ____

C. As directed by the CRS, **REFER** to LOP Sequencer table 5.1 and manually **START** loads as required to re-establish systems. The LOP sequencer will not auto initiate unless the EDG output breaker is closed. ____

D. **PROCEED** to Section 4.20. ____

4.19.3. Power is NOT from Salem Unit 3 (gas turbine), **PERFORM** the following:

NOTE

LOCA sequencer will start loads as soon as power is restored.

A. **CLOSE** the 1E infeed breaker from the energized 13kV yard transformer (1AX501 or 1BX501). ____

B. **PROCEED** to Section 4.20. ____

4.19.4. Power is from Salem Unit 3 (gas turbine), **PERFORM** the following:

NOTE

When re-energizing electrical busses from the Salem Unit 3 generator, coordinate bus loading with the Salem control room to ensure that loading remains within Salem Unit 3 generator capability. (Approximately 4 MW per 1E vital bus).

IF LOCA conditions exist, the LOCA sequencers will control loads immediately upon restoration of power to the bus.

A. **OPEN** both LOAD SEQUENCER POWER SUPPLY BREAKERS
(located lower right hand side (back) of Panel 1A (B, C, D) C428) to de-energize DIESEL GEN LOAD SEQUENCER PNL. ____

B. **PLACE** the following breakers in Pull to Lock (PTL) as applicable:
(all breakers are arc flash 3)

- 401 (402, 403, 404) 04 (SACS) ____
- 401 (402, 403, 404) 05 (CS) ____
- 401 (402, 403, 404) 06 (RHR) ____
- 401 (402, 403, 404) 09 (SSW) ____
- 401 (402, 403, 404) 12 (Chillers) ____

C. **CLOSE** the 1E infeed breaker from energized 13kV (1AX501). ____

D. Manually START desired loads as directed by CRS. ____

E. **PROCEED** to Section 4.20. ____

4.20 **RESTORE** the following Electrical Systems as indicated:
[CD-675F]

4.20.1. Non-1E 4Kv System IAW HC.OP-SO.PB-0001(Q) ____

4.20.2. 480V System IAW HC.OP-SO.PG-0001(Q) ____

4.20.3. 7.2Kv System IAW HC.OP-SO.NA-0001(Q) ____

4.21 WHEN directed by System Operator,
THEN **RESTORE** the 500Kv Yard IAW HC.OP-SO.MH-0001(Z) and the 13Kv Yard IAW HC.OP-SO.MC-0001(Z). [**CD-675F**] ____

CAUTION

Minimization of heat-up of Chilled Water Loop is essential to ensure adequate cooling of chiller oil during restart attempt. Inadequate oil cooling will result in a chiller trip.

4.22 **PERFORM** the following to minimize heatup of Chilled Water Loop:
[**CD-675F**] ____

4.22.1. **SECURE** Chilled Water Pumps
AND **MINIMIZE** the use of associated fans until ready to attempt Chiller restart. ____

4.22.2. WHEN power is restored to the Turbine Building Chilled Water,
THEN **ATTEMPT** a Chiller restart, as soon as possible, to further minimize Chilled Water loop heat-up. ____

4.23 WHEN power is restored,
THEN **PERFORM** the following to restore Chilled Water: [**CD-675F**]

4.23.1. **ENSURE** TACS has been re-established to chillers. ____

4.23.2. **ENSURE** two of three Chilled Water Pumps are running through at least two but NO more than three Chillers. ____

4.23.3. **ENSURE** any alarms are cleared by pressing the push-button on Local Panel OR pressing the STOP push-button in Main Control Room. ____

4.23.4. **REFER TO** HC.OP-SO.GB-0001(Q)
AND **PERFORM** the normal start sequence. ____

4.24 WHEN HPCI/RCIC Room temperatures return to normal
THEN **PERFORM** the following: [**CD-675F**]

4.24.1. **ENSURE** the following the HPCI Room Fire Dampers are open:

- 1FP-GUD292 ____
- 1FP-GUD293 ____

4.24.2. **PLACE** HPCI AND RCIC high temperature isolation trip switches to NORMAL at the following panels: (Key 172, PA2235 in Work Control Key Cabinet for all switches) ____

A. HPCI at Panel P-620 Switch B21B-S6A ____

Panel P-641 Switch B21B-S6C ____

B. RCIC at Panel P-621 Switch B21B-S5B ____

Panel P-640 Switch B21B-S5D ____

4.25 When directed by the CRS, **PERFORM** the following:

4.25.1. **ENSURE** all Load Sequencer breakers A (B, C, D) C428 are closed. ____

NOTE

Emergency load sequencer keys in Work Control Key Cabinet:
- Key 86, GEK594 or EB0001 (Sequencer A)
- Key 87, CAT60 or EB0001 (Sequencer B)
- Key 88, GEK592 or EB0001 (Sequencer C)
- Key 89, GEK591 or EB0001 (Sequencer D)

4.25.2. **RESET** LOP Emergency Load sequencers using WCC keys. ____

4.25.3. **RESET** LOCA sequencers and **VERIFY** “Logic A (B, C, D) Initiation” lamps are extinguished. ____

5.0 DISCUSSION

5.1 Upon loss of offsite power all Non-Class 1E loads are shed from the emergency busses. Various non-class 1E loads will sequence back on following the energization of the Class 1E busses, if a LOCA signal is NOT present. A list of loads and sequencing times are in Table 5.1 for load sequenced equipment after a LOP and 5.2 for load sequenced equipment after a LOCA. Both RACS pumps will sequence "ON" and the RACS diversion valves open to the Drywell Coolers following a LOP. Subsequently the drywell cooler fans automatically start. ____

5.2 Upon a LOP all Class 1E System Instruments are powered from Class 1E UPS supplies which auctioneer to their associated 125VDC supply. Should a Diesel Generator fail to start the 1E 125VDC Battery Busses are reliable for a minimum of 4 hours. The non-1E UPS supplies are reliable for up to a minimum of 4 hours. At all times during a LOP the operator should consider redundant or similar indication and/or in-plant observation. (**SEE** Table 5.3) [**CD-214D, CD-675F**] ____

5.3 Symptoms for failed Control Room process indicators resulting from the LOP include:

- Red led power indicator not lit. ____
- "RY" edgewise indicator showing a steady mid-scale reading. ____
- Bailey indicating recorder and Bailey vertical ribbon indicator failed full downscale. ____

5.4 During a LOCA or LOP/LOCA process indicators which are environmentally qualified are indicated by a brown label on the indicator/recorder bezel. ____

5.5 HPCI and RCIC are supplied from the 125V/250VDC busses supply and remain operable during the loss of offsite power for a minimum of 4 hours. [**CD-675F**] ____

5.6 Loss of offsite power can result from major shifts in electrical loads, lightning, storms, wind, or fire and smoke. Operators should be aware that a loss of offsite power can occur from out of phase comparison trips from smoke providing a conductive path between line phases during brush fires. [**CD-098B**] ____

5.7 System Operator has the capability to OPEN/CLOSE the following 500Kv Breakers:

- BS 1-3 ____
- BS 5-1 ____
- BS 3-4 ____
- BS 2-4 ____
- System Operators can also OPEN BS 6-5 IF BS 2-6 is CLOSED. ____

5.8 500Kv (except BS 2-4) and 13.8Kv Circuit Breakers are pneumatically operated, and each breaker has sufficient stored air for a minimum of three operations without compressor actuation. 500Kv Circuit Breaker BS 2-4 is hydraulically operated, and has sufficient stored energy for a minimum of two operations without hydraulic pump operation.
Loss of PAX panel AC power to the 500kV circuit breaker gas compressor and tank heaters will lead to a breaker trip and lock out on Low Gas Pressure. Therefore, during a LOP/SBO event, it is imperative to restore AC power to the 500kV breaker gas compressor as soon as possible in order to clear the Low Pressure lockout and satisfy SOP prerequisite for normal gas pressure. If power from the Salem Gas Turbine via the X-Tie Line 5037 will not be available, notify T&D or Site Maintenance that a portable AC gas generator will be needed to supply power to the breaker gas compressor and heaters. ____

5.9 125VDC Control Power for 500Kv Breakers is supplied by a Primary DC System and a Backup DC System at the Switchyard Control House. Each system has 2 battery chargers and a 125VDC battery designed to last a minimum of 12 hours. The Backup DC System provides power for protective actuations (such as breaker trips) only and is NOT capable of supplying power for breaker closure. ____

5.10 It is highly unlikely that a common mode failure could occur that would render all EDGs inoperative coincident with a loss of offsite power. If this does occur, then EDGs A and B provide power to HPCI and RCIC respectively and suppression pool cooling, and EDGs C and D provide power to the Instrument Gas System for subsequent operations of the SRV's. CRS shall decide which EDG to start first. ____

5.11 IF an EDG fails to start and is rendered inoperable while a valid LOCA condition exists, then contact the TSC (when manned) to provide support for obtaining temporary power from an operable bus to supply the inoperable diesel's fuel oil transfer pumps. Fuel oil can then be transferred from the Fuel Oil Storage Tanks of the inoperable Diesel to the operating Diesels Fuel Oil Storage Tanks. This will ensure a continuous 7-day supply is available in the event of an extended loss of offsite power. [**CD-225G**] ____

5.12 An EDG trips upon receipt of any of the following signals on automatic initiation:

- Engine overspeed 565-576 RPM (110-112%) ____
- Generator regular differential overcurrent ____
- Generator phase overcurrent ____
- Lube oil pressure low (60 psi decreasing) ____
- Bus differential overcurrent ____

5.13 Possible causes for a EDG failure to start:

- Loss of fuel ____
- Loss of starting air to engine, valves closed ____
- Loss of 125VDC control power ____
- Trip signal on DG breaker, in test ____

5.14 The EDG has many more trips in test than with initiation signal present and all high priority alarm condition should be checked. ____

5.15 The D/G is equipped with a sync check relay which prohibits the operator from closing the D/G Bkr. when incoming and running voltages are out of phase. [**CD-675F**] ____

5.16 The Anti-pump circuitry on the D/G output breaker could cause the output breaker to fail open, if a LOP were to occur within 2 seconds of closing the output breaker when testing and loading the D/G to the grid. To load the D/G under this condition the operator must wait a minimum of 2 seconds from the time the breaker was originally closed, then depress the TRIP push-button (even though the breaker is already tripped) to reset the logic. When the TRIP push-button is released, then the breaker will close and the D/G will load. ____

5.17 During a Station Blackout, the possibility of heat stress in various areas exists and the practice of stay time should be considered. (Reference Health and Safety Manual) [**PR 960507167**] ____

5.18 During a loss of off-site power/station blackout, the Diesel Fire Pump will auto start. Continued operation of the Fire Pump will result in loss of inventory of the Fire Water Storage Tanks due to no Recirc capability for the system. The Fire Water will dump via system relief valves and discharge into the storm drain system. ____

5.19 The existence of this procedures fulfills the requirements of the following Closing Documents: ____

- CD-278C, INPO SER 25-84
- CD-301Y, FSAR Z430.31
- CD-214D, NRC GENERIC LETTER 81-04
- CD-374B, NRC IN 84-38
- CD-602X, FSAR 1.14.1.66.2
- CD-026Z, NRC Open Item 354/85-24-03
- CD-098B, INPO SER 5-83
- CD-461Y, FSAR 9.5.3.3
- CD-651X, FSAR 9.3.6.2.2
- CD-837X, FSAR 9.5.3.2.2
- CD-650E, NRC LER 86-192
- CD-533X, FSAR 9.2.8.2 amend 10
- CD-526X, FSAR 9.2.7.1.3
- CD-675F, NRC CODE 10 CFR 50.63
- CD-225G, NRC VIOL 354/92-80-05

LOP SEQUENCER TABLE 5.1

LOP SEQUENCER "A" (PNL AC428)		
MANUAL SWITCH	**NOMENCLATURE**	**SEQUENCE TIMER**
HS-6855-ER	AVH – 212; DRYWELL COOLER FAN BVH – 212; DRYWELL COOLER FAN CVH – 212; DRYWELL COOLER FAN DVH – 212; DRYWELL COOLER FAN EVH – 212; DRYWELL COOLER FAN FVH – 212; DRYWELL COOLER FAN GVH – 212; DRYWELL COOLER FAN HVH – 212; DRYWELL COOLER FAN	13 sec
HS-6855-ES	CV-301; R/B AIR HANDLING UNIT BVH-300; R/B AIR HANDLING UNIT	19 sec
HS-6855-EK	AV-412; DG ROOM RECIRC FAN EV-412; DG ROOM RECIRC FAN	30 sec
HS-6855-ED	AP-210; SACS PUMP	45 sec
HS-6855-EE	AP-502; SSWS PUMP	55 sec
HS-6855-EL	AVH-401; SWGR RM COOLER FAN	65 sec
HS-6855-EF	AK-403; CLASS 1E PNL RM CHILLER AP-414; CLASS 1E PNL RM CHILLER PMP	75 sec
HS-6855-EM	AVH-408; CLASS 1E PNL RM FAN	80 sec
HS-6855-ET	AP-209; RACS PUMP	85 sec
HS-6855-EW	AV-412; DG RM RECIRC FAN EV-412; DG RM RECIRC FAN	95 sec
HS-6855-EA	SPARE	SPARE
HS-6855-EG	SPARE	SPARE
HS-6855-EH	SPARE	SPARE
HS-6855-EI	SPARE	SPARE
HS-6855-EJ	SPARE	SPARE
HS-6855-EN	SPARE	SPARE
HS-6855-EP	SPARE	SPARE
HS-6855-EU	SPARE	SPARE
HS-6855-EV	SPARE	SPARE

LOP SEQUENCER TABLE 5.1 (Continued)

LOP SEQUENCER "B" (PNL BC428)		
MANUAL SWITCH	**NOMENCLATURE**	**SEQUENCE TIMER**
HS-6855-FP	AVH – 212; DRYWELL COOLER FAN BVH – 212; DRYWELL COOLER FAN CVH – 212; DRYWELL COOLER FAN DVH – 212; DRYWELL COOLER FAN EVH – 212; DRYWELL COOLER FAN FVH – 212; DRYWELL COOLER FAN GVH – 212; DRYWELL COOLER FAN HVH – 212; DRYWELL COOLER FAN	13 sec
HS-6855-FR	BV – 301; R/B EXHAUST FAN	19 sec
HS-6855-FK	BV – 412; DG ROOM RECIRC FAN FV – 412; DG ROOM RECIRC FAN	30 sec
HS-6855-FD	BP-210; SACS PUMP	45 sec
HS-6855-FE	BP-502; SSWS PUMP	55 sec
HS-6855-FL	BVH-401; SWGR RM COOLER FAN	65 sec
HS-6855-FF	BK-403; CLASS 1E PNL RM CHILLER BP-414; CLASS 1E PNL RM CHILLER PMP	75 sec
HS-6855-FM	BVH-408; CLASS 1E PNL RM FAN	80 sec
HS-6855-FS	BP-209; RACS PMP	85 sec
HS-6855-FW	BV-412; DG RM RECIRC FAN FV-412; DG RM RECIRC FAN	95 sec
HS-6855-FA	SPARE	SPARE
HS-6855-FG	SPARE	SPARE
HS-6855-FH	SPARE	SPARE
HS-6855-FI	SPARE	SPARE
HS-6855-FJ	SPARE	SPARE
HS-6855-EN	SPARE	SPARE
HS-6855-FN	SPARE	SPARE
HS-6855-FT	SPARE	SPARE
HS-6855-FU	SPARE	SPARE
HS-6855-FV	SPARE	SPARE

LOP SEQUENCER TABLE 5.1(Continued)

LOP SEQUENCER 'C' (PNL CC428)		
MANUAL SWITCH	**NOMENCLATURE**	**SEQUENCE TIMER**
HS-6855-GP	CVH-300; R/B AIR HANDLING UNIT	19 sec
HS-6855-GC	AVH-403; CLASS 1E PNL RM CHILLER AV-415; CONTROL RM FAN AV-400; CR EMER HTG COIL	30 sec
HS-6855-GJ	CV-412; DG RM RECIRC FAN GV-412; DG RM RECIRC FAN	30 sec
HS-6855-GD	CP-210; SACS PUMP	45 sec
HS-6855-GE	CD-502; SSWS PUMP	55 sec
HS-6855-GF	AK-400; CONTROL ROOM WATER CHILLER AV-410; CONTROL AREA BATTERY FAN	60 sec
HS-6855-GG	AP-400; CR CHILLER PUMP	65 sec
HS-6855-GK	CVH-401; SWGR RM COOLER FAN	65 sec
HS-6855-GH	AVH-407; CONTROL EQUIP RM HTG COIL	70 sec
HS-6855-GA	SPARE	SPARE
HS-6855-GI	SPARE	SPARE
HS-6855-GL	SPARE	SPARE
HS-6855-GM	SPARE	SPARE
HS-6855-GN	SPARE	SPARE
HS-6855-GR	SPARE	SPARE
HS-6855-GS	SPARE	SPARE
HS-6855-GT	SPARE	SPARE
HS-6855-GU	SPARE	SPARE
HS-6855-GV	SPARE	SPARE
HS-6855-GW	SPARE	SPARE

LOP SEQUENCER TABLE 5.1(Continued)

LOP SEQUENCER 'D' (PNL DC428))		
MANUAL SWITCH	**NOMENCLATURE**	**SEQUENCE TIMER**
HS-6855-HM	AV-301; R/B EXHAUST FAN AVH-300; R/B AIR HANDLING UNIT	19 sec
HS-6855-HC	BV-400; CONTROL RM EMER HTG COIL BV-415; CONTROL RM RETURN FAN BVH-403; CONTROL RM SUPPLY FAN	30 sec
HS-6855-HJ	DV-412; DG RM RECIRC FAN HV-412; DG RM RECIRC FAN	30 sec
HS-6855-HD	DP-210; SACS PUMP	45 sec
HS-6855-HE	DP-502; SSWS PUMP	55 sec
HS-6855-HF	BV-410; CONTROL AREA BATTERY FAN BK-400; CONTROL ROOM CHILLER	60 sec
HS-6855-HG	BP-400; CONTROL ROOM CHILLER PUMP	65 sec
HS-6855-HK	DVH-401; SWGR RM COOLER FAN	65 sec
HS-6855-HH	BVH-407; CONTROL EQUIP RM FAN	70 sec
HS-6855-HW	DV-412; DG RM RECIRC FAN HV-412; DG RM RECIRC FAN	95 sec
HS-6855-HA	SPARE	
HS-6855-HI	SPARE	
HS-6855-HL	SPARE	
HS-6855-HN	SPARE	
HS-6855-HP	SPARE	
HS-6855-HR	SPARE	
HS-6855-HS	SPARE	
HS-6855-HT	SPARE	
HS-6855-HU	SPARE	SPARE
HS-6855-HV	SPARE	SPARE

LOCA SEQUENCER TABLE 5.2

LOCA SEQUENCER "A" (PNL AC428)		
MANUAL SWITCH	**NOMENCLATURE**	**SEQUENCE TIMER**
HS-6854-AB	AV-213; R/B FRVS RECIRC FAN AV-206; R/B FRVS VENT FAN	19 sec
HS-6854-AC	EV-213; R/B FRVS RECIRC FAN	30 sec
HS-6854-AK	AV-412; DG RM RECIRC FAN EV-412; DG RM RECIRC FAN	30 sec
HS-6854-AD	AP-210; SACS PUMP	45 sec
HS-6854-AE	AP-502; SSWS PUMP	55 sec
HS-6854-AL	AVH-401; SWGR RM COOLER FAN	65 sec
HS-6854-AF	AK-403; CLASS 1E PNL RM CHILLER AP-414; CLASS 1E PNL RM CHILLER PMP	75 sec
HS-6854-AM	AVH-408; CLASS 1E PNL RM FAN	80 sec
HS-6854-AW	AV-412; DG RM RECIRC FAN EV-412; DG RM RECIRC FAN	95 sec
HS-6854-AA	SPARE	SPARE
HS-6854-AG	SPARE	SPARE
HS-6854-AH	SPARE	SPARE
HS-6854-AI	SPARE	SPARE
HS-6854-AJ	SPARE	SPARE
HS-6854-AN	SPARE	SPARE
HS-6854-AP	SPARE	SPARE
HS-6854-AR	SPARE	SPARE
HS-6854-AS	SPARE	SPARE
HS-6854-AT	SPARE	SPARE
HS-6854-AU	SPARE	SPARE
HS-6854-AV	SPARE	SPARE

LOCA SEQUENCER TABLE 5.2 (Continued)

LOCA SEQUENCER "B" (PNL BC428)		
MANUAL SWITCH	**NOMENCLATURE**	**SEQUENCE TIMER**
HS-6854-BB	BV-213; R/B FRVS RECIRC FAN BV-206; R/B FRVS VENT FAN	19 sec
HS-6854-BC	FV-213; R/B FRVS RECIRC FAN	30 sec
HS-6854-BK	BV-412; DG RM RECIRC FAN FV-412; DG RM RECIRC FAN	30 sec
HS-6854-BD	BP-210; SACS PUMP	45 sec
HS-6854-BE	BP-502; SSWS PUMP	55 sec
HS-6854-BL	BVH-401; SWGR RM COOLER FAN	65 sec
HS-6854-BF	BK-403; CLASS 1E PNL RM CHILLER BP-414; CLASS 1E PNL RM CHILLER PMP	75 sec
HS-6854-BM	BVH-408; CLASS 1E PNL RM FAN	80 sec
HS-6854-BW	BV-412; DG RM RECIRC FAN FV-412; DG RM RECIRC FAN	95 sec
HS-6854-BA	SPARE	SPARE
HS-6854-BG	SPARE	SPARE
HS-6854-BH	SPARE	SPARE
HS-6854-BI	SPARE	SPARE
HS-6854-BJ	SPARE	SPARE
HS-6854-BN	SPARE	SPARE
HS-6854-BP	SPARE	SPARE
HS-6854-BR	SPARE	SPARE
HS-6854-BS	SPARE	SPARE
HS-6854-BT	SPARE	SPARE
HS-6854-BU	SPARE	SPARE
HS-6854-BV	SPARE	SPARE

LOCA SEQUENCER TABLE 5.2(Continued)

LOCA SEQUENCER "C" (PNL CC428)		
MANUAL SWITCH	**NOMENCLATURE**	**SEQUENCE TIMER**
HS-6854-CB	CV-213; R/B FRVS RECIRC FAN	19 sec
HS-6854-CC	AVH-403; CLASS 1E PNL RM CHILLER AV-415; CONTROL RM FAN AV-400; CR EMER HTG COIL	30 sec
HS-6854-CJ	CV-412; DG RM RECIRC FAN GV-412; DG RM RECIRC FAN	30 sec
HS-6854-CD	CP-210; SACS PUMP	45 sec
HS-6854-CE	CP-502; SSWS PUMP	55 sec
HS-6854-CF	AK-400; CONTROL ROOM WATER CHILLER AV-410; CONTROL AREA BATTERY FAN	60 sec
HS-6854-CG	AP-400; CR CHILLER PUMP	65 sec
HS-6854-CK	CVH-401; SWGR RM COOLER FAN	65 sec
HS-6854-CH	AVH-407; CONTROL EQUIP RM HTG COIL	70 sec
HS-6854-CW	CV-412; DG RM RECIRC FAN GV-412; DG RM RECIRC FAN	95 sec
HS-6854-CA	SPARE	SPARE
HS-6854-CI	SPARE	SPARE
HS-6854-CL	SPARE	SPARE
HS-6854-CM	SPARE	SPARE
HS-6854-CN	SPARE	SPARE
HS-6854-CP	SPARE	SPARE
HS-6854-CR	SPARE	SPARE
HS-6854-CS	SPARE	SPARE
HS-6854-CT	SPARE	SPARE
HS-6854-CU	SPARE	SPARE
HS-6854-CV	SPARE	SPARE

LOCA SEQUENCER TABLE 5.2 (Continued)

LOCA SEQUENCER "D" (PNL DC428)		
MANUAL SWITCH	**NOMENCLATURE**	**SEQUENCE TIMER**
HS-6854-DB	DV-213; R/B FRVS RECIRC FAN	19 sec
HS-6854-DC	BVH-403; CLASS 1E PNL RM CHILLER BV-415; CONTROL RM FAN BV-400; CR EMER HTG COIL	30 sec
HS-6854-DJ	DV-412; DG RM RECIRC FAN HV-412; DG RM RECIRC FAN	30 sec
HS-6854-DD	DP-210; SACS PUMP	45 sec
HS-6854-DE	DP-502; SSWS PUMP	55 sec
HS-6854-DF	BK-400; CONTROL ROOM WATER CHILLER BV-410; CONTROL AREA BATTERY FAN	60 sec
HS-6854-DG	BP-400; CR CHILLER PUMP	65 sec
HS-6854-DK	DVH-401; SWGR RM COOLER FAN	65 sec
HS-6854-DH	BVH-407; CONTROL EQUIP RM HTG COIL	70 sec
HS-6854-DW	DV-412; DG RM RECIRC FAN HV-412; DG RM RECIRC FAN	95 sec
HS-6854-DA	SPARE	SPARE
HS-6854-DI	SPARE	SPARE
HS-6854-DL	SPARE	SPARE
HS-6854-DM	SPARE	SPARE
HS-6854-DN	SPARE	SPARE
HS-6854-DP	SPARE	SPARE
HS-6854-DR	SPARE	SPARE
HS-6854-DS	SPARE	SPARE
HS-6854-DT	SPARE	SPARE
HS-6854-DU	SPARE	SPARE
HS-6854-DV	SPARE	SPARE

TABLE 5.3
BATTERY BANK CAPACITIES

125 VDC 1E (design 4 hrs)

Ch	Switchgear	Battery	Capacity (design 4 hrs)
A	10D410	1AD411	1885 AH at 8 hours
B	10D420	1BD411	1885 AH at 8 hours
C	10D430	1CD411	1885 AH at 8 hours
D	10D440	1DD411	1885 AH at 8 hours
C	10D436	1CD447	577 AH at 8 hours
D	10D446	1DD447	577 AH at 8 hours

125 VDC Non 1E (design 4 hrs)

	Switchgear	Battery	Capacity (design 4 hrs)
10D470		1A1D471	1650 AH at 8 hours
		1A2D471	1650 AH at 8 hours
10D480		1B1D471	1650 AH at 8 hours
		1B2D471	1650 AH at 8 hours
10D476		1A1D477	1650 AH at 8 hours
		1A2D477	1650 AH at 8 hours
10D486		1B1D477	1650 AH at 8 hours
		1B2D477	1650 AH at 8 hours
Guardhouse	10D510	10D511	1500 AH at 8 hours

+ 24VDC Non-1E (design 4 hrs)

	Switchgear	Battery	Capacity (design 4 hrs)
	1AD307	1AD301	100 AH at 8 hours
	1BD307	1BD301	100 AH at 8 hours

250VDC 1E (design 4 hrs)

Ch	Sw	itchgear	Battery	Capacity (design 4 hrs)
HPCI	A	10D450 (to 10D251 bus)	10D421	825 AH at 8 hours
RCIC	B	10D460 (to 10D261 bus)	10D431	330 AH at 8 hours

Continued on next page

TABLE 5.3 (Continued)
BATTERY BANK CAPACITIES

250VDC Non-1E (design 1 hr)

Switchgear	Battery	Capacity (design 1 hr)
10D170	10D141	825 AH at 8 hours

Switchyard

Switchgear	Battery	Capacity
Primary 10-R111	10-R106	275 AH at 8 hours
Backup 10-R117	10-R112	275 AH at 8 hours

TABLE 5.4		
OPEN / VERIFY OPEN THE FOLLOWING		
500KV BREAKERS	BS 5-1 BS 6-5 BS 2-6 BS 2-4 (Verify from CR only) BS 1-3 BS 3-4	Control Room
500KV CIRCUIT SWITCHERS	2T60 4T60	Control Room
13.8KV BREAKERS	BS 9-0 BS 7-8 BS 6-7 BS 1-2 BS 2-3 BS 4-5	Control Room
7.2KV BREAKERS	52-11001 52-11008 52-12001 52-12008	Control Room/ 120' TB
52-50101	52-50105 52-50108 52-50201 52-50205 52-50207	Control Room/ CW
4.16KV BREAKERS	52-10201 52-10210 52-10206 52-10207 52-10205 52-10203 52-10110 52-10105 52-10107 52-10103 52-10101 52-10301 52-10310 52-10401 52-10410	Control Room/ 120' TB

Continued on next page

TABLE 5.4		
OPEN / VERIFY OPEN THE FOLLOWING		
13.8KV FEEDER BREAKERS TO THE ARTIFICIAL ISLAND SUBSTATION	31G-52-1 32G-52-1 41G-52-2 42G-52-2	Yard

TABLE 5.5
CONTAINMENT ISOLATION VALVES

LINE/SYSTEM PENETRATION		LINE SIZE	VALVE NUMBER	LOCATION
HPCI Turbine Steam Supply	P-7	10	FD-HV-F003	4327/102 Pipe Chase
RWCU Supply	P-9	6	BG-HV-F004	4505/145 Pipe Chase
RCIC Turbine Steam Supply	P-11	4	FC-HV-F008	4319/102 Pipe Chase
Drywell Purge Inlet Vent	P-22	4	GS-HV-5050B	4321/102 Pipe Chase
Drywell Purge Outlet Vent	P-23	4	GS-HV-5050A	4410B/132 FRVS Recirc Unit Area B
HPCI & RCIC Vacuum Network	P-204	3	FC-HV-F084	4227D/77 Torus Area D
HPCI & RCIC Vacuum Network	P-204	3	FD-HV-F079	4102G/55 Torus Area G
RHR Suppression Chamber Spray Header	P-214A	6	BC-HV-F027B	4227A/77 Torus Area A
RHR Suppression Chamber Spray Header	P-214B	6	BC-HV-F027A	4227G/77 Torus Area G
Suppression Chamber Purge Vent Vacuum Relief	P-219	6	GS-HV-5054B	4227A/77 Torus Area A
Suppression Chamber Purge Inlet & Vacuum Relief	P-220	6	GS–HV-5054A	4227E/77 Torus Area E

ATTACHMENT 1
CONTROL ROOM HVAC ACTIONS
Page 1 of 1

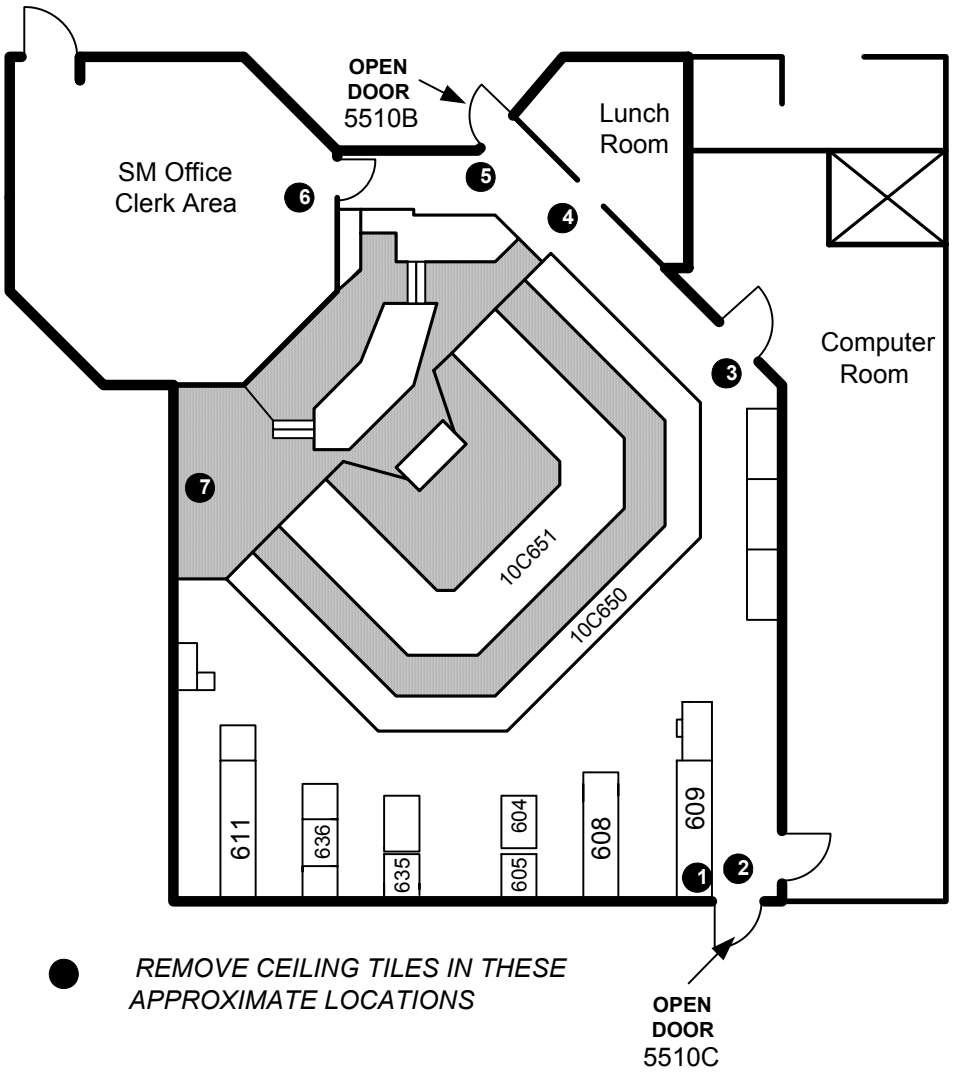
EQUIPMENT REQUIRED:

2 Door Stops
Tile Removal Pole (or equivalent)

1. **REMOVE / BREAK OUT** the seven Control Room ceiling panels identified below. ____

2. **BLOCK OPEN** doors 5510B and 5510C to the Main Control Room. ____

3. **OPEN** the following electrical cabinet doors:
   10C650, 10C611, 10C609, 10C635, 10C636, 10C604, 10C605, 10C608 ____

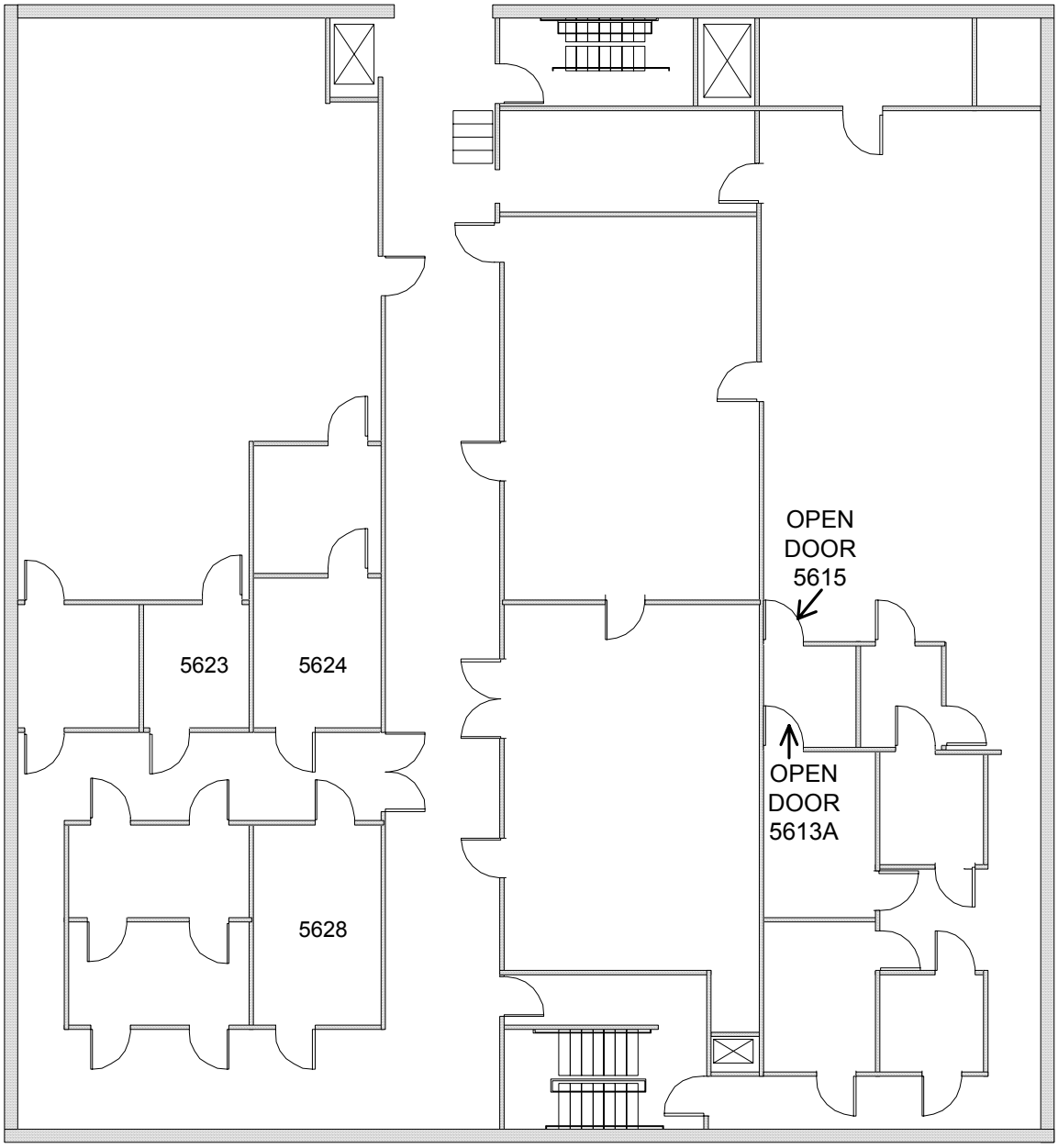


ATTACHMENT 2
AUX BUILDING ACTIONS [CD-675F]

EQUIPMENT REQUIRED:

2 Door Stops

1. **BLOCK OPEN** doors 5615 and 5613A to Inverter Room 5615 (163' Aux building).



ATTACHMENT 2
AUX BUILDING ACTIONS [CD-675F]

DC LOAD SHEDDING

1. **OPEN** the circuit breakers in the following tables when plant has entered an SBO.
   CLOSE the circuit breakers in the following tables when restoring offsite power.
   All are ARC Flash Category 0.

In order to reduce the heat loads in Control Equipment Room 5302 (Lower Relay Room), several circuits located within cabinets in that room, which are powered by Non-Class 1E batteries, will be de-energized. The order below is based on distribution panel location and heat load (which is identified in parentheses). De-energize the following:

LOCATION	PANEL #	CIRCUIT #	LOAD (6080 W)	OPEN	CLOSE
163' CONTROL DIESEL RM 5628	1AJ484	1	NON-1E SOLID STATE LOGIC CAB. 1AC653-2		
		2	NON-1E SOLID STATE LOGIC CAB. 1AC653-3		
		3	NON-1E SOLID STATE LOGIC CAB. 1AC653-6		
		4	NON-1E SOLID STATE LOGIC CAB. 1AC653-7		
		5	NON-1E SOLID STATE LOGIC CAB. 1AC653-10		
		6	NON-1E SOLID STATE LOGIC CAB. 1AC653-11		
		8	FIRE PROT PNLS 10C467, 1CC441, 10C466, 10C464, 10C465		
		9	PLANT MULTIPLEXING CAB. 1AC676B		
		14	NON-1E OPTICAL ISOLATION AUX CAB. 10C663		

LOCATION	PANEL #	CIRCUIT #	LOAD (5140 W)	OPEN	CLOSE
163' CONTROL DIESEL RM 5628	1CJ484	1	NON-1E SOLID STATE LOGIC CAB. 1CC653-2		
		2	NON-1E SOLID STATE LOGIC CAB. 1CC653-3		
		3	NON-1E SOLID STATE LOGIC CAB. 1CC653-6		
		4	NON-1E SOLID STATE LOGIC CAB. 1CC653-7		
		5	NON-1E SOLID STATE LOGIC CAB. 1CC653-10		
		6	NON-1E SOLID STATE LOGIC CAB. 1CC653-11		
		14	RMS LASER PRINTER 10C629, 1LC600, 1MC600		

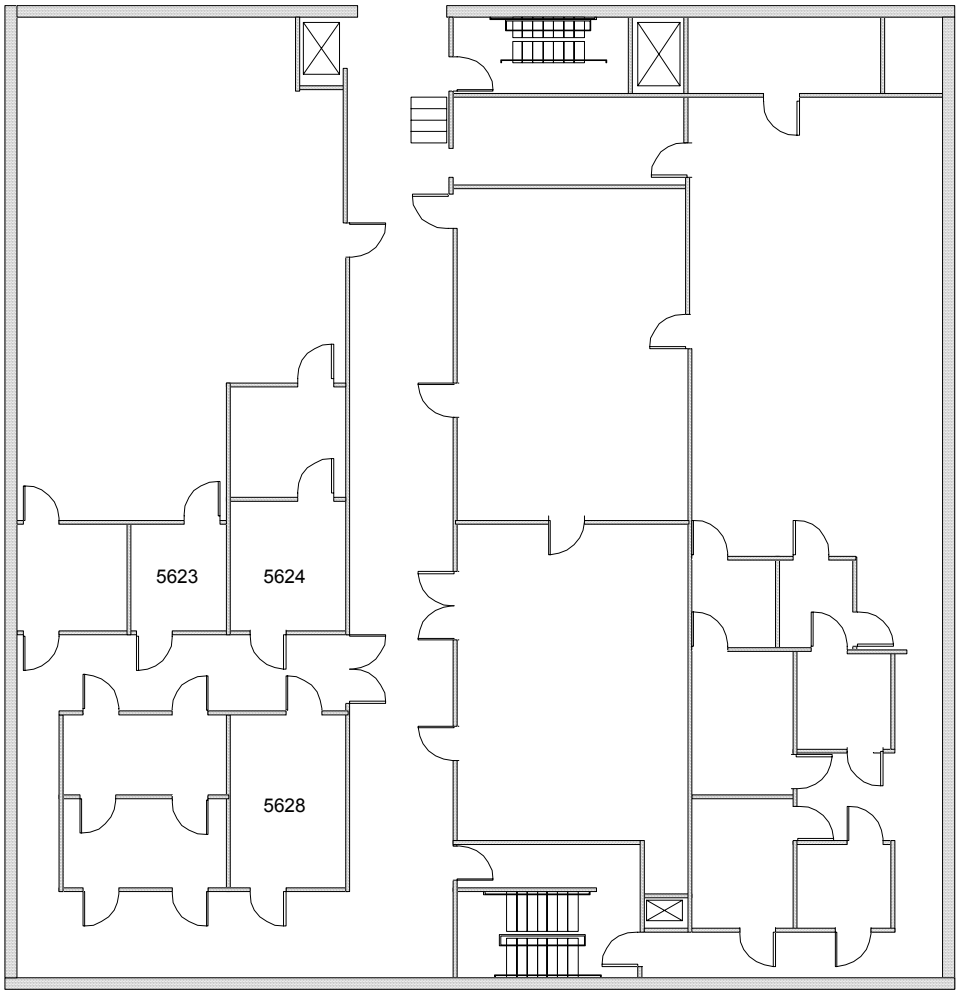
LOCATION	PANEL #	CIRCUIT #	LOAD (4650 W)	OPEN	CLOSE
163' CONTROL DIESEL RM 5624	1BJ484	1	NON-1E SOLID STATE LOGIC CAB. 1BC653-2		
		2	NON-1E SOLID STATE LOGIC CAB. 1BC653-3		
		3	NON-1E SOLID STATE LOGIC CAB. 1BC653-6		
		4	NON-1E SOLID STATE LOGIC CAB. 1BC653-7		
		5	NON-1E SOLID STATE LOGIC CAB. 1BC653-10		
		6	NON-1E SOLID STATE LOGIC CAB. 1BC653-11		
		14	NON-1E OPTICAL ISOLATION AUX CAB. 10C663		

LOCATION	PANEL #	CIRCUIT #	LOAD (4565 W)	OPEN	CLOSE
163' CONTROL DIESEL RM 5624	1DJ484	1	NON-1E SOLID STATE LOGIC CAB. 1DC653-2		
		2	NON-1E SOLID STATE LOGIC CAB. 1DC653-3		
		3	NON-1E SOLID STATE LOGIC CAB. 1DC653-6		
		4	NON-1E SOLID STATE LOGIC CAB. 1DC653-7		
		5	NON-1E SOLID STATE LOGIC CAB. 1DC653-10		
		6	NON-1E SOLID STATE LOGIC CAB. 1DC653-11		

ATTACHMENT 2
AUX BUILDING ACTIONS [CD-675F]
Page 3 of 5
DC LOAD SHEDDING

LOCATION	PANEL #	CIRCUIT #	LOAD (2200 W)	OPEN	CLOSE
163' CONTROL DIESEL RM 5623	1DJ492	3	DIGITAL I/O CAB. 10Z628		
		4	ANALOG I/O CAB. 10Z653A		
		5	DIGITAL I/O CAB. 10Z632		
		7	DIGITAL I/O CAB. 10Z658		
		9	DIGITAL I/O CAB. 10Z656		
		16	DIGITAL I/O CAB. 10Z660		

LOCATION	PANEL #	CIRCUIT #	LOAD (1260 W)	OPEN	CLOSE
163' CONTROL DIESEL RM 5623	1CJ492	5	DIGITAL I/O CAB. 10Z630		
		14	ANALOG I/O CAB. 10Z663A		
		17	ANALOG I/O CAB. 10Z662A		

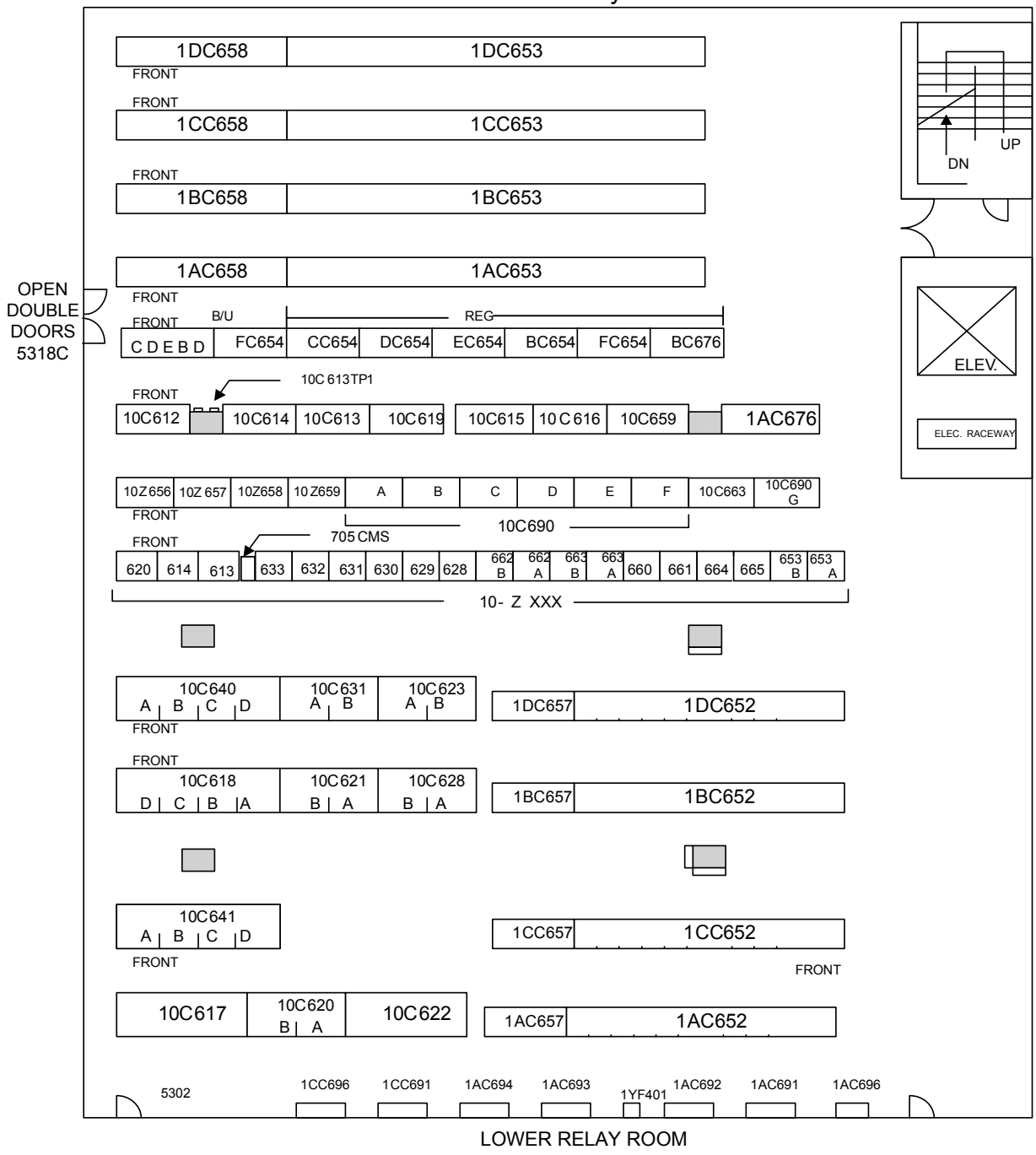


ATTACHMENT 2
AUX BUILDING ACTIONS [CD-675F]

EQUIPMENT REQUIRED:

2 Door Stops

1. **BLOCK OPEN** double door 5318C in the lower relay room.

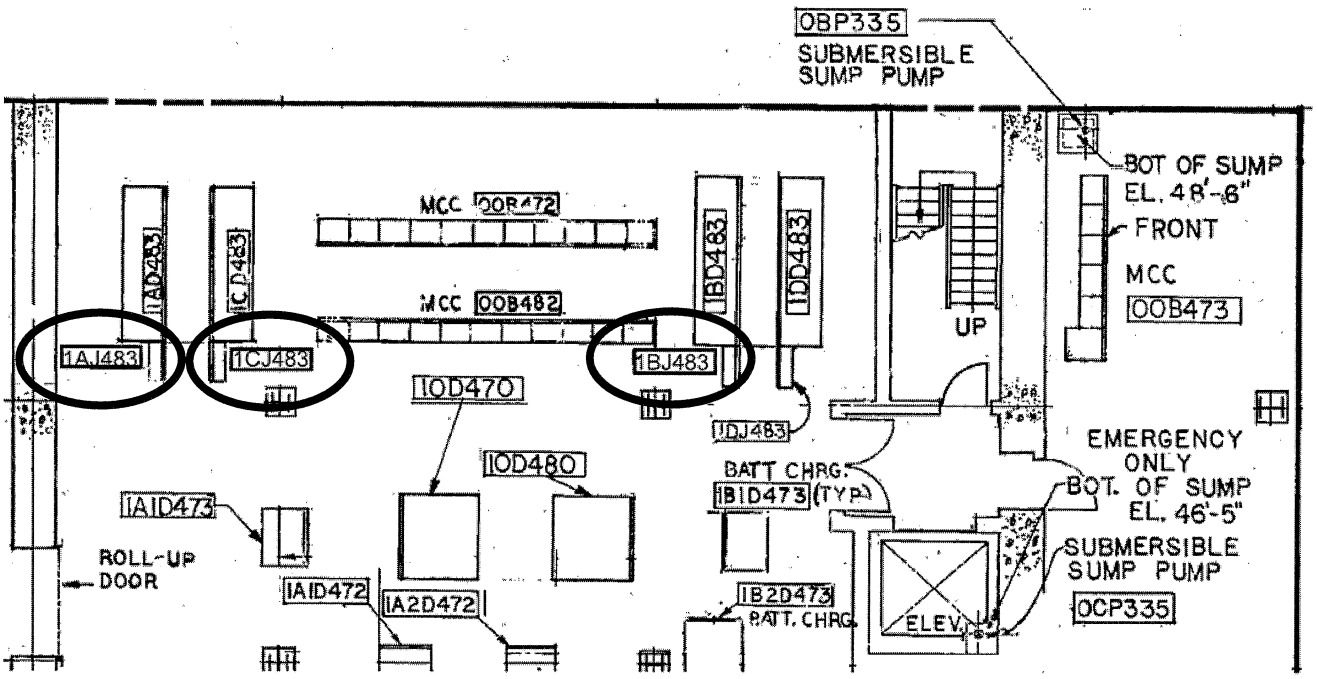


ATTACHMENT 2
AUX BUILDING ACTIONS [CD-675F]
Page 5 of 5
DC LOAD SHEDDING

LOCATION	PANEL #	CIRCUIT #	LOAD (5585 W)	OPEN	CLOSE
54' CONTROL DIESEL RM 5102A	1BJ483	6	FUSE PANEL 1YF406		
		22	FEEDWATER & RECIRC INSTR. CAB. 10C612		

LOCATION	PANEL #	CIRCUIT #	LOAD (2140 W)	OPEN	CLOSE
54' CONTROL DIESEL RM 5102A	1AJ483	7	FUSE PANEL 1YF405		
		15	ROD POSITION INFO CAB 10C615		
		21	PROCESS INSTR. VERT. BOARD 10C613		

LOCATION	PANEL #	CIRCUIT #	LOAD	OPEN	CLOSE
54' CONTROL DIESEL RM 5102A	1CJ483	6	ROD SEQUENCE CONTROL CAB 10C659		



ATTACHMENT 3
RAD WASTE BUILDING ACTIONS [CD-675F]
Page 1 of 1
DC LOAD SHEDDING

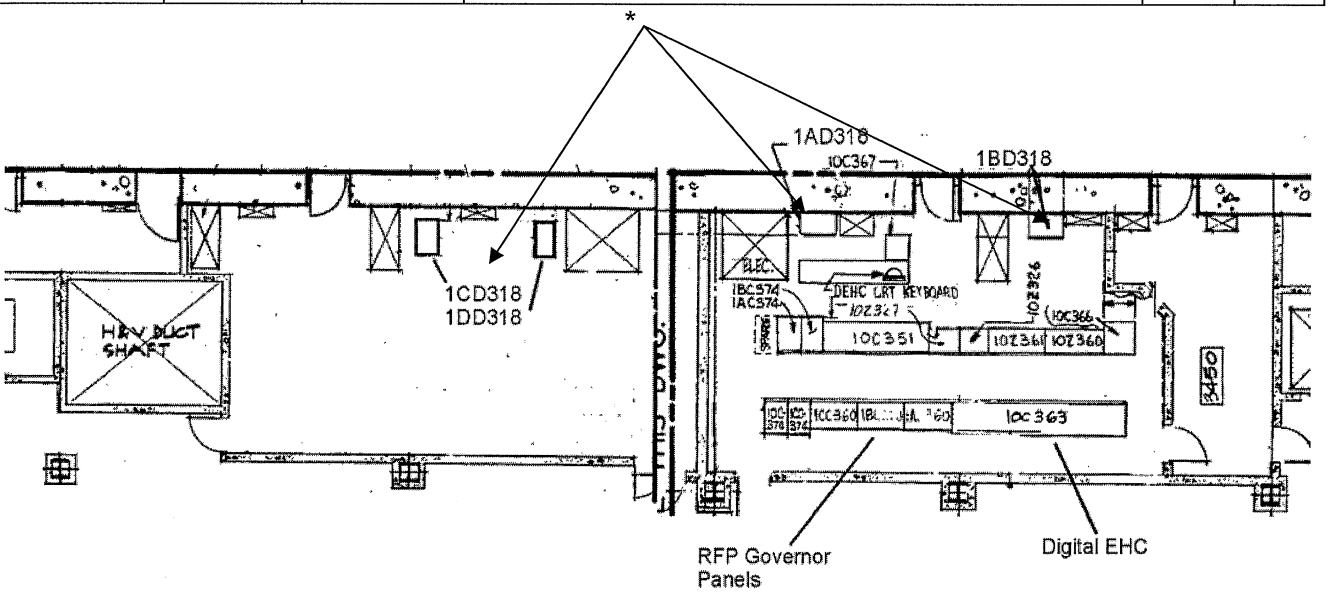
1. **OPEN** the circuit breakers in the following tables when plant has entered an SBO.
   CLOSE the circuit breakers in the following tables when restoring offsite power.
   All are ARC Flash Category 0.

LOCATION	PANEL #	CIRCUIT #	LOAD (840 W)	OPEN	CLOSE
124' Radwaste RM 3449	1BD318 *	12	STA SERV XFMR A PROT 1BC654		
		19	TACS SOLV 1AC658A		
		24	PNL,BUS PROT 1DC654D		
		27	STA SERV XFMR PROT PNL 1EC654A		

LOCATION	PANEL #	CIRCUIT #	LOAD (580 W)	OPEN	CLOSE
124' Radwaste RM 3449	1AD318 *	12	STA SRV XFMR A PROT PNL 1BC654		
		27	STA SERV C PROT RLY 1EC654B		
		28	PNL,BUS PROT 1DC654C RLY		

LOCATION	PANEL #	CIRCUIT #	LOAD (840 W)	OPEN	CLOSE
124' Radwaste RM 3432	1DD318 *	11	PNL,BUS PROT 1DC654B B/U		
		12	STA SERV XFMR PROT PNL 1CC654B		
		14	PROCESS INST CAB 10C613		
		27	STA SERV XFMR PROT PNL 1FC654A		

LOCATION	PANEL #	CIRCUIT #	LOAD (570 W)	OPEN	CLOSE
124' Radwaste RM 3432	1CD318 *	11	PNL,BUS PROT 1DC654A		
		12	XFMR B PROTECT REC PNL 1CC654A		
		14	CAB,FDWTR & RECIRC INST 10C612		
		27	STA SERV XFMR D PNL 1FC654B		



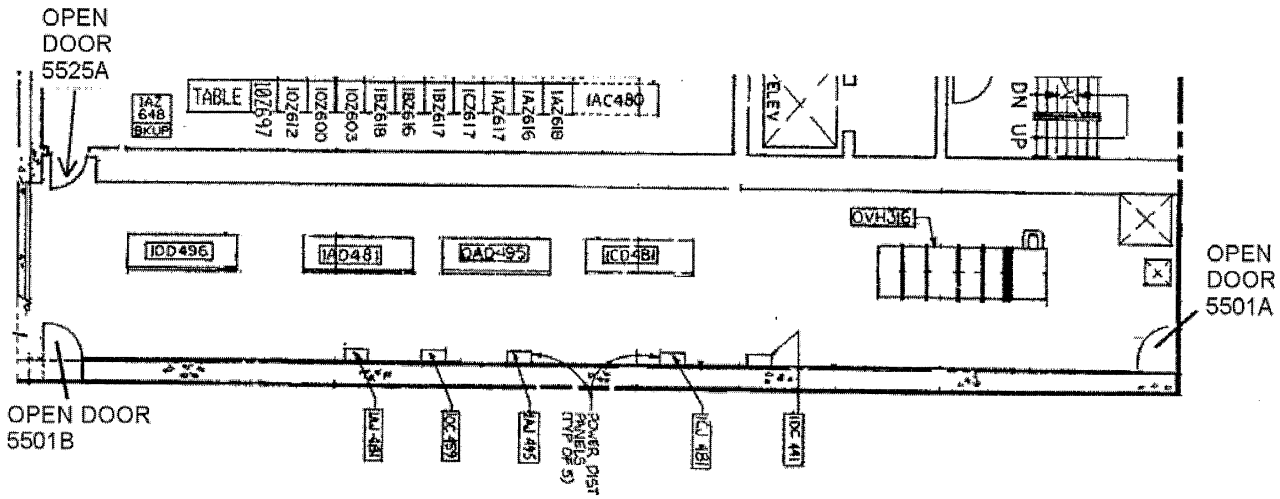
ATTACHMENT 4
ADDITIONAL AUX BUILDING ACTIONS [CD-675F]
Page 1 of 3

EQUIPMENT REQUIRED:

5 Door Stops
4 Keys, all #172 (PA 2235) in Work Control Key Cabinet

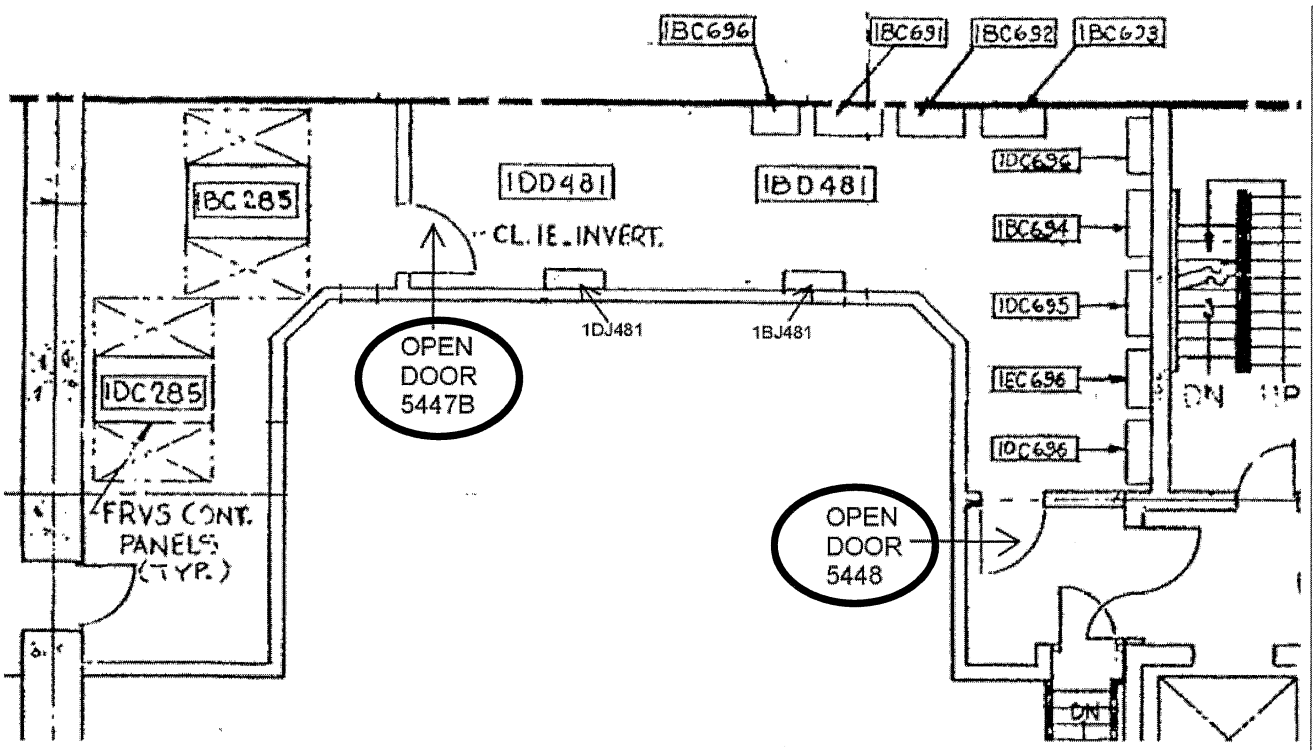
PERFORM the following

1. **BLOCK OPEN** doors 5525A, 5501A and 5501B to inverter room 5501 (137' Aux Bldg).



ATTACHMENT 4
ADDITIONAL AUX BUILDING ACTIONS [CD-675F]

2. **BLOCK OPEN** doors 5447B and 5448 to inverter room 5448 (124' Aux/Control Bldg).

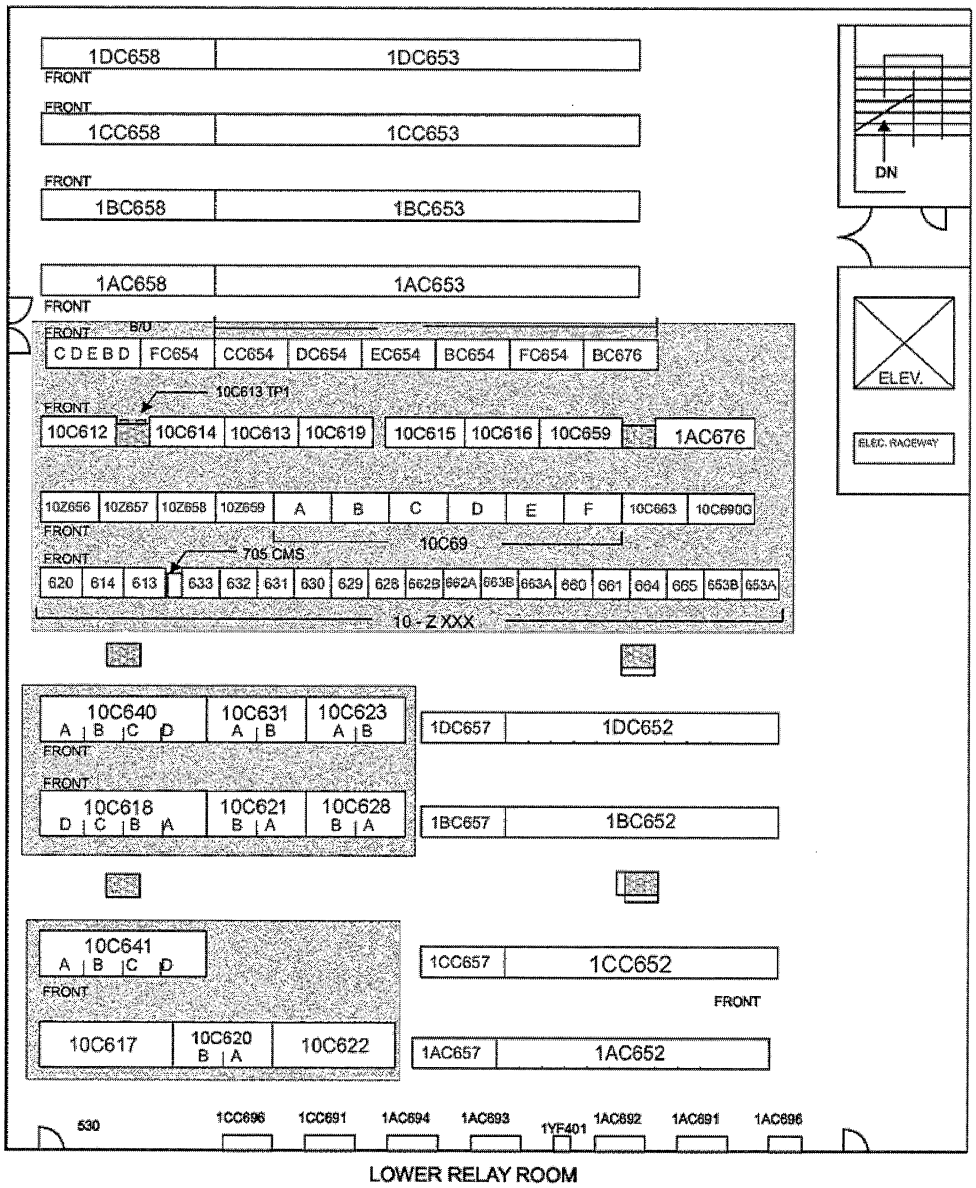


ATTACHMENT 4
ADDITIONAL AUX BUILDING ACTIONS [CD-675F]
Page 3 of 3

3. **BYPASS** HPCI and RCIC high temperature isolation trips at the following:

   - HPCI panel P-620, Switch B21B-S6A
   - HPCI panel P-641, Switch B21B-S6C
   - RCIC panel P-621, Switch B21B-S5B
   - RCIC panel P-640, Switch B21B-S5D

4. **OPEN** Lower Relay Room Non-Bailey cabinet doors in the shaded areas below:



HC.OP-AB.ZZ-0135(Q)

- Biennial Review Performed: Yes _ No ✓ NA ___
- Packages and Affected Document Numbers incorporated into this revision:
  CP No. _____ CP Rev. ___ AD No. ___ Rev No. ___ None ✓
- The following OTSCs were incorporated into this revision: None

REVISION SUMMARY

- Step 4.5.1.A: Added “RCIC” to step that directs maintaining reactor pressure and level control. Complete statement did not properly transfer with format change from Revision 27 to 28. This change is editorial.