UNIT 2(3)
DGA-12
REVISION 15

PARTIAL OR COMPLETE LOSS OF AC POWER

Requirements:

NONE.

Special Controls/Reviews:

NONE.

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INFORMATION ONLY

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D.O.S.R.

PARTIAL OR COMPLETE LOSS OF AC POWER

A. SYMPTOMS:

1. Panel 902-8 Annunciators:

   a. A-1, 4KV MAIN FEED BRK TRIP.

   b. A-2, 4KV RES FEED BRK TRIP.

   c. E-1, 4KV BUS 21 & 22 VOLT LO.

   d. D-3, 4KV BUS 23-24 VOLTAGE LO.

   e. E-3, 4KV BUS 23-1 & 24-1 VOLT LO.

   f. H-10, 4KV BUS 24-1 VOLTAGE DEGRADED.

   g. F-7, 4KV BUS 23-1 VOLTAGE DEGRADED.

   h. C-1, UNIT AUX TRANSFORMER 21 TROUBLE.

   i. C-2, TRANSFORMER 22 RESERVE AUX TROUBLE.

   j. E-2, RESERVE TR 22 TRIP.

2. Panel 903-8 Annunciators:

   a. A-1, 4KV MAIN FEED BRK TRIP.

   b. A-2, 4KV RES FEED BRK TRIP.

   c. E-1, 4KV BUS 31&32 VOLT LO.

   d. D-3, 4KV BUS 33-34 VOLTAGE LO.

   e. E-3, 4KV BUS 33-1 & 34-1 VOLT LO.

   f. C-4, 4KV BUS 33-1 Degraded Voltage.

   g. D-4, 4KV BUS 34-1 Degraded Voltage.

   h. C-1, UNIT AUX TRANSFORMER 31 TROUBLE.

   i. C-2, TRANSFORMER 32 RESERVE AUX TROUBLE.

   j. E-2, RESERVE TR 32 TRIP.

3. Loss of TR 21(31) and TR 22(32).

4. Loss of DG 2(3) and/or DG 2/3.

B. AUTOMATIC ACTIONS:

1. Reactor Scram.

2. Main Turbine and Generator trip.

3. DG-2/3 and DG-2(3) auto start and automatically tie to Buses 23-1(33-1) and 24-1(34-1).

4. ESS Uninterruptable Power Supply (UPS) transfers to 250 Vdc Feed MCC-2(3) or alternate ac Bus 25(36).

5. Security D/G auto starts if low voltage exists on Bus 34-1.

6. IF degraded bus voltage on 23-1(33-1) or 24-1(34-1) occurs for 5 minutes, THEN affected bus will load shed and associated D/G will start AND close into unpowered bus(es). IF voltage is restored within 5 minutes, THEN no load shed OR no D/G start will occur, timer will reset AND alarm can be reset.

C. IMMEDIATE OPERATOR ACTIONS:

NOTE

Figure 1, Loss of AC Flow Chart, should be used as a guide in the performance of this procedure.

1. IF power is lost to TR 21(31) OR TR 22(32), THEN verify that power transfers to TR 22(32) or TR 21(31).

2. IF an automatic bus transfer has occurred, THEN exit this procedure (refer to guidance in DAP 07-34, 4kv Electrical Distribution Management, as required).

CAUTION

© A D/G shall NOT be started manually unless it does NOT start automatically when required. ©(W-2).

3. Verify that DG-2/3 and DG-2(3) auto start.

   a. Verify the following for each D/G that auto started.

      (1) D/G Cooling Water Pump operating.

      (2) D/G operating normally per Table 5, Diesel Generator Normal Operating Parameters.

C. 4. IF a D/G fails to auto start, THEN perform DOA 6600-01, Diesel Generator Failure, concurrent with this procedure.

5. IF Emergency Bus 23-1(33-1) OR 24-1(34-1) is unpowered, THEN verify that D/G Breaker closes to Emergency Bus.

6. IF a D/G Breaker fails to auto close, THEN verify that Emergency Bus Tie Breakers Open. (Bus 23 to 23-1 or Bus 24 to 24-1 (Bus 33 to 33-1 or Bus 34 to 34-1))

7. IF both D/Gs on a unit fail to start, THEN Bus 23-1/33-1 OR Bus 24-1/34-1 may be crosstied as follows:

a. Verify power available.

b. For Bus 23-1/33-1 crosstie, place control switches for LPCI Pumps 2A(3A) and 2B(3B) AND Core Spray Pump 2A(3A) in Pull-To-Lock (PTL).

c. For Bus 24-1/34-1 crosstie place control switches for LPCI Pumps 2C(3C) AND 2D(3D) AND Core Spray Pump 2B(3B) in Pull-To-Lock (PTL).

d. Close Bus 23-1/33-1 AND/OR Bus 24-1/34-1 Tie Breakers.

NOTE

Loads listed in Table 1 and Table 2 are based on Equipment Name Plate Data using efficiencies and power factors as listed in the Dresden Electrical Load Monitoring System (ELMS). The loads are calculated maximum loads and do NOT include transformer loses or valve loads.

e. Limit current based upon available D/G loading OR 600 amps through any 4kv bus tie if offsite power is available. Refer to Table 1 OR Table 2 for the Kw requirements of ECCS Loads OR Safe Shutdown Equipment Loads.

8. IF no D/Gs OR offsite power supply are available, THEN GO TO Subsequent Operator Actions Step D.23.

D. SUBSEQUENT OPERATOR ACTIONS:

1. IF there are no ECCS signals present, THEN verify restart of the following loads:

a. RBCCW Pumps 2(3)A and 2(3)B.

b. DW Coolers.

2. Verify that Unit 2(3) 125 Vdc AND 250 Vdc Batteries each have an operating battery charger by checking float voltage on Panel 902(3)-8.

D. 3. IF the Unit 2(3) 125 Vdc Battery does NOT have an operating battery charger, THEN execute DGA-13, Loss of 125 Vdc Battery Chargers with Simultaneous Loss of Auxiliary Electrical Power, concurrently with this procedure.

4. IF the Unit 2(3) 250 Vdc Battery becomes inoperable, THEN execute DOA 6900-04, Loss of the Unit 2(3) 250 VDC Power Supply, concurrently with this procedure.

5. IF No ECCS condition exists, THEN GO TO Subsequent Operator Action Step D.7.

6. IF ECCS D/G loads are required, THEN perform following:

a. © Verify the ECCS loads listed in Table 1 auto started. ©(W-12)

b. IF a loss of 250 Vdc Battery Charger occurs, THEN execute DGA-03, Loss of 250 VDC Battery Chargers Concurrent with a Design Base Accident, concurrently with this procedure.

c. At Panel 902(3)-7, start the Emergency Seal Oil Pump.

d. Verify ESS Bus is powered.

e. © Within 40 minutes, restore power to MCC 29-8 from the Standby HVAC Control Panel, AND initiate Control Room Isolation and Pressurization as follows: ©(W-14)

(1) Reset Undervoltage (UV) relays on Bus 29.

(2) Close Bus 29 to MCC 29-8 at MCC 29-8.

(3) At Panel 923-5, start Air Filtration Unit by placing AIR FLTR UNIT BOOSTER FAN A/B control switch in either FAN A OR FAN B position.

(4) At Panel 923-5, isolate Control Room by placing CONTROL ROOM ISOLATION switch in ISOLATE position.

(5) IF Instrument Air is lost to Booster fan outlet dampers, THEN manually throttle flow to 2000 cubic feet per minute.

(6) Start Control Room Standby Air Handler Unit (AHU) AND Air Conditioner (A/C).

NOTE

The following step is only to be performed if there are D/Gs running and supplying power to Buses 24-1(34-1) and/or 23-1(33-1) OR the Bus 24-1/34-1 or Bus 23-1/33-1 Tie Breaker is closed. If one or more of the D/Gs failed to start and Emergency ac power is unavailable or limited, these steps are only performed as directed by the Shift Supervisor.

D. 6. f. Power 4Kv buses 23(33) and Buses 24(34), by performing the following:

(1) Place the Bus 23(33) and 24(34) pump motor control switches in PTL.

(2) Isolate Bus 24(34) and Bus 23(33) by placing the following breaker switches in PTL.

- Bus 24(34) to TR 20(30).
- Bus 24(34) to TR 26(36).
- Bus 24(34) to TR 27(37).
- Bus 23(33) to TR 25(35).

NOTE

© Bus 24 to Bus 24-1(34 to 34-1), Bus 23 to Bus 23-1(33 to 33-1), Bus 23-1/33-1 Crosstie Breakers and Bus 24-1/34-1 Crosstie Breakers must be held in the close position for at least three seconds after the close light illuminates. ©(W-12)

(3) At Panel 902(3)-8, close Bus 24(34)-1 to Bus 24(34) crosstie breaker.

(4) Verify Bus 24(34) powered AND that there is NO rise in DG-2(3) load.

(5) At Panel 902(3)-8, close Bus 23(33)-1 to Bus 23(33) crosstie breaker.

(6) Verify Bus 23(33) powered AND that there is NO rise in DG-2/3 load.

CAUTION

Current limitations must be observed for starting any equipment as listed on TABLE 1, D/G Loads Available for ECCS Conditions.

D. 6. g. © Within 30 minutes, shut down one (1) LPCI Pump AND start a CCSW Pump. ©(W-13, W-16)

h. Verify a sufficient supply of D/G fuel for all D/Gs, including the Diesel Fire Pump if used for Isolation Condenser Makeup.

i. WHEN offsite power is restored, THEN GO TO Subsequent Operator Action Step D.19.

7. IF NO ECCS condition exists, THEN perform the following as needed:

CAUTION

1. Current limitations must be observed for starting any equipment as listed in TABLE 2, D/G Loads Available for No ECCS Conditions.

2. Before powering in-plant busses, ensure that loads are stripped so that equipment can be powered in sequence AND Diesel Generator loading is minimized.

a. At Panel 902(3)-7 start the following pumps:

(1) Turbine Emergency Bearing Oil Pump.

(2) Emergency Seal Oil Pump.

b. Verify the Essential Service Bus is powered.

c. Consider closing the MSIVs to reduce Reactor Coolant inventory loss.

NOTE

© The Bus 24 to Bus 24-1(34 to 34-1), Bus 23 to Bus 23-1(33 to 33-1), Bus 23-1/33-1 Crosstie Breakers and Bus 24-1/34-1 Crosstie Breakers must be held in the close position for at least three seconds after the close light illuminates. ©(W-12)

d. Power 4Kv buses 23(33) and Buses 24(34), by performing the following:

D. 7. d. (1) Place the Control Room ac pump motor control switches in PTL.

(2) Isolate Bus 24(34) and Bus 23(33) by placing the following breaker switches in PTL.

- Bus 24(34) to TR 20(30).
- Bus 24(34) to TR 26(36).
- Bus 24(34) to TR 27(37).
- Bus 23(33) to TR 25(35).
- Bus 25(35) to Bus 26(36).
- Bus 25(35) to Bus 27(37).

(3) At Panel 902(3)-8, close Bus 24(34)-1 to Bus 24(34) crosstie breaker.

(4) Verify Bus 24(34) powered AND that there is NO rise in DG-2(3) load.

(5) At Panel 902(3)-8, close Bus 23(33)-1 to Bus 23(33) crosstie breaker.

(6) Verify Bus 23(33) powered AND that there is NO rise in DG-2/3 load.

8. IF required, THEN start a Service Water Pump.

NOTE

The U-2 to U-3 CRD Crosstie Valves may be used with the Control Rod Drive Pump.

9. IF required, THEN start a Control Rod Drive Pump AND perform the following:

a. Control Reactor Water Level.

b. Establish cooling water as soon as possible from Service Water or TBCCW.

NOTE

TBCCW to the Cribhouse is normally supplied from Unit 2.

10. IF Unit 2 TBCCW can NOT be restored AND Unit 3 TBCCW is available, THEN supply TBCCW to the 2/3 Cribhouse as follows:

a. Close 2/3-3819-500, U2 TBCCW CRIBHOUSE SUPPLY.

D. 10. b. Close 2/3-3820-500, TBCCW CRIBHOUSE RETURN.

c. Open 3-3829-A-500, U3 TBCCW TO THE CRIBHOUSE.

d. Open 3-3829-B-500, U3 TBCCW FROM THE CRIBHOUSE.

11. IF power is available, THEN start a Turbine Building Closed Cooling Water Pump (TBCCW) as follows:

a. Open breakers on Bus 27(37) except for MCC 27-1 (37-1).

b. Open the circuit breakers on MCC 27-1 except for 120/208 distribution transformer.

c. Close Bus 24(34) to Bus 27(37) breakers.

d. Verify Bus 27(37) powered.

e. Verify no rise in DG-2(3) load.

f. Close circuit breaker to TBCCW Pump 2(3) at MCC 27-1(37-1).

g. Start TBCCW Pump 2(3) per DOP 3800-01, Turbine Building Closed Cooling Water (TBCCW).

12. IF the Unit is in Cold Shutdown OR Refuel, THEN perform the following as necessary:

a. Re-establish Fuel Pool Cooling:

(1) DOP 1900-01, Fuel Pool Cooling and Cleanup.

(2) DOP 1000-04, Fuel Pool Cooling Mode of Operation of Shutdown Cooling System.

b. IF Fuel Pool Gates are NOT installed, THEN restore power to the Reactor Building Crane from Bus 27 OR Bus 37 AND install Fuel Pool Gates per DFP 0800-06.

c. Restore power to the Refuel Platform from MCC 29-3 (39-3).

d. Restart the Shutdown Cooling System per DOP 1000-03, Shutdown Cooling Mode of Operation.

NOTE

Steps identified as "Unit 2 ONLY" are required only if the loss of offsite power has occurred on Unit 2.

MO 3-4399-74 valve is powered from 250 VDC RBX MCC 3A, compt A03.

13. IF Clean Demin water is required for the Isolation Condenser, THEN perform the following:

    a. (Unit 2 ONLY), open breakers on Bus 25(35) except for MCC 25-2.

    b. (Unit 2 ONLY), open circuit breakers on MCC 25-2 except for 120/208 distribution transformer.

    c. (Unit 2 ONLY), open circuit breakers on MCC 29-3.

    d. (Unit 2 ONLY), close the circuit breaker for MO 2-4399-74 valve at MCC 29-3.

    e. Reset the Undervoltage relays at Bus 29(39).

    f. Close the Bus 29(39) to MCC 29-3 (39-3) feeder breaker from the local control station located near the Oil Storage Tanks for Unit 2 (near SBGT for Unit 3).

    g. Verify NO rise in DG-2(3) load.

    h. (Unit 2 ONLY), close the circuit breakers for the 2/3 A (B) Clean Demin Pump at MCC 25-2.

    i. (Unit 2 ONLY), close Bus 23 to Bus 25 breakers.

    j. Verify Bus 25 powered.

    k. (Unit 2 ONLY), verify no rise in DG-2/3 load.

    l. Start 2/3 A(B) Clean Demin Pump.

    m. Operate MO 2(3)-4399-74 valve to control Isolation Condenser level.

14. IF power is available, THEN start an Instrument Air Compressor.

15. IF Instrument Air has been lost, THEN perform DOA 4700-01, Instrument Air System Failure.

16. Restore Control Room Ventilation as follows:

    a. Reset the UV relays on Bus 29.

D. 16. b. Close Bus 29 to MCC 29-8 Breaker at MCC 29-8.

c. Reset the Control Room Isolation at MCC 29-8.

d. Start the Control Room AHU (Air Handler Unit) and A/C.

CAUTION

Due to the high starting current, if a Shutdown Cooling Pump must be placed in service with power being supplied from a D/G, the D/G load must be reduced to allow for the additional starting current load.

17. WHEN the Shutdown Cooling interlocks clear, THEN verify that the D/G load is less than 2000 kW prior to starting a SDC Pump.

18. Verify a sufficient supply of D/G fuel for all D/Gs, including the Diesel Fire Pump if used for Isolation Condenser makeup.

19. WHEN offsite power is restored, THEN restore the Reserve Aux Transformer 22(32) as follows:

a. Follow the Load Dispatcher's instructions.

b. Reset the UV relays on Buses 21(31) and 23(33).

20. Restore offsite power to Bus 23(33) as follows:

a. Set DG-2/3 droop to 55.

b. Synchronize TR 22(32) to Bus 23(33).

c. Close TR 22(32) to Bus 23(33) ACB.

21. Restore offsite power to Bus 24(34) as follows:

a. Set DG-2(3) droop to 55.

b. Synchronize TR 22(32) to Bus 24(34).

c. Close TR 22(32) to Bus 24(34) ACB.

22. Restore power to the following auxiliary loads:

a. Restore offsite power to Bus 21 and 22 (31 and 32).

b. Reset UV relays on Bus 28(38) and 29(39).

c. At Bus 29(39) close feed to MCC 29-5/29-6 (39-5/39-6).

d. At the local control station, close feed to MCC 29-3 (39-3).

D. 22. e. Transfer MCC 29-7/28-7 (39-7/38-7) to Bus 29(39).

f. Restore power to Buses 20, 25, 26 and 27 from their normal feeds if NOT powered previously.

g. Close any circuit breakers opened previously on the 480 V distribution system.

23. IF a total loss of ac power occurs, THEN perform the following:

a. Verify HPCI initiation on high drywell pressure and restore Reactor Water level to the high level trip setpoint of approximately 48 inches.

b. WHEN Reactor water level has been raised to the high level trip setpoint, THEN perform the following to minimize the drain on the 250 Vdc Battery and prevent temperature/ pressure buildup in the Suppression Pool.

(1) Shutdown HPCI.

(2) Rack out the HPCI Aux Oil Pump 250 VDC breaker.

c. Commence Reactor Cooldown through the Isolation Condenser at a rate to minimize Reactor Coolant System makeup requirements and minimize drywell heatup.

d. IF Reactor Water Level decreases to the Lo-Lo alarm setpoint of -59 inches, THEN attempt to restart the HPCI System to restore to the Hi Level trip setpoint.

e. Perform DEOPs concurrently to restore Reactor Water level. (Alternate Injection Systems)

f. Verify auto-start of the Diesel Driven Fire Pump AND maintain water level in Isolation Condenser.

g. Verify the Diesel Driven Fire Pump Intake Bay clear of all debris to prevent loss of pump suction due to plugging.

h. Monitor loads on the 125 Vdc and 250 Vdc Battery and load shed all non-essential loads NOT required for Emergency Plant Cooldown within 30 minutes. (Reference DGA 13 for 125 Vdc load shed.)

i. Open the access doors on Control Room and Auxiliary Electrical Room panels to provide additional cooling to electrical equipment in accordance with DOA 5750-01, Ventilation System Failure.

NOTE

© The purpose of the following steps is to ensure that appropriate containment integrity can be provided during a station blackout event for the required duration. The guidance in NUMARC 87-00 indicates that many containment isolation valves can be excluded from consideration under the following criteria:

1) Valves normally locked closed during operation.
2) Valves that fail closed on loss of ac power or air.
3) Check valves.
4) Valves in non-radioactive closed loop systems NOT expected to be breached in a station blackout (with the exception of lines that communicate directly with the containment atmosphere).
5) All valves less than 3 inches nominal diameter.
6) Valves that can be closed using dc power (as long as ac independent position indication is verified).
7) Valves that are in series with another valve that meets criteria 1), 2), 3) or 6). ©(W-15)

D. 23. j. © IF Primary Containment Isolation initiations have occurred, THEN verify that the following valves are closed if that Group isolation has occurred to ensure adequate isolation:

(1) Group I:

2(3)-220-2, MN STM DRN ISOL VLV

(2) Group II:

None (all valves meet exclusion criteria).

(3) Group III:

2(3)-1201-2, INLET ISOL
2(3)-1201-3, AUX PP SUCTION
2(3)-1001-2A, A PP SUCT VLV
2(3)-1001-2B, B PP SUCT VLV
2(3)-1001-2C, C PP SUCT VLV

(4) Group IV:

2(3)-2301-36, TORUS SUCT VLV
2(3)-2301-5, STEAM ISOL VLV

(5) Group V:

2(3)-1301-2, RX OUTLET ISOL
2(3)-1301-3, RX INLET ISOL ©(W-15)

NOTE

Closure of valves listed in Table 4, Valves of Concern, are required to establish containment integrity ONLY if core damage is imminent.

D. 23. k. © IF plant conditions require the operation of the valves listed in Table 4, Valves of Concern (valves were open at the time ac power was lost), THEN close valves manually as follows:

(1) Rack out breaker so that valve does NOT reposition upon return of power.

(2) Engage handwheel.

(3) Close valve. ©(W-15)

l. Verify Condensate Storage level adequate for Reactor Coolant Inventory loss due to the cooldown.

E. USER REFERENCES:

1. Dresden Emergency Operating Procedures (DEOP).

2. DGA-03, Loss of 250 VDC Battery Chargers Concurrent with a Design Basis Accident.

3. DGA-13, Loss of 125 VDC Battery Chargers with Simultaneous Loss of Auxiliary Electrical Power.

4. DGP 02-03, Unit 2/3 Reactor Scram.

5. DOA 4700-01, Instrument Air System Failure.

6. DOA 6600-01, Diesel Generator Failure.

7. DOA 6900-04, Loss of the Unit 2(3) 250 VDC Power Supply.

8. DOP 3800-01, Turbine Building Closed Cooling Water (TBCCW).

9. DAP 07-34, 4kv Electrical Distribution Management.

F. DISCUSSION:

This procedure assumes a complete or partial loss of TR 21, 22, 31, and 32. It then determines the requirements for Diesel Generator loading by verifying ECCS or Safe Shutdown conditions and provides tables to list the kW requirements for either Diesel Generator loading sequence. However, this procedure does not assume that a Loss of Coolant Accident or any other specified accident has occurred while providing directions for ac Power distribution requirements and restoration. In the unlikely chance of a total loss of ac power with no Emergency Diesel Generators

F. or the other unit Emergency Crosstie available, directions are provided to attempt to cope with the loss of ac.

The Immediate Operator Actions of this procedure deal with the verification of the Automatic Actions with regards to the Electrical requirements for the existing plant conditions. Reactor Plant Immediate Operator Actions will be covered by the Reactor Scram or Dresden Emergency Operating Procedures.

A caution is provided against starting the Diesel Generator manually when it would start automatically. Starting the Diesel manually prior to a loss of off-site power could result in an overload of the Diesel when off-site power is lost.

The Subsequent Operator Actions initially provide the actions for existing plant conditions of ECCS Diesel loads or Safe Shutdown loads and then provide the detailed steps required to restore the non-vital buses and equipment required for Safe Shutdown of the Plant. This includes starting a Service Water Pump for additional equipment cooling, restoring Turbine Building Closed Cooling System, starting an Instrument Air Compressor, and verifying sufficient Diesel Generator fuel oil if the loss of ac power continues.

Steps are provided to crosstie to the alternate unit if no other power source is available within the current limitations based on the cross tie breakers load limits. An interlock (on the Bus 24-1/34-1 crosstie) prevents the buses from being tied if DG-2 is supplying Bus 24-1 and DG-3 is supplying Bus 34-1. An interlock (on the Bus 23-1/33-1 crosstie) prevents the busses from being tied if DG 2/3 is supplying either Bus 23-1 or Bus 33-1. The interlock on the Bus 23-1/33-1 crosstie can be bypassed with the DG 2/3-CROSSTIE INTERLOCKS BYPASS keylock switch. The 600 amp limitation is based on the capacity of the Bus 23-1/33-1 tie, the Bus 24-1/34-1 tie, the Bus 23(33) to 23-1(33-1) tie, AND the Bus 24(34) to 24-1(34-1) tie. Care should be taken not to overload Bus 23-1(33-1) AND Bus 24-1(34-1) normal feeds if the Bus 23-1/33-1 OR 24-1/34-1 tie is used.

A degraded voltage scheme has been added to the station to protect the induction motor loads on the ECCS Buses 23-1(33-1) and 24-1(34-1). A degraded voltage condition will cause induction motors to draw more current and overheat the motor windings. If bus voltage drops below the degraded voltage setpoint for seven seconds, an alarm notifies the operator of the degraded bus voltage. If normal bus voltage is not restored within five minutes, the diesel generator is started, the incoming line breakers are tripped, load shedding is initiated and the diesel generator breaker closes when existing permissives are satisfied.

The 125 Volt Load Shedding prevents unnecessary loading of the batteries when the 125 Volt Battery Chargers are inoperable. The 250 Volt Batteries' Loads are essential and are shed only in the event of a Design Base Accident Loss of Coolant Accident or Station Blackout.

F. DOA 6900-4, Loss of 250 Vdc System, directs the operator on how to obtain 250 Vdc from the opposite unit or isolate damaged 250 Vdc buses.

For a total loss of ac power on both units with no Emergency Diesels available, the Subsequent actions provide steps to allow the plant to cope with the total loss of ac power. In a total loss of ac and the Emergency Diesels for both units, the HPCI system is started to restore Reactor Vessel level and a cooldown is initiated through the Isolation Condenser. Reactor Water inventory is re-established initially by the HPCI system which is then shut down to minimize the drain on the 250 Vdc Battery and the temperature/pressure build up in the Suppression Pool. Reactor coolant inventory loss makeup is from the Condensate Storage Tank, which Tech Spec requires a minimum allowable level. Shell side makeup to the Isolation Condenser is from the Diesel Driven Fire Pump, which is monitored to prevent loss due to any possible intake structure debris build up due to loss of the Traveling Screens.

Unnecessary 125 Vdc and 250 Vdc loads are reduced or shed within 30 minutes to maximize the availability of the Batteries for HPCI System operation and vital instrumentation supply. Due to the loss of all ventilation, the access doors to Control Room and Auxiliary Electrical Rooms panels must be opened to provide some means of cooling.

W. WRITER'S REFERENCES:

1. NUREG-1032, Evaluation of Station Blackout Accidents of Nuclear Power Plants.

2. U-2, 8/16/85, Loss of All AC DVR.

3. Letter from G. P. Wagner to CECo. Nuclear Power Station Managers dated 7/29/85, Procedures to DEOP with Station Blackout.

4. NUREG-0823, Integrated Plant Safety Assessment Systematic Evaluation Program dated February, 1983.

5. Letter from Sargent and Lundy to J. E. Hausman titled HPCI Room Cooler Notes of Meeting.

6. Confirmatory Action Letter CAL R111-90-01, NRC Docket No. 50-237, Response from T. Kovach dated March 2,1990.

7. DVR 12-2-90-005, (LER 90-002).

8. Dresden Electrical Load Monitoring (ELMS), Revision 1, January 23,1990.

9. DOP 1300-03, Manual Operation of the Isolation Condenser.

10. DOA 5750, Smoke, Noxious Fumes or Airborne Contaminants in the Control Room.

W. 11. Technical Specifications 3.9 and 4.9, Auxiliary Electrical Systems.

12. NTS Commitment #237-402-83-02502REI, Resetting Undervoltage Relays.

13. FSAR procedure commitment, section 5.2.3.3, and Table 8.2.3:1.

14. FSAR procedure commitment, section 14.2.4.3, and Table 8.2.3:1.

15. B.M.K. Wong letter to C.W. Schroeder, dated April 26, 1992, Station Blackout Responses to Safety Evaluation Report Recommendations. (CHRON #184897); 4/17/89, 5/18/90, 1/21/91 and 2/15/91 letters from M.H. Richter (CECo) to Dr. T.E. Murley (NRC).

16. B.M. Viehl letter to C.W. Schroeder, dated March 22, 1993, LPCI/CCSW Long Term Containment Heat Up Analysis - Initiation Time of Containment Cooling. (CHRON #119315)

FIGURE 1

LOSS OF AC FLOW CHART

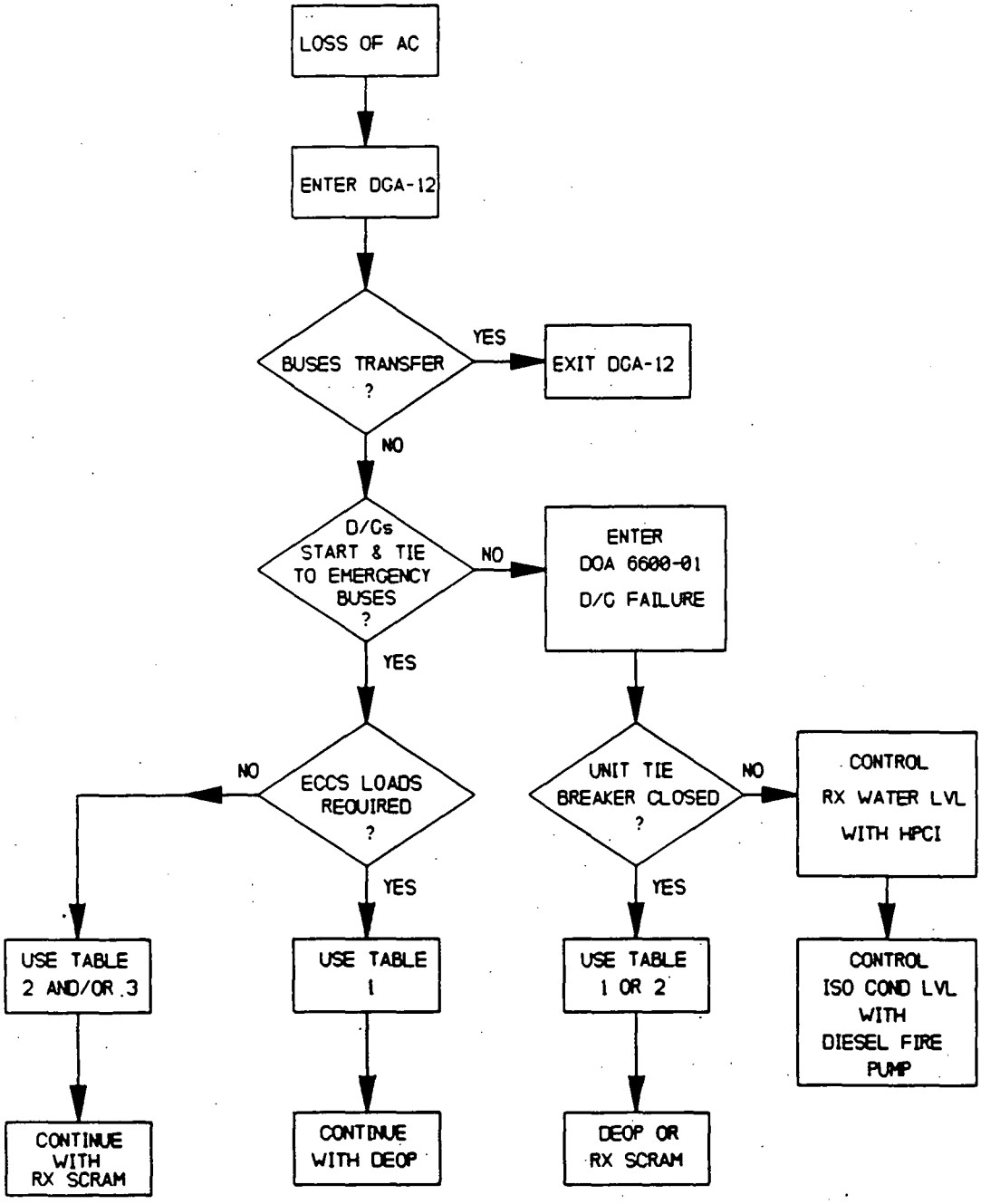

TABLE 1

DIESEL GENERATOR LOADS AVAILABLE FOR ECCS CONDITIONS

DG-2: Bus 24-1 and Bus 29	
Component	kW Required
LPCI Pump 2C	562
LPCI Pump 2D	562
CS Pump 2B	642
LPCI/CS/HPCI Area Cooling Fans	8
D/G Cooling Water Pump 2B	87
D/G Ventilation Fan 2B	25
D/G Starting Air Comp	5
D/G Fuel Transfer Pump	2
ESS Uninterruptable Power Supply Panel	40
125 Vdc Battery Charger	26
250 Vdc Battery Charger	52
CR Stby Air Handler Unit	42
CR Stby A/C	125
CR Booster Fan A or B	7
CR Air Filter Unit Heater	9
SBLC Heater	25
CCSW Pump (Manual start) (NOT included in total kW)	401
CCSW Vault Coolers	11
SBGT Fan	18
SBGT Heater	30
HPCI Oil Tank Heater	9
Distribution Transformers (MCC 29-1 and 29-8)	24
Total kW Required	2,311

TABLE 1

DIESEL GENERATOR LOADS AVAILABLE FOR ECCS CONDITIONS
(Continued)

DG-2/3: Bus 23-1 and Bus 28	
Component	kW Required
LPCI Pump 2A	562
LPCI Pump 2B	562
CS Pump 2A	642
LPCI/CS Area Cooling Fans	5
D/G Cooling Water Pump 2/3	87
D/G Ventilation Fan 2/3	27
D/G Starting Air Comp	5
D/G Fuel Transfer pump	2
Emerg Lighting	9
Inst Bus Transformer 2A and 2B	38
125 Vdc Battery Charger	26
250 Vdc Battery Charger 2	52
ESS Uninterruptable Power Supply Alternate Feed	40
Turbine Turning Gear Oil Pump	42
Turbine Turning Gear	50
Turbine Bearing Lift Pumps (total)	44
CCSW Pump (Manual start) (NOT included in total kw)	401
CCSW Vault Coolers	12
X-Area Coolers	15
H_2 Seal Oil Pump	14
Distribution Transformers (MCC 28-1 and 28-2)	10
Total kw Required	2,244

TABLE 1

DIESEL GENERATOR LOADS AVAILABLE FOR ECCS CONDITIONS
(Continued)

DG-3: Bus 34-1 and Bus 39	
Component	kW Required
LPCI Pump 3C	562
LPCI Pump 3D	562
CS Pump 3B	642
LPCI/CS/HPCI Area Cooling Fans	8
D/G Cooling Water Pump 3B	83
D/G Ventilation Fan 3B	25
D/G Starting Air Comp	5
D/G Fuel Transfer Pump	2
Emerg Lighting	57
ESS Uninterruptable Power Supply Panel	40
125 Vdc Battery Charger	26
250 Vdc Battery Charger	52
SBGT Air Heater	30
SBGT Fan 2/3 B	18
CCSW Pump (Manual start) (NOT included in total kW)	401
CCSW Vault Coolers	11
HPCI Oil Tank Heater	9
Distribution Transformer (MCC 39-1)	3
Total kW Required	2,135

TABLE 1

DIESEL GENERATOR LOADS AVAILABLE FOR ECCS CONDITIONS
(Continued)

DG-2/3: Bus 33-1 and Bus 38	
Component	kW Required
LPCI Pump 3A	562
LPCI Pump 3B	562
CS Pump 3A	642
LPCI/CS Area Cooling Fans	5
D/G Cooling Water Pump 2/3	87
D/G Ventilation Fan 2/3	27
D/G Starting Air Comp	5
D/G Fuel Transfer Pump	2
Emerg Lighting	7
Inst Bus Transformer 3A & 3B	38
125 Vdc Battery Charger	26
250 Vdc Battery Charger 2	52
Distribution Transformer (MCC 38-1 and 38-2)	10
Turbine Turning Gear Oil Pump	42
Turbine Turning Gear	50
Turbine Bearing Lift Pumps (total)	44
CCSW Pump (Manual start) (NOT included in total kW)	401
CCSW Vault Coolers	11
SBLC Heater	25
X-Area Cooler	12
H_2 Seal Oil Pump	14
Total kW Required	2,223

TABLE 2

DIESEL GENERATOR LOADS AVAILABLE FOR NO ECCS CONDITIONS

DG-2: Bus 24-1 and Bus 29	
Component	kW Required
RBCCW Pump 2B or 2/3	249
DW Coolers 2 C/D/E (total)	187
D/G Cooling Water Pump 2B	87
D/G Ventilation Fan 2B	25
D/G Starting Air Comp	5
D/G Fuel Transfer Pump	2
Emerg Lighting	35
ESS Uninterruptable Power Supply Panel	40
125 Vdc Battery Charger	26
250 Vdc Battery Charger	52
CR Stby Air Handler Unit	42
CR Stby A/C	125
CR Air Filter Unit Heater	9
Inst Air Comp 2-4715	83
TBCCW Pump 2B	34
SDC Pump 2B	406
CRD Pump 2B	201
Service Water Pump 2B or 2/3	803
SBGT Fan	18
SBGT Heater	30
SBLC Heater	25
HPCI Oil Tank Heater	9
Distribution Panel	24
Total kW Required	2,517

TABLE 2

DIESEL GENERATOR LOADS AVAILABLE FOR NO ECCS CONDITIONS
(Continued)

DG-2/3: Bus 23-1 and Bus 28	
Component	kW Required
RBCCW Pump 2A	249
DW Coolers 2 A/B/F/G (total)	249
D/G Cooling Water Pump 2/3	87
D/G Ventilation Fan 2/3	25
D/G Starting Air Comp	5
D/G Fuel Transfer Pump	2
Emerg Lighting	35
Inst Bus Transformer 2A and 2B	38
125 Vdc Battery Charger	26
250 Vdc Battery Charger 2	52
ESS Uninterruptable Power Supply Alternate Feed	40
Turbine Turning Gear Oil Pump	42
Turbine Turning Gear	50
Inst Air Comp 2-4706	53
TBCCW Pump 2A	34
Turbine Bearing Lift Pumps (total)	44
SDC Pump 2A/C (each)	406
CRD Pump 2A	201
Service Water Pump 2A Or 2/3	803
X-Area Coolers	12
Distribution Transformer	10
H_2 Seal Oil Pump	14
Total kW Required	2,477

TABLE 2

DIESEL GENERATOR LOADS AVAILABLE FOR NO ECCS CONDITIONS
(Continued)

DG-3: Bus 34-1 and Bus 39	
Component	kW Required
RBCCW Pump 3B Or 2/3	249
DW Coolers 3 C/D/E (total)	187
D/G Cooling Water Pump 3B	87
D/G Ventilation Fan 3B	25
D/G Starting Air Comp	5
D/G Fuel Transfer Pump	2
Emerg Lighting	53
ESS Uninterruptable Power Supply Panel	40
125 Vdc Battery Charger	26
250 Vdc Battery Charger 3	52
Inst Air Comp 3B-4715	83
Inst Air Comp 3-4732	96
TBCCW Pump 3B	34
SDC Pump 3B	406
CRD Pump 3B (Bus 34)	201
Service Water Pump 3B Or 2/3	803
HPCI Oil Tank Heater	9
Distribution Transformer	3
SBGT Air Heater	30
SBGT Fan 2/3 B	18
Total kW Required	2,409

TABLE 2

DIESEL GENERATOR LOADS AVAILABLE FOR NO ECCS CONDITIONS
(Continued)

DG-2/3: Bus 33-1 and Bus 38	
Component	kW Required
RBCCW Pump 3A	249
DW Coolers 3 A/B/F/G (total)	249
D/G Cooling Water Pump 2/3	87
D/G Ventilation Fan 2/3	25
D/G Starting Air Comp	5
Emerg Lighting	9
Inst Bus Transformer 3A and 3B	38
125 Vdc Battery Charger	26
250 Vdc Battery Charger 2	52
Distribution Transformer	13
Turbine Turning Gear Oil Pump	49
Turbine Turning Gear	50
Turbine Bearing Lift Pumps (total)	44
Inst Air Comp 3A-4706	53
TBCCW Pump 3A	34
SDC Pump 3A	406
CRD Pump 3A	201
Service Water Pump 3A or 2/3	803
SBLC Heater	25
X-Area Cooler	12
H_2 Seal Oil Pump	14
Total kW Required	2,444

TABLE 3

LOADS REQUIRED TO MAINTAIN COLD OR REFUEL

COMPONENT
Service Water Pump
RBCCW Pump
"C" Shutdown CLG PUMP OR ONE FPC PUMP
A OR B SHUTDOWN COOLING PUMP
REACTOR BLDG CRANE
REFUEL PLATFORM

TABLE 4

© VALVES OF CONCERN

NOTE

The following valves are considered to be Primary Containment Isolation valves by the FSAR.

VALVE	VALVE NUMBER
TORUS SPRAY	MO 2(3)-1501-18A OR MO 2(3)-1501-19A
TORUS SPRAY	MO 2(3)-1501-18B OR MO 2(3)-1501-19B
TORUS CLG/TEST	MO 2(3)-1501-38A OR MO 2(3)-1501-20A
TORUS CLG/TEST	MO 2(3)-1501-38B OR MO 2(3)-1501-20B
DW SPRAY	MO 2(3)-1501-28A OR MO 2(3)-1501-27A
DW SPRAY	MO 2(3)-1501-28B OR MO 2(3)-1501-27B
PP SUCT VLV	MO 2(3)-1501-5A *
PP SUCT VLV	MO 2(3)-1501-5B *
PP SUCT VLV	MO 2(3)-1501-5C *
PP SUCT VLV	MO 2(3)-1501-5D *
PP SUCT VLV	MO 2(3)-1402-3A *
PP SUCT VLV	MO 2(3)-1402-3B *
FLOW TEST VLV	MO 2(3)-1402-4A
FLOW TEST VLV	MO 2(3)-1402-4B

* These valves may be excluded provided that Suppression Pool level is verified to remain above 7 feet (above the suction inlets) for the duration of a Station Blackout. ©(W-15)

TABLE 5

DIESEL GENERATOR NORMAL OPERATING PARAMETERS

		Normal Reading
1.	Lube Oil Pressure 2(3)(2/3)-6641-537	60 to 105 psig
2.	Lube Oil Filter Inlet Temp. 2(3)(2/3)-6641-533	180 to 220 °F
3.	Fuel Oil Pressure 2(3)(2/3)-6641-11	20 to 45 psig
4.	Engine Cooling Water Inlet Temp. 2(3)(2/3)-6641-12	150 to 160 °F
5.	Engine Cooling Water Outlet Temp. 2(3)(2/3)-6641-13	160 to 180 °F
6.	Engine Cooling Water Ht Exch Service Water Pressure 2(3)-3941-31 2/3-3941-31	 10 to 25 psig 20 to 40 psig
7.	Engine Cooling Water Ht Exch Service Water Pressure 2(3)-3941-30 2/3-3941-30	 10 to 25 psig 20 to 40 psig
8.	Differential Press. (Difference between items 6 and 7.)	6 psid
9.	D/G Heat Exch Service Water Inlet Temperature 2-3941-879 3-3941-35 2/3-3941-883	 35 to 100°F 35 to 100°F 35 to 100°F
10.	D/G Heat Exch Service Water Outlet Temperature 2-3941-881 3-3941-36 2/3-3941-884	 45 to 120°F 45 to 120°F 45 to 120°F
11.	Turbo Lube Oil Filter Disch Oil Pressure 2(3)(2/3)-6641-535	60 psig MIN
12.	Air Box Pressure 2(3)(2/3)-6641-15	13 psig MIN
13.	Governor Oil Level	High, Normal, Low
14.	Lube Oil Cooler Disch. Temp. 2(3)(2/3)-6641-07	165 to 190 °F
15.	Turbo Oil Pump Pressure 2(3)(2/3)-6641-08	80 to 95 psig
16.	Oil Gallery Sight Glass Level 2(3)(2/3)-6641-539	FULL
17.	Camshaft Bearing Sight Glass Level 2(3)(2/3)-6641-538	FULL
18.	D/G Cooling Water Flow 2(3)-3941-897 2/3-3941-897	 >865 GPM >840 GPM