CALVERT CLIFFS NUCLEAR POWER PLANT

LOSS OF 120 VOLT VITAL AC
OR 125 VOLT VITAL DC POWER

AOP-7J

BASIS DOCUMENT

UNIT 1

REVISION 11

LIST OF EFFECTIVE PAGES

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1-31	11

PROCEDURE ALTERATIONS

REVISION/CHANGE	PAGE NUMBERS
1100	8,11,16,18,20,26,27

PROCEDURE NUMBER: AOP-7J, UNIT ONE
PROCEDURE NAME: LOSS OF 120 VOLT VITAL AC OR 125 VOLT VITAL DC POWER

PURPOSE:

The purpose of this AOP is to provide the actions necessary to place the plant in a safe, stable condition following a loss of power to any 120 Volt Vital AC Instrument Bus or 125 Volt Vital DC Bus.

BACKGROUND INFORMATION:

Actions directed by this AOP will place the plant in a safe, stable condition following a loss of power to a 120 Volt Vital AC Instrument Bus or 125 Volt Vital DC Bus. Unless indicated, each section of this procedure assumes that the Unit is paralleled prior to the event and that the electrical system lineup is normal.

To prevent common failures, buses should not be re-energized until the cause of the power loss has been determined by use of protective relaying dropped flags, fuse failure indications or as determined by Electrical Maintenance Group Circuit functional tests.

The major effects of the loss of each electrical bus are listed so that the operator is aware of important equipment that is unavailable. Electrical prints are referenced so that all equipment affected by the loss of power may be determined.

Faults are assumed such that power cannot quickly be restored to the bus. If the loss of power is the result of incorrect breaker operation, block step A. should be completed prior to re-energizing the bus.

The listed indications were chosen to be specific for the event. A Preliminary section is provided in which a diagnostic set of conditions is provided to attempt to determine which buses have lost power. From there, the operators are directed to the appropriate section of the AOP.

REFERENCES:

1. AOP-7I, Loss of Electrical Buses.

2. Loss of Control Indication Power Study.

3. SOER 90-1, Ground Faults on AC Electrical Distribution Systems.

4. SOER 83-3, Inverter Failures.

5. CCNPP Units 1 and 2 Updated Final Safety Analysis Report.

6. CCNPP Technical Specifications.

7. Licensing memo, E.R. Grant to L.J.Hubbard dated August 5, 1991.

8. TELCOM between C. Drumgoole, PD&MAU, R.A. Gambill, PMU, and Don Spencer of Sulzer-Bingham on July 6, 1990, documented in Basis Number B0044.

9. Single Line Diagram 120V AC System, 61-022-E.

10. Single Line Diagram 125V DC Vital System Bus 11, 61-024-E.

11. Single Line Diagram 125V DC Vital System Bus 21, 63-024-E.

12. Single Line Diagram 125V DC Vital System Bus 12 and 22, 61-025-E.

13. Memo F. Cottone to K. Riggleman, Problem Report 2942 Investigation Results, June 14, 1991.

14. Response to questions regarding the loss of ESFAS sensor cabinets, J.E. Kunzmann memo to R.K. Bleacher dated October 14, 1996.

15. Technical Requirements Manual (TRM).

SECTION NUMBER: II. ENTRY CONDITIONS

A loss of power to any of the buses in this AOP will, in most cases, become apparent to the operators through Control Room alarms and indications or through the inability of a particular component to perform its intended function. From there, the operators will enter this AOP and perform the diagnostic exercise in Section IV that should specifically identify the affected buses. The operators will access these buses and perform the prescribed actions to mitigate the event until electrical power has been restored.

SECTION NUMBER: III. PRECAUTIONS

CAUTIONS

1. NO-1-100, Conduct of Operations in part states that "Tripped circuit breakers and blown fuses are indicative of electrical faults. Energizing an electrical fault places the power source and the faulted component in jeopardy. A circuit therefore should be tested before it is re-energized if it has suffered a tripped breaker or blown fuse.

2. This caution is included to remind the operator that if the various RPS and ESFAS functions are inoperable that manual action may be required.

3. Power restoration should be done in a controlled manner after the plant is placed in a stable condition. This caution is placed here to remind operators to resist the urge to just reclose the open circuit breaker that may have tripped and try to immediately repower the lost bus.

NOTES

1. The AOP is written to provide actions under most operating conditions. It is assumed that the Unit is paralleled to the grid under normal operating conditions.

2. The AOP assumes that the Unit is operating in Modes 1 or 2. To consider the equipment status during other operating modes would have made the AOP very complex and unwieldy. This situation has been discussed with plant management and it has been decided that this is the most practical way of addressing this issue. In certain instances, reference is made to other operating modes if a critical function such as SDC has been lost and needs to be addressed. From a procedural compliance perspective, this Note is very important in that it provides operators with the option of not performing the step when not in Modes 1 and 2 if a component is not required for operation under the current conditions.

3. If power is lost to electrical buses and the ability to maintain SDC conditions could be affected, the AOP for a loss of SDC should be implemented to restore or maintain SDC.

4. Electrical prints are referenced in most sections of the AOP so that the operators will be aware of any loads which have not been referenced in the AOP because they do not have an immediately significant affect on plant operations.

5. The AOPs have been designed so steps are presented in the order in which they should be evaluated. It is not required in all cases that the actions of one step be completed prior to proceeding to the next steps. The decision as to whether to proceed with the subsequent steps concurrently with any step still in progress must be made by either the Control Room Supervisor or the Shift Manager. This decision should be made after considering the degree of independence of the steps and subsequent steps do not depend on the successful completion of the step in progress in order to be accomplished.

SECTION NUMBER: IV. PRELIMINARY
BLOCK STEP: IV.A. DETERMINE THE APPROPRIATE SECTION FOR THE EVENT.

This procedure is divided into sections depending on which 120 Volt Vital AC Instrument Bus or 125 Volt Vital DC Bus has lost power. The operator is directed to proceed to the appropriate section depending on the initiating event.

The immediate action requirements are applicable when ever less than the minimum required sources or buses are available.

The operators are instructed to go to 1C24 where indications are located to determine which bus has failed.

If a 120 Volt Vital AC Instrument Bus is de-energized and its associated 125 Volt DC Bus is energized. Then the 120 Volt Vital AC Instrument Bus is the problem and the operators should proceed to the section which addresses a loss of power to a 120 Volt Vital AC Instrument Bus.

If both 120 Volt Vital AC Instrument Buses associated with a 125 Volt DC Bus are de-energized and the 125 Volt DC Bus is also de-energized, then the operators should proceed to the section which addresses a loss of power to a 125 Volt DC Bus. The actions will cover the loss of both the DC Bus and the AC Buses.

Two Unit 2 Buses are also addressed in this AOP. 22 120 Volt Vital AC Instrument Bus (2Y02) and 24 120 Volt Vital AC Instrument Bus (2Y04) are addressed in this AOP because they have loads on them that affect this Unit.

SECTION NUMBER: V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)
BLOCK STEP: V.A. RESPOND TO A LOSS OF 11 120 VAC INSTRUMENT BUS (1Y01).

1. 1-PIC-100X is de-energized and fails down scale. If pressure control were to remain in Channel X it would be sending a minimum pressure signal calling for the PZR heaters to be on. Channel Y is selected so that a valid PZR pressure signal is used to automatically control pressure. **[P0056]**

2. RRS cabinet 1C31, Channel X, is de-energized so Reactor Regulating System is switched to Channel Y. **[P0056]**

3. 1-LIC-110X is de-energized and fails down scale sending a low level signal to the PZR level control circuit resulting in all charging pumps starting and letdown reducing to minimum. Channel Y is selected so that a valid PZR level signal is used to automatically control level. **[P0056]**

4. Pressurizer low level cutoff is normally selected to X/Y. PZR heaters will be interlocked off due to the control channel X until the Y position is selected. **[P0056]**

5. The temperature instruments from 11 loop that feed the Tavg instrumentation are de-energized and failed low. So the operator is directed to bypass them in RRS test drawer. This action coupled with step 2 above should restore the RRS outputs of Tref and program PZR level to normal.

6. The handswitches for the Letdown Isolation Valves, 1-CVC-515-CV and 1-CVC-516-CV are placed in Shut because IA downstream of the CNTMT IA Control Valve, 1-IA-2085-CV is isolated and the valves will fail shut. This way restoration of letdown will be done in a controlled manner after IA is reestablished instead of just reopening when IA is restored.

7. With letdown secured PZR level will be controlled manually by starting and stopping charging flow. A liberal band is given for controlling PZR level to minimize the cycling of the charging pump.

8. With instrument air isolated to the Containment non-safety related seismic portion of the header, control of the Spray valves will be lost once header pressure bleeds off. The step directs control of pressure by use of heaters and spray. The operator may be able to control pressure by cycling the heaters off and letting pressure drift down.

   If the Spray Valves are not available, then steps are provided to use Aux Spray. The actions were specifically ordered so that the Auxiliary Spray isolation valve is opened prior to shutting the loop charging isolations. This ensures that a flowpath is always available without dependance on the bypass check valve around CVC-519. This is the preferred lineup recommended by the Fuels Group during their work to support charging flow requirement during a LOCA. HIC-100 is placed in Manual and reduced to minimum to ensure the Spray Valves will remain shut when Instrument Air is restored. Limits are set as to the number of cycles of Aux Spray allowed so the temperature differential is logged. The valve is opened and HIC-100 is placed in MANUAL and its output is reduced to zero so that when IA is restored, the controller will be at its proper setting and the Spray Valves will be shut. The Loop Charging Valves are shut as desired to throttle Aux Spray flow. Steps are provided to isolate Aux Spray when pressure control has been stabilized.

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9. This ensures SW flow to an operable CC HX and ensures SW pump minimum flow requirements are maintained.

10. 1-CRM-5291-CV and 1-CRM-5292-CV fail closed on loss of air downstream of IA-2085-CV isolating airflow to the Containment APD. The air pump is turned off rather than rely on the low flow trip to prevent damage to the air pump.

11-12. On loss of this bus, a number of alarms actuate and various indications and components are affected. This list of alarms and indications is provided based on the results of a review of the Loss of Control Indication Power Study performed by Engineering. Not all loads that are lost are listed in the procedure.

As a rule all the Channel A instrumentation is lost, SG Level & Pressure, PZR Pressure, Nuclear Instrumentation, RCS Temperature, Core Flow, etc. This will give all the Pre-Trip alarms as well as the indications failing. Containment Pressure 1-PI-5310 and sump level 1-LI-4146 lose power and fail low.

Channel A RPS de-energizing causes K-1 and K-2 relays to trip opening TCBs 1, 2, 5 and 6.

On the Safe Shutdown Panels 1C43 and 2C43, most of the Channel A instrumentation is de-energized. The B Channels are powered from 2Y02. This concept allows for train separation for the instrumentation and controls on both Safe Shutdown Panels.

These effects should be noted and actions taken as appropriate or depending on plant conditions. Certain specific actions are required and either have already been performed in previous steps based on their urgency or will be performed in subsequent steps.

13. The ESFAS and AFAS cabinets have lost power on the loss of this bus. They must be de-energized prior to re-energizing the bus, so that actuations will not occur. The sensors de-energize to actuate and the logic modules energize to actuate.

14. RPS cabinet A has lost power on the loss of this bus. The steps for de-energizing the cabinet were taken from OI-6 and are placed in the procedure so that the operator can repower the cabinet in a controlled manner.

15-16. If a sensor cabinet is initially de-energized and the loss of this bus de-energizes a second sensor cabinet, the 2 of 4 logic will be satisfied to actuate all logic channels. Since the UV logic will not clear when the bus is re-energized, all equipment with UV trips will remain locked out. To clear the unnecessary logic channel actuations, the logic cabinet is de-energized. This will permit the operator to operate equipment as required. (Reference: Response to questions regarding the loss of ESFAS sensor cabinets, J.E. Kunzmann memo to R.K. Bleacher dated October 14, 1996)

17. To prevent damage to the Main Steam Effluent and N-16 Radiation Monitors, they must be shutdown per OI-35 prior to reenergizing the bus.

BLOCK STEP: V.B. RESTORE POWER TO THE BUS.

1. Refer to Bases for Block Step III, Caution 1.

2. On loss of 1Y01, it is apparent either TS 3.8.9, Distribution Systems - Operating or TS 3.8.10, Distribution Systems - Shutdown applies. Other Tech Specs may apply and Tech Specs that may pertain to equipment powered from this bus are listed. (Reference: Licensing memo, E.R. Grant to L.J.Hubbard dated August 5, 1991)

3. In previous steps, actions have been provided for major loads powered from this bus. In this step, reference is made to the drawings and DS-013, which provides a comprehensive listing of all components powered from the bus. If power is lost to the bus for an extended period of time, then these references should be accessed and long-term actions determined.

4. Step 4 returns systems to normal that were manipulated in section A once power is restored. In step 4b, steps are provided to re-open the IA to CNTMT non-safety related header Isolation Valve, 1-IA-2085-CV. This is done early to allow air to the containment CVs which are operated in later steps. Steps 4f and 4g need to be performed in order. The ESFAS Sensor Cabinet ZD is energized, its sensor modules reset, and then the ESFAS Actuation Logic Cabinets are energized per OI-34. Sensor modules are reset prior to actuator logic to prevent actuation from occurring.

5. This step is provided as an exit statement. The operators will have returned equipment to normal as appropriate and from here, they will either exit the AOP or address other buses which may have lost power.

SECTION NUMBER: VI. 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02)
BLOCK STEP: VI.A. RESPOND TO A LOSS OF 12 120 VAC INSTRUMENT BUS (1Y02).

1. 1-PIC-100Y is de-energized and fails down scale. If pressure control were to remain in Channel Y it would be sending a minimum pressure signal calling for the PZR heaters to be on. Channel X is selected so that a valid PZR pressure signal is used to automatically control pressure. **[P0056]**

2. 1-HIC-110 is being given erroneous signals from PZR level program from Reactor Reg and 1-LIC-110Y, which is de-energized. So the controller is placed in manual until PZR level control signal and Reactor Reg are restored in steps 3, 4 & 6.

3. RRS cabinet 1C32, Channel Y, is de-energized so Reactor Regulating System is switched to Channel X. **[P0056]**

4. 1-LIC-110Y is de-energized and fails down scale sending a low-level signal to the PZR level control circuit resulting in all charging pumps starting and letdown reducing to minimum. Channel X is selected so that a valid PZR level signal is used to automatically control level. **[P0056]**

5. Pressurizer low level cutoff is normally selected to X/Y. PZR heaters will be interlocked off due to the control Channel Y until the X position is selected. **[P0056]**

6. The temperature instruments from 12 loop that feed the Tavg instrumentation are de-energized and failed low. So the operator is directed to bypass them in RRS test drawer. This action coupled with step 3 above should restore the RRS outputs of Tref and program PZR level to normal.

7. Once valid signals are provided to 1-HIC-110 it should be able to maintain PZR level on program when placed in Automatic.

8. This ensures SW flow to an operable CC HX and ensures SW pump minimum flow requirements are maintained.

9-10. On loss of this bus, a number of alarms actuate and various indications and components are affected. This list of alarms and indications is provided based on the results of a review of the Loss of Control Indication Power Study performed by Engineering. Not all loads that are lost are listed in the procedure.

As a rule all Channel B instrumentation is lost, PZR pressure, Nuclear Instrumentation, RCS temperature, Core Flow, etc. Channel B SG pressure and level indicators are powered from 1Y02 but the transmitter loop is powered from 2Y02, so the parameters are still valid on the Plant Computer. Losing Channel B will give all the Pre-Trip alarms. The SGIS/CSAS relay to trip secondary pumps is powered from 1Y02, so neither channel B or A will actuate the associated pumps.

Containment Pressures 1-PI-5307 and 1-PI-5308 along with sump level 1-LI-4147 lose power and fail low.

Channel B RPS de-energizing causes K-1 and K-2 relays to trip opening TCBs 1, 2, 5 and 6.

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These effects should be noted and actions taken as appropriate or depending on plant conditions. Certain specific actions are required and either have already been performed in previous steps based on their urgency or will be performed in subsequent steps.

11. The ESFAS and AFAS cabinets have lost power on the loss of this bus. They must be de-energized prior to re-energizing the bus, so that actuations will not occur. The sensors de-energize to actuate and the logic modules energize to actuate.

12. RPS cabinet B has lost power on the loss of this bus. The steps for de-energizing the cabinet were taken from OI-6 and are placed in the procedure so that the operator can repower the cabinet in a controlled manner.

13-14. If a sensor cabinet is initially de-energized and the loss of this bus de-energizes a second sensor cabinet, the 2 of 4 logic will be satisfied to actuate all logic channels. Since the UV logic will not clear when the bus is re-energized, all equipment with UV trips will remain locked out. To clear the unnecessary logic channel actuations, the logic cabinet is de-energized. This will permit the operator to operate equipment as required. (Reference: Response to questions regarding the loss of ESFAS sensor cabinets, J.E. Kunzmann memo to R.K. Bleacher dated October 14, 1996)

15. To prevent damage to the Main Steam Effluent and N-16 Radiation Monitors, they must be shutdown per OI-35 prior to reenergizing the bus.

BLOCK STEP: VI.B. RESTORE POWER TO THE BUS.

1. Refer to Bases for Block Step III, Caution 1

2. On loss of 1Y02, it is apparent either TS 3.8.9, Distribution Systems - Operating or TS 3.8.10, Distribution Systems - Shutdown apply. Other Tech Specs may apply and any Tech Specs that may pertain to equipment powered from this bus are listed. (Reference: Licensing memo, E.R. Grant to L.J.Hubbard dated August 5, 1991)

3. In previous steps, actions have been provided for major loads powered from this bus. In this step, reference is made to the drawings and DS-013, which provides a comprehensive listing of all components powered from the bus. If power is lost to the bus for an extended period of time, then these references should be accessed and long-term actions determined.

4. Step 4 returns systems to normal that were manipulated in section A once power is restored. Step 4d and 4e need to be performed in order. The ESFAS Sensor Cabinet ZE is energized, its sensor modules reset, and the ESFAS Actuation Logic Cabinets are energized per OI-34. Sensor modules are reset prior to actuator logic to prevent actuation from occurring.

5. This step is provided as an exit statement. The operators will have returned equipment to normal as appropriate and from here, they will either exit the AOP or address other buses which may have lost power.

SECTION NUMBER: VII. 13 120 VOLT VITAL AC INSTRUMENT BUS (1Y03)
BLOCK STEP: VII.A. RESPOND TO A LOSS OF 13 120 VAC INSTRUMENT BUS (1Y03).

1-2. On loss of this bus, a number of alarms actuate and various indications and components are affected. This list of alarms and indications is provided based on the results of a review of the Loss of Control Indication Power Study performed by Engineering. Not all loads that are lost are listed in the procedure.

As a rule all Channel C instrumentation is lost, SG level and pressure, Nuclear Instrumentation, RCS temperature, Core Flow, etc. As a result all the Pre-Trip alarms will come in . The digital acoustic flow monitors for the PORVs and Safeties, ERV-402, ERV-404, RV-200 and RV-201 are de-energized.

Channel C RPS de-energizing causes K-3 and K-4 relays to trip opening TCBs 3, 4, 7 and 8.

These effects should be noted and actions taken as appropriate or depending on plant conditions.

3-4. These cabinets have lost power on the loss of this bus. They are de-energized prior to re-energizing the bus, so that they can be repowered in a controlled manner and to be consistent with similar steps for loss of 1Y01 and 1Y02.

5-6. If a sensor cabinet is initially de-energized and the loss of this bus de-energizes a second sensor cabinet, the 2 of 4 logic will be satisfied to actuate all logic channels. Since the UV logic will not clear when the bus is re-energized, all equipment with UV trips will remain locked out. To clear the unnecessary logic channel actuations, the logic cabinet is de-energized. This will permit the operator to operate equipment as required. (Reference: Response to questions regarding the loss of ESFAS sensor cabinets, J.E. Kunzmann memo to R.K. Bleacher dated October 14, 1996)

BLOCK STEP: VII.B. RESTORE POWER TO THE BUS.

1. Refer to Bases for Block Step III, Caution 1.
2. Refer to Bases for Block Step V.B.2.

3. In previous steps, actions have been provided for major loads powered from this bus. In this step, reference is made to the drawings and DS-013, which provides a comprehensive listing of all components powered from the bus. If power is lost to the bus for an extended period of time, then these references should be accessed and long-term actions determined.

4. Step 4 returns systems to normal that were manipulated in section A once power is restored.

5. This step is provided as an exit statement. The operators will have returned equipment to normal as appropriate and from here, they will either exit the AOP or address other buses which may have lost power.

SECTION NUMBER: VIII. 14 120 VOLT VITAL AC INSTRUMENT BUS (1Y04)
BLOCK STEP: VIII.A. RESPOND TO A LOSS OF 14 120 VAC INSTRUMENT BUS (1Y04).

1-2. On loss of this bus, a number of alarms actuate and various indications and components are affected. This list of alarms and indications is provided based on the results of a review of the Loss of Control Indication Power Study performed by Engineering. Not all loads that are lost are listed in the procedure. As a rule all Channel D instrumentation is lost, SG level and pressure, Nuclear Instrumentation, RCS temperature, Core Flow, etc. As a result all the Pre-Trip alarms will come in . These effects should be noted and actions taken as appropriate or depending on plant conditions. Certain specific actions are required and will be performed in subsequent steps.

Channel D RPS de-energizing causes K-3 and K-4 relays to trip opening TCBs 3, 4, 7 and 8.

3-4. These cabinets have lost power on the loss of this bus. They are de-energized prior to re-energizing the bus, so that they can repowered in a controlled manner and to be consistent with similar steps for loss of 1Y01 and 1Y02.

5-6. If a sensor cabinet is initially de-energized and the loss of this bus de-energizes a second sensor cabinet, the 2 of 4 logic will be satisfied to actuate all logic channels. Since the UV logic will not clear when the bus is re-energized, all equipment with UV trips will remain locked out. To clear the unnecessary logic channel actuations, the logic cabinet is de-energized. This will permit the operator to operate equipment as required. (Reference: Response to questions regarding the loss of ESFAS sensor cabinets, J.E. Kunzmann memo to R.K. Bleacher dated October 14, 1996)

BLOCK STEP: VIII.B. RESTORE POWER TO THE BUS.

1. Refer to Bases for Block Step III, Caution 1.
2. Refer to Bases for Block Step V.B.2.

3. In previous steps, actions have been provided for major loads powered from this bus. In this step, reference is made to the drawings and DS-013, which provides a comprehensive listing of all components powered from the bus. If power is lost to the bus for an extended period of time, then these references should be accessed and long-term actions determined.

4. Step 4 returns systems to normal that were manipulated in section A once power is restored.

5. This step is provided as an exit statement. The operators will have returned equipment to normal as appropriate and from here, they will either exit the AOP or address other buses which may have lost power.

SECTION NUMBER: IX. 22 120 VOLT VITAL AC INSTRUMENT BUS (2Y02)
BLOCK STEP: IX.A. RESPOND TO A LOSS OF 22 120 AC INSTRUMENT BUS (2Y02).

Half the channels on Unit 1 Safe Shutdown Panel, 1C43, are powered from Unit 2, 2Y02. For the channels involved the transmitter loop is powered from 1C43 and then through an isolation amplifier the signal is sent to the appropriate panel in Unit 1 Control Room. For example 1-PI-105B transmitter loop is indicated on 1C43 and loses power when 2Y02 is lost. Recorder 1-PR-105B on 1C06 indicates zero but the recorder still runs.

1. 1-LI-110Y is de-energized and fails down scale sending a low level signal to the PZR level controller 1-LIC-110Y circuit resulting in all charging pumps starting and letdown reducing to minimum. Channel X is selected so that a valid PZR level signal is used to automatically control level.

2. The low level signal from 1-LI-110Y will keep all PZR heaters off unless the Low Level Cutout switch is placed in the Y position.

3. When the Low Level Cutout is reset, the proportional heaters may be reset at 1C06.

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4. On loss of this bus, a number of alarms actuate and various indications and components are affected. This list of indications is provided based on the results of a review of the Loss of Control Indication Power Study performed by Engineering. These effects should be noted and actions taken as appropriate or depending on plant conditions. Certain specific actions are required and either have already been performed in previous steps based on their urgency or will be performed in subsequent steps.

5. Half the indications on 1C43 lose power. It is through the loss of power to these transmitters that the indications on the other panels in the control room are affected.

6. On loss of 2Y02, certain equipment powered from this bus is affected by Tech Specs.
   Channel B SG pressure fails causing several B channel Trip Units to trip.
   The following components are affected:
   - ESFAS Sensor ZE loses 11 and 12 SG pressure inputs.
   - AFAS Sensor ZE loses 11 and 12 SG pressure and level inputs.
   - AFAS Sensor ZE loses AFW flow to 11 and 12 SG inputs.

   The Safe Shutdown Panel controls and indication that are listed in step 4.
   The various indications identified in step 3. The Tech Spec contains a table that lists the instrumentation channels affected.
   Auxiliary Feedwater steam train flow control valves failing open on U-1 due to loss of 2Y02.

7. The Unit 2 AOP-7J has a section for loss of this bus. The majority of loads lost will be Unit 2 loads; therefore, the Unit 2 Operators will supervise re-energizing the bus.

SECTION NUMBER: X. 24 120 VOLT VITAL AC INSTRUMENT BUS (2Y04)
BLOCK STEP: X.A. RESPOND TO A LOSS OF 24 120 VAC INSTRUMENT BUS (2Y04).

1. WRNI Channel D Power and SUR are indicated on 1C43, 1C15 and 1C05. Half the indications that are on 1C43 are powered by Unit 2 for electrical separation. Therefore when 2Y04 is lost the Channel D WRNI is de-energized. The Alarms on 1C05 "AUX ENCORE WR NEUTRON MON SYS TROUBLE" and "NUCLEAR INSTR CHANNEL INOPERATIVE" will come in if Channel D is selected for display at 1C43.

2. These indications have an effect on Tech Specs in that the Nuclear Instrumentation inputs are lost to these panels.

SECTION NUMBER: XI. 11 125 VOLT DC BUS.
BLOCK STEP: XI.A. RESPOND TO A LOSS 11 125 VOLT BUS.

The loss of this bus is quite unlikely; to inadvertently de-energize this bus would require that both battery chargers and 11 battery be removed from the bus. But if it were to happen the actions required to recover would be labor intensive since control power to many breakers in the control room is lost. 1Y01 is also de-energized when 11 DC bus is lost, so many of the same actions are performed as would be done in Section V of this procedure.

IA downstream of the CNTMT IA Control Valve, 1-IA-2085-CV is isolated and the CC Return to CNTMT Isolation Valve, 1-CC-3832-CV, fails shut. Without cooling to the RCPs, they must be tripped to prevent overheating. The first 5 steps of this section insure proper automatic control of Pzr level and pressure after the Reactor is tripped. 1100

1. Refer to Bases for Block Step V.A.1.
2. Refer to Bases for Block Step V.A.2.
3. Refer to Bases for Block Step V.A.3.
4. Refer to Bases for Block Step V.A.4.
5. Refer to Bases for Block Step V.A.5.

6. The CC Return to CNTMT Isolation Valve, 1-CC-3832-CV, fails shut. Without cooling to the RCPs, they must be tripped. If the Reactor is critical, it must be tripped prior to securing RCP flow. The Reactivity Control Immediate Actions of EOP-0, Post Trip Immediate Actions are performed to ensure that the most important safety function is addressed and then 11B and 12B RCPs are tripped from 1C06. 11A and 12A RCP breakers lose control power as does the feeder breakers for Unit 1 RCP bus; therefore 11A and 12A RCPs must be tripped locally. Tripping these 13 KV breakers is an evolution that should require some oversight so a Warning is provided to station a Safety Observer when working in this panel. Once the RCPs have been tripped, EOP-0 is implemented.

7. If the Reactor is NOT critical, then 11B and 12B RCPs are tripped from 1C06. 11A and 12A RCP breakers lose control power as does the feeder breakers for Unit 1 RCP bus; therefore 11A and 12A RCPs must be tripped locally. Tripping these 13 KV breakers is an evolution that should require some oversight so a Warning is provided to station a Safety Observer when working in this panel.

   The step directs the Control Room staff to determine the appropriate emergency response actions (In step 6 above the operators will be directed to the ERPIP once the EOPs are entered). Recovery actions should not be delayed while attempting to determine response actions. The step is placed here in the procedure to allow notification of plant personnel to ensure that assistance is or will be available if needed and the appropriate offsite organizations are notified in a timely manner.

8. On loss of this bus, various indications and components are affected. This list is provided based on the results of simulator validation and a review of the Loss of Control Indication Power Study performed by Engineering and includes components from loss of 1Y01 as well as from the loss of DC bus. This list is not intended to include every load that loses power.

   Loss of DC power affects fall into two categories. Loss of breaker control power, which also results in loss of breaker position indication and loss of protective relaying trip capabilities. Loss of power to Control Valves causes them to go to their fail position.

9. The PZR Backup and Proportional Heaters are operated as necessary to maintain RCS pressure. The RCPs have been tripped, so main spray is not available. Aux Spray is not available because Aux Spray Valve, 1-CVC-517 has failed shut. On loss of DC power, 11 PZR Heater Proportional Controller Breaker will not trip from the Control Room and must be tripped locally. Also 11 and 14 Backup Heaters lose the ESFS undervoltage trip capability but still can be manually turned off and on from the Control Room.

10. Letdown is lost on loss of DC when 1-CVC-515-CV fails closed, so PZR level will be maintained by cycling charging pumps. A generous band is provided that controls PZR level, to limit charging pump starts to minimize thermal transients on the loop penetration nozzles. Control power is lost to the breakers associated with 11A 480 Volt Bus. Therefore if 11 Charging pump is running or if 13 Charging pump is aligned to 11A bus and they need to be secured local operation of the breaker will be required. The Letdown Isolation Valves are shut because 1-CVC-515 fails shut lost and the handswitch should be placed in CLOSE to prevent uncontrolled letdown flow when power is restored to the bus.

11. This step directs the operator to use manual control of the ADVs to control temperature and pressure in normal bands, because the AUTO control signal and quick open functions to the ADVs are lost and the TBVs will not open.

12. The valve handswitch is placed in CLOSE, the CV fails shut, to prevent uncontrolled restoration of CC to the RCP seals when power is restored.

13. Starting the Saltwater Air Compressors aids in plant control, IA and PA may be lost due to loss of SRW to the Turbine Building on loss of 1-SRW-1600 and 1-SRW-1637.

14. The SW valves to 11 ECCS Cooler, 11 CC HX, and 11 SRW HX fail open so the pump must be locally throttled to prevent the pump from operating at runout.

15-16. IA and PA to both units would be lost until IA Compressors 12 and 22 could be supplied cooling water from the Fire Main. 11 IA Compressor and 11 PA Compressor have to be manually tripped, however, because it will not trip on the high temperature condition that will occur on loss of SRW to the Turbine Building.

17. Aux Feedwater is initiated due to the unavailability of Main Feedwater. Loss of SRW to the Turbine Building stops cooling flow to the SGFP and Condensate Booster Pump lube oil coolers. The Main Feed System must be secured per the next step. Aux Feedwater is initiated using the steam driven AFW pumps and 11 SG AFW Steam Supply Valve, 1-MS-4070-CV and 1-MS-4070A-CV because 12 SG AFW Steam Supply Valve, 1-MS-4071-CV, fails shut. A wide band of level control is given consistent with other procedures where natural circulation of the RCS is performed.

    If the AFW Motor Train is in operation, it would be feeding the SGs uncontrolled. Thus successful starting of the Steam Train is followed by securing the AFW Motor Train.

    If the AFW Steam Train is not available, the motor train is used. Since the AFW Motor Train Flow Control Valves, 1-AFW-4525 and AFW-4535, fail open on loss of power, their flow control valve inlet isolation valves are shut and their bypass valves are throttled to maintain flow. 13 AFW pump has to be started locally due to the loss of control power. The steps are ordered this way to prevent starting the pump at runout.

18. Loss of SRW cooling in the Turbine Building necessitates securing the Main Feed System. The pumps that can be tripped from the Control Room are, and the ones that have lost control power are tripped locally. The Condensate Booster Pumps are placed in Pull-To-Lock to prevent restart on condensate low pressure when power is restored. Either 12 or 13 Condensate Pump is operated as necessary to maintain the condensate system pressurized to prevent flashing in the feedwater heaters and provide cooling for SG blowdown.

19. This step verifies adequate RCS flow is being maintained to remove heat from the core and transfer it to the S/Gs. If adequate flow cannot be verified, then RCS and Core Heat Removal Safety Function may become jeopardized if the condition cannot be remedied. Operators should ensure RCS pressure and inventory, and S/G steaming and feeding are being controlled properly to prevent violation of a safety function.

    Natural circulation is monitored by heat removal via at least one S/G. Natural circulation flow should occur within 5 to 15 minutes after the RCPs were tripped as long as inventory and pressure are controlled. A note is included prior to this step to inform the operator verification of an RCS temperature response to a plant change during natural circulation can not be accomplished until approximately 5 to 15 minutes following the action due to the increase in loop cycle times.

    Natural circulation is governed by decay heat, component elevation, primary to secondary heat transfer, loop flow resistance, and voiding. Component elevations on Combustion Engineering plants are such that satisfactory natural circulation decay heat removal is obtained by fluid density differences between the core region and the steam generator tubes.

    The operator has adequate instrumentation to monitor natural circulation for the single-phase liquid natural circulation process. The RCS temperature instrumentation can be used along with the other information to confirm the single-phase natural circulation process is effective. The natural circulation process involving two phase cooling is complex and varied enough so that RCS loop differential temperatures may not be a meaningful indication of adequate natural circulation cooling.

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The RCS temperature response during natural circulation will be slow as compared to a normal forced flow system response time of 6-12 seconds, since the coolant loop cycle time will be significantly longer (5 to 15 minutes). When single-phase natural circulation flow is established in at least one loop, the RCS should indicate the following conditions:

- RCS subcooling at least 30°F based on CET temperatures. Adequate subcooling ensures that an adequate amount of fluid in its desired status is available to remove decay heat. During natural circulation, CET subcooling should be used to determine if adequate subcooling exists. The CETs do not rely on loop flow for detecting fluid conditions adjacent to the core and therefore will be the most accurate indication of core temperature.

- T_{HOT} minus T_{COLD} less than 50°F. T_{HOT} minus T_{COLD}, with two S/Gs operable, is expected to be about 20 to 25°F. If only one S/G is available during natural circulation, as would be the case if one S/G was unable to be fed or steamed, the differential temperature is expected to be about 40 to 50°F.

- T_{HOT} and T_{COLD} constant or lowering. After natural circulation has been established, hot and cold leg temperatures should remain constant or be lowering. If the RCS is being cooled down, then the heat removed from the RCS should exceed the heat generated by decay heat and RCS temperature should lower. A rise in RCS temperatures indicates proper heat removal is not being maintained.

- CET temperatures trend consistent with T_{HOT}. Hot leg RTD temperature should be consistent with core exit thermocouples. Adequate natural circulation flow ensures core exit thermocouple temperatures will be approximately equal to the hot leg RTDs temperature within the bounds of the instruments' inaccuracies. Generally speaking, the CET temperatures will be somewhat higher than T_{HOT}. Since the steaming rate affects RCS temperatures, the margin of agreement between the CETs and T_{HOT} will vary. The critical area of concern here is to verify a general temperature trend using RTDs as primary indicator of RCS temperatures and the CETs to verify the trend. T_{HOT} indicated temperature response should be similar to the CET temperatures for RCS. For example, if T_{HOT} is constant, then CET temperatures should remain relatively constant. Likewise, if T_{HOT} increases or decreases, then CET temperatures should also increase or decrease, although there may be a small time lag involved before the CET temperatures change. (Reference: Sam Moore, BG&E E&C Systems Engineering Unit, memo to John Wilson dated April 3, 1991)

- Steaming rate affects RCS temperatures. Natural circulation is governed by decay heat, component elevations, primary to secondary heat transfer, loop flow resistance, and voiding. As previously mentioned, component elevations on CE plants are such that satisfactory natural circulation decay heat removal is obtained by fluid density differences between the core region and the steam generator tube sheet. Steaming rate affects the cold leg temperatures and density. This affects the magnitude of thermal driving head developed and therefore the amount of natural circulation flow. This will in turn affect hot leg temperatures since core flow is raised. When steam flow is adjusted, it should result in positive response in cold and hot leg temperatures with the major change being seen in cold leg temperatures.

20. The Main Generator Field Breaker loses remote trip capability due to loss of DC control power.

21. Opening the Turbine Generator output breakers stops the generator from motorizing. The Reactor and Turbine are tripped in the beginning of this procedure but due to the loss of control power the Generator output breakers will not trip until done manually. In response to a 1991 Problem Report number 2942, it was stated by D. Milanicz at electric test that the generator could handle a reverse powering situation of 2% - 3% for a few hours. Therefore the placement of this step later in the procedure is sufficient for protection of the generator.

22. The RC Waste Evaporators lose CC flow when CC Supply Isolation Valves, 1-CC-3842-CV and 2-CC-3842-CV fail shut.

23. Refer to Bases for Block Step V.A.12.
24. Refer to Bases for Block Step V.A.13.

25. The SRW Head Tank level control valve 1-SRW-1579-CV fails open and may cause the head tank to overflow.

26. The CC Head Tank level control valve 1-CC-3820-CV fails open and may cause the head tank to overflow.

27. 0-WGS-2191-CV fails shut on loss of 11 DC. If a waste gas discharge was in progress , according to a Caution in OI-17B, 0-WGS-2191-PCV must be closed as soon as possible to prevent the discharge header relief valve from lifting, discharging the Waste Gas Decay Tank to the Waste Gas Surge Tank.

28. Refer to the Bases for Block Step V.A.10.

29. The breaker is not providing protection for faults due to loss of power to the breaker trip circuitry. The breaker must be manually tripped locally.

BLOCK STEP: XI.B. RESTORE POWER TO THE BUS.

1. Refer to Bases for Block Step III, Caution 1.
2. Refer to Bases for Block Step V.B.2.

3. 11 120 Volt Vital AC Instrument Bus 1Y01 is lost until it can be supplied power from its backup bus 1Y11 via MCC 104R. The steps from OI-26B are referenced and not provided to ensure the proper steps are performed.

4. Once the cause of the loss of power to 11 125 Volt DC bus has been determined and if 1Y01 was not the cause of the loss of power, then 1Y01 can be re-energized and loads on 1Y01 can be restored. Steps b and c need to be performed in order. The ESFAS Sensor Cabinet ZD is energized, its sensor modules reset, and the then ESFAS Actuation Logic Cabinet AL is energized per OI-34. Sensor modules are reset prior to actuator logic to prevent actuation from occurring.

5. In previous steps, actions have been provided for major loads powered from this bus. In this step, reference is made to the drawings and DS-013, which provides a comprehensive listing of all components powered from the bus. If power is lost to the bus for an extended period of time, then these references should be accessed and long-term actions determined.

6. If no fault exists on 11 125 Volt DC Bus, then the appropriate Battery Charger is placed in service per the OI or Electrical Maintenance is directed to place the Reserve Battery in service, which should provide a few more hours of power to the bus. If the bus can not be re-energized at this time, the operators are essentially at a hold point until the bus can be made available for restoration of power.

7. When power has been restored to 11 125 Volt DC Bus, 1Y01 can be energized from its normal power supply. The steps from OI-26B are referenced and not provided to ensure the proper steps are performed. When this step is accomplished, the Tech Spec Action Statement can be exited.

8. These loads were addressed in section A due to the loss of either 1Y01 or 11 125 Volt DC Bus. When power has been restored to both buses from their normal power supplies, these systems can be restored to normal. The sequencing of the steps is important. Letdown cannot be restored until IA is restored to Containment. IA restoration (step c) must take place prior to step d, and prior to stopping SWACs in step f. Component Cooling flow is initiated to resupply cooling flow to components and to attempt to prevent RCP CBO temperatures from exceeding 250°F.

   Prior to reinitiating Component Cooling water flow to the containment, the operator first records the highest RCP Controlled Bleed-off and lower seal temperatures. The Controlled Bleed-off temperatures are recorded since the seals of any RCP whose Controlled Bleed-off temperature has exceeded 250°F, must be rebuilt prior to restarting of the affected pump. This record is necessary since Controlled Bleed-off temperatures will lower when flow is restored to containment, and there are no indications to determine if temperatures have exceeded the limit.

   This step allows the operator to restore Component Cooling flow to containment by simply opening the containment isolation valve as long as RCP lower seal temperatures have not exceeded 280°F. If RCP lower seal temperatures have exceeded 280°F, flow must be restored by throttling the manual isolation valve. This is done to prevent thermal shock to the RCP seals and seal coolers resulting from the initiation of cooling water at elevated component temperatures. The step to restore Component Cooling to containment has been modified so it is sequenced after determining RCP lower seal temperatures have not exceeded 280°F so Component Cooling water is not restored to a pump whose seals have exceeded 280°F without throttling flow.

9. EOP-8 may have sent the operators to this AOP if the unit was in Modes 1 or 2 for the following reasons. RCS and Core Heat removal may have been affected when the RCPs were de-energized. Vital Auxiliaries may have been affected due to loss of this bus. RCS pressure control may have been affected due to loss of Aux Spray and other PZR pressure control problems. Inventory may have been affected due to the charging and letdown problems.

   Restart of the RCPs or plant cooldown can be determined through the steps in AOP-3E and the plant can be stabilized. Once plant conditions are stable or when the operators have control of the event, the applicable procedure is implemented.

SECTION NUMBER: XII. 12 125 VOLT DC BUS.
BLOCK STEP: XII.A. RESPOND TO A LOSS OF 12 125 VOLT DC BUS.

1. On loss of this bus, various indications and components are affected. This list is provided based on the results of a review of the Loss of Control Indication Power Study performed by Engineering. These effects should be noted and actions taken as appropriate or depending on plant conditions.

2-3. On loss of power to this bus, 1Y03 is also de-energized. Steps from the section for loss of power to 1Y03 are provided. Due to loss of 1Y03, these ESFAS cabinets have lost power and need to be de-energized per the OI, which addresses actions for these cabinets. Also due to loss of 1Y03, RPS Channel C loses power, so steps are provided to de-energize this RPS Channel.

4. This step directs the Control Room staff to determine the appropriate emergency response actions. Recovery actions should not be delayed while attempting to determine response actions. The EALs require that an Unusual Event is declared if AOP-7J is implemented and 125 Volt DC Power is lost for greater than 15 Minutes. The step is placed here in the procedure to allow notification of plant personnel to ensure that assistance is or will be available if needed and the appropriate offsite organizations are notified in a timely manner.

BLOCK STEP: XII.B. RESTORE POWER TO THE BUS.

1. Refer to Bases for Block Step III, Caution 1

2. 13 120 Volt Vital AC Instrument Bus 1Y03 is lost until it can be supplied power from its backup bus 1Y11 via MCC 104R. The steps from OI-26B are referenced and not provided to ensure the proper steps are performed.

3. This step returns systems to normal, that were manipulated in Section A once power is restored.

4. TS 3.8.1, A.C. Sources - Operating and 3.8.2, A.C. Sources - Shutdown may apply due to 1B DG field flash and control power losing power and the start solenoids failing shut.

   Refer to Block Step V.B.2.

5. In previous steps, actions have been provided for major loads powered from this bus. In this step, reference is made to the drawings and DS-013, which provides a comprehensive listing of all components powered from the bus. If power is lost to the bus for an extended period of time, then these references should be accessed and long-term actions determined.

6. If the bus can not be re-energized at this time, the operators are essentially at a hold point until the bus can be made available for restoration of power.

7. When power has been restored to 12 125 Volt DC Bus, 1Y03 can be energized from its normal power supply. The steps from OI-26B are referenced and not provided to ensure the proper steps are performed.

8. The TCBs trip on loss 1Y03. When 1Y03 is returned to normal, the TCBs can be closed.

9. Various rad monitors are lost on a loss of this 1Y03. When power is restored to this bus, the alarms associated with the rad monitors can be reset.

10. This step is provided as an exit statement. The operators will have returned equipment to normal as appropriate. From here, the operators will either exit the AOP or address other buses or bus which may have lost power.

SECTION NUMBER: XIII. 21 125 VOLT DC BUS.
BLOCK STEP: XIII.A. RESPOND TO A LOSS OF 21 125 VOLT DC BUS.

The loss of this bus is quite unlikely; to inadvertently de-energize this bus would require that both battery chargers and 21 battery be removed from the bus. But if it were to happen the actions required to recover would be labor intensive since control power to many breakers is lost. 1Y02 is also de-energized when 21 DC bus is lost, so many of the same actions are performed as would be done in Section VI of this procedure.

The CC Supply to CNTMT Isolation Valve, 1-CC-3833-CV fails shut, on loss of 21 DC bus. Without cooling to the RCPs, they must be tripped to prevent overheating. The first 5 steps of this section of the procedure help to stabilize the plant after the ensuing trip. If the Reactor is critical, the Reactor and Turbine must be tripped, the Reactivity Control Immediate Actions of EOP-0, Post Trip Immediate Actions are performed to ensure that the most important safety function is addressed and then the RCPs are de-energized. At that point EOP-0 is implemented. 1100

1. Refer to Bases for Block Step VI.A.1.
2. Refer to Bases for Block Step VI.A.3.
3. Refer to Bases for Block Step VI.A.4.
4. Refer to Bases for Block Step VI.A.5.
5. Refer to Bases for Block Step VI.A.6.

6. The CC Return to CNTMT Isolation Valve, 1-CC-3833-CV fails shut. Without cooling to the RCPs, they must be tripped. If the Reactor is critical, it must be tripped prior to securing RCP flow. The Turbine must be manually tripped because the ESFAS BL Actuation Cabinet is de-energized. The Reactivity Control Immediate Actions of EOP-0, Post Trip Immediate Actions are performed to ensure that the most important safety function is addressed and then all RCPs are tripped at the Bus Feeder Breaker Control Switch since control power is lost to 11B and 12B RCP breakers. The caution before the step also includes information about the Main Feedwater system which will be mitigated during EOP-0 implementation.

7. If the Reactor is not critical, then the RCPs are tripped in the same manner as in step 6.

   The step directs the Control Room staff to determine the appropriate emergency response actions (In step 6 above the operators will be directed to the ERPIP once the EOPs are entered). Recovery actions should not be delayed while attempting to determine response actions. The EALs require that an Unusual Event is declared if AOP-7J is implemented and 125 Volt DC Power is lost for greater than 15 Minutes. The step is placed here in the procedure to allow notification of plant personnel to ensure that assistance is or will be available if needed and the appropriate offsite organizations are notified in a timely manner.

8. On loss of this bus, various indications and components are affected. This list is provided based on the results of a review of the Loss of Control Indication Power Study performed by Engineering. These effects should be noted and actions taken as appropriate or depending on plant conditions.

9. The PZR Backup and Proportional Heaters are operated as necessary to maintain RCS pressure. On loss of DC power, 12 PZR Heater Proportional Controller Breaker loses control power and must be tripped locally. The RCPs have been tripped, so main spray is not available.
Unlike the steps in 11 125 Volt DC bus, Aux Spray is available, since IA has not been isolated to containment, and is used for pressure control. Limits are set as to the number of cycles of Aux Spray allowable so the temperature differential is logged. When 1-CVC-517-CV is full open, the Loop Charging Valves are shut as desired to throttle Aux Spray flow. Steps are provided to isolate Aux Spray when pressure control has been stabilized.

10. Letdown is lost on loss of DC when 1-CVC-516-CV fails closed, so PZR level will be maintained by cycling charging pumps. A generous band is provided to control PZR level to limit charging pump starts. Control power is lost to the breakers associated with 14A 480 Volt Bus. Therefore if 12 Charging pump is running or if 13 Charging pump is aligned to 14A bus and they need to be secured local operation of the breaker will be required. The Letdown Isolation Valves are shut because 1-CVC-516 is lost and the handswitch should be placed in CLOSE to prevent uncontrolled letdown flow when power is restored to the bus.

11. The valve handswitch is placed in CLOSE to prevent uncontrolled restoration of CC to the RCP seals when power is restored.

12. Starting the Saltwater Air Compressors aids in plant control, IA and PA may be lost due to loss of SRW to the Turbine Building on loss of 1-SRW-1638 and 1-SRW-1639.

13. The SW valves to 12 ECCS Cooler, 12 CC HX, and 12 SRW HX fail open so the pump must be locally throttled to prevent the pump from operating at runout.

14. IA and PA to both units would be lost until IA Compressors 11 and 21 could be supplied cooling water from the Fire Main. 12 IA Compressor has to be manually tripped, however, because they will not trip on the high temperature condition that will occur on loss of SRW to the Turbine Building.

15. Aux Feedwater is initiated due to the unavailability of Main Feedwater. Loss of SRW to the Turbine Building stops cooling flow to the SGFP and Condensate Booster pump lube oil coolers. The Main Feed System must be secured per the next step. Aux Feedwater is initiated using the motor driven AFW pump since its flow controllers are still energized. A wide band of level control is given consistent with other procedures where natural circulation of the RCS is performed.

    If the AFW Steam Train is in operation, it would be feeding the SGs uncontrolled. Thus successful starting of the Motor Train is followed by securing the AFW Steam Train.

    If the AFW Motor Train is not available, the steam driven AFW pumps are started using 12 SG AFW Steam Supply Valve, 1-MS-4071-CV because 11 SG AFW Steam Supply Valve, 1-MS-4070-CV, fails shut. Since the AFW Steam Train Flow Control Valves, 1-AFW-4511-CV and AFW-4512-CV, fail open on loss of power, their flow control valve inlet isolation valves are shut and their bypass valves are throttled to maintain flow.

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16. Loss of SRW cooling in the Turbine Building necessitates securing the Main Feed System. The pumps that can be tripped from the Control Room are, and the ones that have lost control are tripped locally. The Condensate Booster Pumps are placed in Pull-To-Lock to prevent restart on condensate low pressure when power is restored. 11 Condensate Pump is operated as necessary to maintain the Condensate system pressurized to prevent flashing in the feedwater heaters.

17. Refer to Bases for Block Step XI.A.19.

18. The RC Waste Evaporators lose CC flow when CC Supply to Evaporators Isolation Valves 1-CC-3840-CV and 2-CV-3840-CV fail shut.

19. Refer to Bases for Block Step VI.A.11.

20. Refer to Bases for Block Step VI.A.12.

21. The Unit 1 Containment Radiation Monitor pump is stopped due to 1-CRM-5292-CV failing shut. This is done as a backup to the low flow trip which should occur.

22. The SRW Head Tank level control valve, 1-SRW-1565-CV, fails open and may cause the head tank to overflow.

23. The breaker is not providing protection for faults due to loss of power to the breaker trip circuitry. The breaker must be manually tripped locally.

BLOCK STEP: XIII.B. RESTORE POWER TO THE BUS.

1. Refer to Bases for Block Step III, Caution 1
2. Refer to Bases for Block Step V.B.2.

3. 12 120 Volt Vital AC Instrument Bus 1Y02 is lost until it can be supplied power from its backup bus 1Y11 via MCC 104R. The steps from OI-26B are referenced and not provided to ensure the proper steps are performed.

4. Once the cause of the loss of power to 21 125 Volt DC bus has been determined and if 1Y02 was not the cause of the loss of power, then 1Y02 can be re-energized and loads on 1Y02 can be restored.

5. In previous steps, actions have been provided for major loads powered from this bus. In this step, reference is made to the drawings and DS-013, which provides a comprehensive listing of all components powered from the bus. If power is lost to the bus for an extended period of time, then these references should be accessed and long-term actions determined.

6. If the bus can not be re-energized at this time, the operators are essentially at a hold point until the bus can be made available for restoration of power.

7. When power has been restored to 21 125 Volt DC Bus, 1Y02 can be energized from its normal power supply. The steps from OI-26B are referenced and not provided to ensure the proper steps are performed. This allows exit for applicable Technical Specification Action Statements.

8. These loads were addressed in section A due to the loss of either 1Y02 or 21 125 Volt DC Bus. When power has been restored to both buses from their normal power supplies, these systems can be restored to normal. Component Cooling flow is initiated to resupply cooling flow to components and to attempt to prevent RCP CBO temperatures from exceeding 250°F.

   Prior to reinitiating Component Cooling water flow to the containment, the operator first records the highest RCP Controlled Bleed-off and lower seal temperatures. The Controlled Bleed-off temperatures are recorded since the seals of any RCP whose Controlled Bleed-off temperature has exceeded 250°F, must be rebuilt prior to restarting of the affected pump. This record is necessary since Controlled Bleed-off temperatures will lower when flow is restored to containment, and there are no indications to determine if temperatures have exceeded the limit.

   This step allows the operator to restore Component Cooling flow to containment by simply opening the containment isolation valve as long as RCP lower seal temperatures have not exceeded 280°F. If RCP lower seal temperatures have exceeded 280°F, flow must be restored by throttling the manual isolation valve. This is done to prevent thermal shock to the RCP seals and seal coolers resulting from the initiation of cooling water at elevated component temperatures. The step to restore Component Cooling to containment has been modified so it is sequenced after determining RCP lower seal temperatures have not exceeded 280°F so Component Cooling water is not restored to a pump whose seals have exceeded 280°F without throttling flow.

9. EOP-8 may have sent the operators to this AOP if the unit was in Modes 1 or 2 for the following reasons. RCS and Core Heat removal may have been affected when the RCPs were de-energized. Vital Auxiliaries may have been affected due to loss of this bus.

   RCS pressure control may have been affected due to loss of Aux Spray and other PZR pressure control problems. Inventory may have been affected due to the charging and letdown problems.

   Restart of the RCPs or plant cooldown can be determined through the steps in AOP-3E and the plant can be stabilized. Once plant conditions are stable or when the operators have control of the event, the applicable procedure is implemented.

SECTION NUMBER: XIV. 22 125 VOLT DC BUS.
BLOCK STEP: XIV.A. RESPOND TO A LOSS OF 22 125 VOLT DC BUS.

1. On loss of this bus, various indications and components are affected. This list is provided based on the results of a review of the Loss of Control Indication Power Study performed by Engineering. These effects should be noted and actions taken as appropriate or depending on plant conditions.

2-3. On loss of power to this bus, 1Y04 is also de-energized. Steps from the section for loss of power to 1Y04 are provided.

Due to loss of 1Y04, these ESFAS cabinets have lost power and need to be de-energized per the OI, which addresses actions for these cabinets. Also due to loss of 1Y04, RPS Channel D loses power, so steps are provided to de-energize this RPS Channel.

4. This step directs the Control Room staff to determine the appropriate emergency response actions Recovery actions should not be delayed while attempting to determine response actions. The EALs require that an Unusual Event be declared if AOP-7J is implemented and 125 Volt DC Power is lost for greater than 15 Minutes. The step is placed here in the procedure to allow notification of plant personnel to ensure that assistance is or will be available if needed and the appropriate offsite organizations are notified in a timely manner.

BLOCK STEP: XIV.B. RESTORE POWER TO THE BUS.

1. Refer to Bases for Block Step III. Caution 1.

2. 14 120 Volt Vital AC Instrument Bus 1Y04 is lost until it can be supplied power from its backup bus 1Y11 via MCC 104R. The steps from OI-26B are referenced and not provided to ensure the proper steps are performed.

3. This step returns systems to normal, that were manipulated in Section A once power is restored.

4. Refer to Bases for Block Step V.B.2.

5. In previous steps, actions have been provided for major loads powered from this bus. In this step, reference is made to the drawings and DS-013, which provides a comprehensive listing of all components powered from the bus. If power is lost to the bus for an extended period of time, then these references should be accessed and long-term actions determined.

6. If the bus can not be re-energized at this time, the operators are essentially at a hold point until the bus can be made available for restoration of power.

7. When power has been restored to 22 125 Volt DC Bus, 1Y04 can be energized from its normal power supply. The steps from OI-26B are referenced and not provided to ensure the proper steps are performed.

8. The TCBs trip on loss 1Y04. When 1Y04 is returned to normal, the TCBs can be closed.

9. Various rad monitors are lost on a loss of 1Y04. When power is restored to this bus, the alarms associated with the rad monitors can be reset.

10. This step is provided as an exit statement. The operators will have returned equipment to normal as appropriate. From here, the operators will either exit the AOP or address other buses or bus, which may have lost power.

CALVERT CLIFFS NUCLEAR POWER PLANT
TECHNICAL PROCEDURE

UNIT ONE

AOP-7J

LOSS OF 120 VOLT VITAL AC OR 125 VOLT VITAL DC POWER

REVISION 19

Safety Related

Approval Authority: Tim Riti 7/11/06
signature/date

Effective Date: 7/12/06

LIST OF EFFECTIVE PAGES

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I. PURPOSE

The purpose of this procedure is to place the plant in a safe, stable condition following a loss of power to any 120 Volt Vital AC Instrument Bus or 125 Volt DC Bus.

II. ENTRY CONDITIONS

A. Loss of power to any 120 Volt Vital AC Instrument Bus or 125 Volt DC Bus as indicated by the loss of various components and their accompanying alarms and indications.

III. PRECAUTIONS

The following specific precautions apply prior to or throughout this procedure.

A. **WARNINGS**

NONE

B. **CAUTIONS**

1. To prevent common failures, buses should **NOT** be re-energized until the cause of the power loss has been determined by use of protective relaying, dropped flags, fuse failure indications or as determined by circuit functional tests performed by the Electrical Maintenance Group.

2. Loss of 12 120 Volt Vital AC Instrument Bus (1Y02) or loss of 21 125 Volt DC Bus will result in the loss of power to the ESFAS BL Actuation Cabinet, which renders the SG High Level and Reactor Trip Bus UV Turbine Trips inoperable.

3. Indiscriminate restoration of power to a bus can result in undesirable Plant response or equipment actuations. In sections V., 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01) thru XIV., 22 125 VOLT DC BUS, Block Step A is designed to stabilize the plant and prepare systems for power restoration.

C. **NOTES**

1. Unless indicated, each section of this procedure assumes the Unit is paralleled prior to the event and the electrical system lineup is normal.

2. Unless otherwise stated, it is assumed that the Unit is operating in Modes 1 or 2. If the Unit is **NOT** in Modes 1 or 2, steps that address equipment which is **NOT** required to be operating for existing conditions may be omitted with the approval of the SM or CRS.

3. If the Unit is on SDC, AOP-3B, ABNORMAL SHUTDOWN COOLING CONDITIONS, should be implemented as necessary.

4. Electrical prints should be referenced so that all equipment affected by the loss of power may be determined.

5. With the approval of the CRS or SM, two or more steps of this procedure may be performed concurrently. The steps must be evaluated in the sequence listed and determined **NOT** to be dependent upon the actions of other steps of the procedure.

IV. PRELIMINARY

ACTIONS	ALTERNATE ACTIONS
A. DETERMINE THE APPROPRIATE SECTION FOR THE EVENT.	
1. Perform the following immediate actions: a. Confirm with the Fuel Handling Supervisor that any fuel assembly being handled has been placed in a safe location. 1901 b. Suspend movement of irradiated fuel. c. Suspend movement of heavy loads over irradiated fuel. d. **IF** in Modes 5 or 6, **THEN** suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration. 1901 2. **GO TO** 1C24A. 3. **IF** 11 120 Volt Vital AC Instrument Bus (1Y01) is deenergized, **AND** 11 125 Volt DC Bus is energized, **THEN PROCEED** to Section V., 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01). 4. **IF** 11 and 21 120 Volt Vital AC Instrument Busses (1Y01 and 2Y01) are deenergized, **AND** 11 125 Volt DC Bus is deenergized, **THEN PROCEED** to Section XI., 11 125 VOLT DC BUS. (continue)	

IV. PRELIMINARY

ACTIONS	ALTERNATE ACTIONS
A. (continued) 5. **IF** 12 120 Volt Vital AC Instrument Bus (1Y02) is deenergized, **AND** 21 125 Volt DC Bus is energized, **THEN PROCEED** to Section VI., 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02). 6. **IF** 12 and 22 120 Volt Vital AC Instrument Busses (1Y02 and 2Y02) are deenergized, **AND** 21 125 Volt DC Bus is deenergized, **THEN PROCEED** to Section XIII., 21 125 VOLT DC BUS. 7. **IF** 13 120 Volt Vital AC Instrument Bus (1Y03) is deenergized, **AND** 12 125 Volt DC Bus is energized, **THEN PROCEED** to Section VII., 13 120 VOLT VITAL AC INSTRUMENT BUS (1Y03). 8. **IF** 13 and 23 120 Volt Vital AC Instrument Buses (1Y03 and 2Y03) are deenergized, **AND** 12 125 Volt DC Bus is deenergized, **THEN PROCEED** to Section XII., 12 125 VOLT DC BUS. 9. **IF** 14 120 Volt Vital AC Instrument Bus (1Y04) is deenergized, **AND** 22 125 Volt DC Bus is energized, **THEN PROCEED** to Section VIII., 14 120 VOLT VITAL AC INSTRUMENT BUS (1Y04). 10. **IF** 14 and 24 120 Volt Vital AC Instrument Buses (1Y04 and 2Y04) are deenergized, **AND** 22 125 Volt DC Bus is deenergized, **THEN PROCEED** to Section XIV., 22 125 VOLT DC BUS. (continue)	

IV. PRELIMINARY

ACTIONS	ALTERNATE ACTIONS
A. (continued) 11. **IF** 22 120 Volt Vital AC Instrument Bus (2Y02) is deenergized, **THEN PROCEED** to Section IX., 22 120 VOLT VITAL AC INSTRUMENT BUS (2Y02). 12. **IF** 24 120 Volt Vital AC Instrument Bus (2Y04) is deenergized, **THEN PROCEED** to Section X., 24 120 VOLT VITAL AC INSTRUMENT BUS (2Y04). END of Section IV	

V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

ACTIONS	ALTERNATE ACTIONS
A. RESPOND TO A LOSS OF 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01).	
1. Verify that the PRZR PRESS CH SEL Switch is in the Y position. 2. Verify that the RRS CH SEL Switch is in the RRS-Y position. 3. Verify that the PRZR LVL CH SEL Switch is in the 110Y position. 4. Verify that the PZR HTR LO LVL CUT-OFF SEL Switch is in the Y position. **NOTE** Switch S1 is located inside the RRS Test Panel Drawer at 1C32. 5. Isolate the RCS Loop 11 instruments to RRS Channel Y by placing switch S1 to OFF. 6. Shut the L/D CNTMT ISOL valves: • 1-CVC-515-CV • 1-CVC-516-CV **CAUTION** **Charging pump starts should be minimized to limit transients on the loop charging inlet nozzles.** 7. Operate the selected charging pump as necessary to maintain PZR level within 15 inches of programmed level, **NOT** to exceed 225 inches. (continue)	

V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

ACTIONS	ALTERNATE ACTIONS
A. (continued)	**CAUTION** **If the difference between the PRZR WTR TEMP and CHG OUT TEMP is greater than 400° F, then TRM 15.4.2 must be complied with.**
8. Operate Pressurizer HTRs and PRZR SPRAY VLVs as necessary to maintain RCS pressure between 2225 and 2275 PSIA.	8.1 **IF** the PRZR SPRAY VLVs are **NOT** available, **THEN** initiate AUX SPRAY, as necessary. a. Record the following information: • PRZR WTR TEMP (1-TI-101) • CHG OUT TEMP (1-TI-229) b. Open the AUX SPRAY valve, 1-CVC-517-CV. c. Operate the LOOP CHG valves as necessary to adjust AUX SPRAY flow: • 1-CVC-518-CV • 1-CVC-519-CV d. Shift the PRESSURIZER SPRAY VLV CONTROLLER, 1-HIC-100, to MANUAL. e. Shut the PRZR SPRAY VLVs by adjusting the output of 1-HIC-100 to 0%: • 1-RC-100E-CV • 1-RC-100F-CV
(continue)	(continue)

V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

ACTIONS	ALTERNATE ACTIONS
A.8 (continued) **NOTE** Loss of power to 1Y01 causes 11 CC HX SW OUT, 1-SW-5206-CV and 11A/11B SRW HX SW BYPASS VLV, 1-SW-5154-CV valves to close. 9. Restore 11 Saltwater header: a. Verify 12 CC HX is in service. b. Verify 11A/11B SRW HX SW OUT valve handswitches are in OPEN. • 1-SW-5209-CV • 1-SW-5210-CV 10. Stop the Unit 1 Containment Radiation Monitor pump. (continue)	A.8.1 (continued) f. **WHEN** AUX SPRAY is **NO** longer needed, **THEN** perform the following actions: (1) Open LOOP CHG valves: • 1-CVC-518-CV • 1-CVC-519-CV (2) Shut AUX SPRAY valve, 1-CVC-517-CV.

V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

ACTIONS	ALTERNATE ACTIONS
A. (continued) 11. The following alarms may actuate and indications may be affected upon loss of the bus: 1C03 • 11 and 12 SG Channel A pressure and level indicators fail low • "12 CST LVL LO" alarm 1C04 • "AFAS LOSS OF POWER " alarm • 12 CST level indicator, 1-LIA-5610, fails low • AFW Motor Driven Train Flow Controllers fail and flow indicates setpoint: • (11 SG) 1-FIC-4525A • (12 SG) 1-FIC-4535A • Loss of PAM CH A FPD, 1-CRT-1C04A 1C05 • Loss of PAM CH A FPD, 1-CRT-1C05A (continue)	

V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

ACTIONS	ALTERNATE ACTIONS
A.11 (continued) 1C06 • Loss of Channel X PZR pressure control and indication fails low • Loss of Channel X PZR level control and indication fails low • Channel A Total Core Cooling Flow indication, 1-PDI-101A, fails low • PZR Low Range pressure indicator, 1-PI-103, goes blank • PZR pressure instrument, 1-PI-102A, fails low • TM/LP Trip Setpoint indication, 1-PIA-102A fails low • Loss of PAM CH A FPD, 1-CRT-1C06A 1C08 • "ACTUATION SYS LOSS OF POWER" alarm • "ACTUATION SYS" tripped alarms for SIAS, CIS, CSAS, RAS, SGIS-A, CRS, and CVCS-A • "ACTUATION SYS SENSOR CH ZD TRIP" alarm 1C15 • Nuclear Instrumentation indication on Channel A is lost (continue)	

V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

ACTIONS	ALTERNATE ACTIONS

A. (continued)
 	
12. The following components will be affected by the loss of the bus:
 	
• Channel A ESFAS and AFAS Actuation Cabinets de-energized
 	
• Channel ZD ESFAS and AFAS Sensor Cabinets de-energized
 	
• Channel A RPS Cabinet de-energized
 	
• Channel A PAMS de-energized
 	
• AFW Motor Driven Train Flow Control Valves fail open and indication is lost:
 	
  • (11 SG) 1-AFW-4525-CV
  • (12 SG) 1-AFW-4535-CV
 	
• Portions of the Unit 1 and Unit 2 Aux Shutdown Panels, 1C43 and 2C43, are de-energized
 	
• IA downstream of the CNTMT IA Control Valve, 1-IA-2085-CV is isolated ("CNTMT IA ISOL 1-IA-2085-CV CLOSED" alarm does **NOT** actuate)
 	
• TCBs 1, 2, 5, and 6 are open and the Reactor does **NOT** trip
 	
• PORV-402 inoperable in MPT ENABLE
 	
• 11 CC HX SW FLOW CONTR, 1-HIC-5206, loses power
 	
• 11A/11B SRW HX SW BYPASS, 1-PIC-5154, loses power
 	
• The radio telephone de-energized
 	
• CNTMT High Range Monitor Channel A, 1-RI-5317A, out of service
 	
(continue)	

V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

ACTIONS	ALTERNATE ACTIONS

A.12 (continued)
• CNTMT Area Rad Monitor, 1-RI-5316A, out of service
• CNTMT Particulate Monitor, 1-RI-5280, out of service
• CNTMT Gaseous Monitor, 1-RI-5281, out of service
• 11 Main Steam Effluent Rad Monitor, 1-RIC-5421, out of service
• 11 Main Steam N-16 Rad Monitor, 1-RIC-5421A, out of service
• CAC SRW INL valves fail open:
  • (11 CAC) 1-SRW-1581-CV
  • (12 CAC) 1-SRW-1584-CV
 	
13. De-energize the following components:
• ESFAS Actuation Logic Cabinet AL and Sensor Cabinet ZD **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM.
• AFAS Actuation Logic Cabinet AL and Sensor Cabinet ZD **PER** OI-32B, AFAS SYSTEM OPERATION.
 	
(continue)	

V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

ACTIONS	ALTERNATE ACTIONS
A. (continued) 14. De-energize PAMS Channel A: a. Open 1Y01-1 Breaker 35, RUN PAMS SYSTEM CABINETS 1C182A & 1PAMSA VIA 1X1P93-1 & 1P93. b. Open 1Y01-1 Breaker 36, RUN PAMS SYSTEM CABINET 1C144A VIA 1X1P93-2 & 1P93. c. Ensure open 1Y01-1 Breaker 33, STARTUP PAMS SYSTEM CABINETS 1C182A & 1PAMSA VIA 1X1P93-1 & 1P93. d. Ensure open 1Y01-1 Breaker 34, STARTUP PAMS SYSTEM CABINET 1C144A VIA 1X1P93-2 & 1P93. 15. De-energize RPS Channel A: a. Place the Neutron Flux Monitor Wide Range - CH "A" power supply breaker, CB 1, located at the rear of the cabinet, in the down (OFF) position. b. Place OPERATE-TEST switch on the Linear Power Channel drawer in the ZERO position. c. Place the RPS Channel A circuit breakers located at the rear of the cabinet to OFF: • CB (A) • CB-1 16. **IF** the loss of 1Y01 caused B train ESFAS actuctions, **THEN** de-energize ESFAS Actuation Logic Cabinet BL **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. (continue)	

V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

ACTIONS	ALTERNATE ACTIONS
A. (continued) 17. **IF** the loss of 1Y01 caused B train AFAS actuctions, **THEN** de-energize AFAS Actuation Logic Cabinet BL **PER** OI-32B, AFAS SYSTEM OPERATION. 18. Shutdown 11 Main Steam Effluent and N-16 Rad Monitor, 1-RIC-5421/5421A, **PER** OI-35, Radiation Monitoring System.	

V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

ACTIONS	ALTERNATE ACTIONS
B. RESTORE POWER TO THE BUS.	
1. Determine the cause of the loss of power to the bus. 2. Determine the applicable TS/TRM requirements which may include the following: • 3.8.1, A.C. Sources - Operating • 3.8.2, A.C. Sources - Shutdown • 3.8.7, Inverters - Operating • 3.8.8, Inverters - Shutdown • 3.8.9, Distribution Systems - Operating • 3.8.10, Distribution Systems - Shutdown • 3.3.1, RPS Instrumentation - Operating • 3.3.2, RPS Instrumentation - Shutdown • 3.3.3, RPS Logic and Trip Initiation • 3.3.4, ESFAS Instrumentation • 3.3.5, ESFAS Logic and Manual Actuation • 3.3.6, DG - Loss of Voltage Start • 3.3.7, Containment Radiation Signal • 3.3.9, CVCS Isolation Signal • 3.3.10, Post Accident Monitoring Instrumentation • 3.3.11, Remote Shutdown Instrumentation • 3.3.12, WR Neutron Flux Monitoring • 3.4.14, RCS Leakage Detection Instrumentation TRM: • 15.3.1, Radiation Monitoring Instrumentation (continue)	

V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

ACTIONS	ALTERNATE ACTIONS
B. (continued) 3. **IF** the bus can **NOT** be restored, **THEN** refer to 1E-22 and Appendix C of ES-013, LOSS OF POWER EFFECT/LOAD LIST, to determine equipment affected. **CAUTION** **Attempts should NOT be made to re-energize a bus if a fault is suspected.** 4. **WHEN** power can be restored to 1Y01, **THEN** perform the following actions.	
a. **IF EITHER** 11 Inverter is available, • INV1 • INV2 **THEN** Energize 1Y01 **PER** OI-26B, 120 VOLT VITAL AC AND COMPUTER AC.	**NOTE** The Inverter Backup Bus is powered from MCC-104. Only one key, per unit, is provided to ensure that only one Inverter is transferred to the Inverter Backup Bus. a.1 **IF** 11 Inverter is **NOT** available, **AND** the Inverter Backup Bus is energized, **THEN** energize 1Y01 from the Inverter Backup Bus by performing the following: (1) Verify **BOTH** 11 Inverter AC OUTPUT breakers in OFF: • INV1 • INV2 (2) Verify the fused disconnect 1Y11-2 is shut. (3) Obtain the ALT A.C. INPUT breaker interlock key from the Shift Manager. (4) Insert the key into the ALT A.C. INPUT breaker interlock and rotate fully clockwise.
(continue)	(continue)

V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

ACTIONS	ALTERNATE ACTIONS
B.4.a (continued)	B.4.a.1 (continued) (5) Place the ALT A.C. INPUT breaker in ON. (6) Shift the MAN TRANS SW to the ALT position.
NOTE 1-HS-2085 is located on the West wall of the 27 ft Switchgear Room and is operated by a T112 key (#85 from the Control Room Key Locker). The TBO key ring also has a T112 key. b. Open the Containment Instrument Air Supply Valve, 1-IA-2085-CV, by momentarily placing 1-HS-2085 in OPEN. c. Restore charging and letdown **PER** OI-2A, CHEMICAL AND VOLUME CONTROL SYSTEM. d. Energize RPS Channel A: (1) Place the Neutron Flux Monitor Wide Range - CH "A" power supply breaker, CB 1, located at the rear of the cabinet, in the up (ON) position. (2) Place the RPS Channel A circuit breakers located at the rear of the cabinet to ON: • CB (A) • CB-1 (3) Place OPERATE-TEST switch on the Linear Power Channel drawer in the OPERATE position. (continue)	

V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

ACTIONS	ALTERNATE ACTIONS

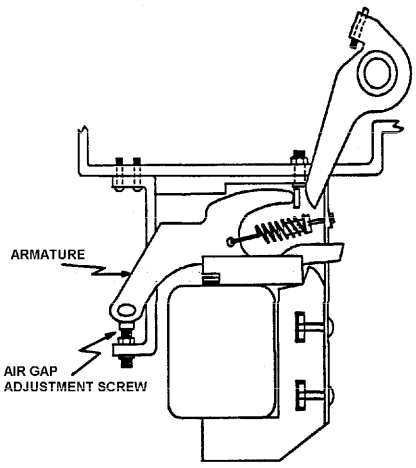
B.4 (continued)

e. Close TCBs 1, 2, 5 and 6 as follows:

NOTE
Manual assistance may be required to ensure UV device is fully positioned.

CAUTION
TCBs may fail to close properly if the UV devices have NOT fully picked up.

(1) Ensure U1 TCB 1, 2, 5 and 6 UV devices are in the full down position.



(2) On 1C15, close TCBs 1, 2, 5 and 6.

f. Energize ESFAS Sensor Cabinet ZD and reset the sensor modules **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM.

g. Energize ESFAS Actuation Logic Cabinets **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM.

(continue)

V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) h. Energize AFAS Sensor Cabinet ZD and reset the sensor modules **PER** OI-32B, AFAS SYSTEM OPERATION. i. Energize AFAS Actuation Logic Cabinets **PER** OI-32B, AFAS SYSTEM OPERATION. j. Energize PAMS Channel A: (1) Close 1Y01-1 Breaker 33, STARTUP PAMS SYSTEM CABINETS 1C182A & 1PAMSA VIA 1X1P93-1 & 1P93. (2) Close 1Y01-1 Breaker 35, RUN PAMS SYSTEM CABINETS 1C182A & 1PAMSA VIA 1X1P93-1 & 1P93. (3) Open 1Y01-1 Breaker 33, STARTUP PAMS SYSTEM CABINETS 1C182A & 1PAMSA VIA 1X1P93-1 & 1P93. (4) Close 1Y01-1 Breaker 34, STARTUP PAMS SYSTEM CABINET 1C144A VIA 1X1P93-2 & 1P93. (5) Close 1Y01-1 Breaker 36, RUN PAMS SYSTEM CABINET 1C144A VIA 1X1P93-2 & 1P93. (6) Open 1Y01-1 Breaker 34, STARTUP PAMS SYSTEM CABINET 1C144A VIA 1X1P93-2 & 1P93. k. Check the "PZR CH X LVL" alarm clear and place the PZR HTR LO LVL CUT-OFF SEL Switch to X/Y. (continue)	

V. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) l. On 1C32, restore the RCS Loop 11 instruments to RRS Channel Y by placing switch S1 to ON. m. Reset any RMS alarms **PER** OI-35, RADIATION MONITORING SYSTEM. n. Restore 11A/11B SRW HX SW OUT valve handswitches as required: • 1-SW-5209-CV • 1-SW-5210-CV o. Place the Containment Radiation Monitors in service **PER** OI-35, RADIATION MONITORING SYSTEM. p. Place the 11 Main Steam Effluent and N-16 Rad Monitors in service **PER** OI-35, RADIATION MONITORING SYSTEM. 5. Return to the appropriate Operating Procedure. END of Section V	

VI. 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02)

ACTIONS	ALTERNATE ACTIONS
A. RESPOND TO A LOSS OF 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02).	
1. Verify that the PRZR PRESS CH SEL Switch is in the X position.	
2. Verify that the LETDOWN THROTTLE VLV CONTROLLER, 1-HIC-110, is in MANUAL.	
3. Verify that the RRS CH SEL Switch is in the RRS-X position.	
4. Verify that the PRZR LVL CH SEL Switch is in the 110X position.	
5. Verify that the PZR HTR LO LVL CUT-OFF SEL Switch is in the X position.	
NOTE Switch S2 is located inside the RRS Test Panel Drawer at 1C31.	
6. Isolate the RCS Loop 12 instruments to RRS Channel X by placing switch S2 to OFF.	
7. Place the LETDOWN THROTTLE VLV CONTROLLER, 1-HIC-110, to AUTO and maintain PZR level near its programmed setpoint.	
(continue)	

VI. 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02)

ACTIONS	ALTERNATE ACTIONS
A. (continued) **NOTE** Loss of power to 1Y02 causes 12 CC HX SW OUT, 1-SW-5208-CV and 12A/12B SRW HX SW BYPASS VLV, 1-SW-5157-CV valves to close. 8. Restore 12 Saltwater header: a. Verify 11 CC HX is in service. b. Verify 12A/12B SRW HX SW OUT valve handswitches are in OPEN. • 1-SW-5211-CV • 1-SW-5212-CV 9. The following alarms may actuate and indications may be affected upon loss of the bus: 1C03 • 11 and 12 SG Channel B pressure and level indicators fail low 1C04 • "AFAS LOSS OF POWER " alarm • 12 CST level indicator, 1-LI-5611 fails low • AFW Turbine Driven Train Flow Controllers fail and flow indicates setpoint: • (11 SG) 1-FIC-4511A • (12 SG) 1-FIC-4512A • Loss of PAM CH B FPD, 1-CRT-1C04B (continue)	

VI. 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02)

ACTIONS	ALTERNATE ACTIONS
A.9 (continued) 1C05 • Loss of PAM CH B FPD, 1-CRT-1C05B 1C06 • Loss of Channel Y PZR pressure control and indication fails low • Loss of Channel Y PZR level control and indication fails low • Channel B Total Core Cooling Flow indication, 1-PDI-101B, fails low • PZR Low Range pressure indicator, 1-PIC-103-1, fails low • PZR pressure instrument, 1-PI-102B, fails low • TM/LP Trip Setpoint indication, 1-PIA-102B fails low • Loss of PAM CH B FPD, 1-CRT-1C06B 1C08 • "ACTUATION SYS LOSS OF POWER" alarm • "ACTUATION SYS " tripped alarms for SIAS, CIS, CSAS, RAS, SGIS-B, CRS, and CVCS-B • "ACTUATION SYS SENSOR CH ZE TRIP" alarm 1C15 • Nuclear Instrumentation indication on Channel B is lost (continue)	

VI. 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02)

ACTIONS	ALTERNATE ACTIONS
A. (continued) 10. The following components will be affected by the loss of the bus: • Channel B ESFAS and AFAS Actuation Cabinets de-energized • Channel A CSAS and SGIS will **NOT** actuate the following: • 11 SGFP • 12 SGFP • 11 COND BSTR PP • 12 COND BSTR PP • 13 COND BSTR PP • 11 HTR DRN PP • 12 HTR DRN PP • The Turbine will **NOT** trip on SG high level or Reactor trip • Main Feedwater will **NOT** reconfigure to post trip state on Reactor trip • Channel ZE ESFAS and AFAS Sensor Cabinets de-energized • Channel B RPS Cabinet de-energized • Channel B PAMS de-energized • Loss of speed control for the AFW steam driven train. If 11 or 12 AFW Pump is running, it will fail to the maximum speed setting. • AFW Turbine Driven Train Flow Control Valves fail open: • (11 SG) 1-AFW-4511-CV • (12 SG) 1-AFW-4512-CV • TCBs 1, 2, 5, and 6 are open and the Reactor does **NOT** trip (continue)	

VI. 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02)

ACTIONS	ALTERNATE ACTIONS

A.10 (continued)
• PORV-404 inoperable in MPT ENABLE
• 12 CC HX SW FLOW CONTR, 1-HIC-5208, loses power
• 12A/12B SRW HX SW BYPASS, 1-PIC-5157, loses power
• CNTMT Area Rad Monitor, 1-RI-5316B, out of service
• 12 Main Steam Effluent Rad Monitor, 1-RIC-5422, out of service
• 12 Main Steam N-16 Rad Monitor, 1-RIC-5422A, out of service
• CAC SRW INL valves fail open:
  • (13 CAC) 1-SRW-1589-CV
  • (14 CAC) 1-SRW-1592-CV
 	
11. De-energize the following components:
• ESFAS Actuation Logic Cabinet BL and Sensor Cabinet ZE **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM.
• AFAS Actuation Logic Cabinet BL and Sensor Cabinet ZE **PER** OI-32B, AFAS SYSTEM OPERATION.
 	
(continue)	

VI. 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02)

ACTIONS	ALTERNATE ACTIONS
A. (continued) 12. De-energize PAMS Channel B: a. Open 1Y02-1 Breaker 27, RUN PAMS SYSTEM CABINETS 1C182B & 1PAMSB VIA 1X1P94-1 & 1P94. b. Open 1Y02-1 Breaker 28, RUN PAMS SYSTEM CABINET 1C144B VIA 1X1P94-2 & 1P94. c. Ensure open 1Y02-1 Breaker 25, STARTUP PAMS SYSTEM CABINETS 1C182B & 1PAMSB VIA 1X1P94-1 & 1P94. d. Ensure open 1Y02-1 Breaker 26, STARTUP PAMS SYSTEM CABINET 1C144B VIA 1X1P94-2 & 1P94. 13. De-energize RPS Channel B: a. Place the Neutron Flux Monitor Wide Range - CH "B" power supply breaker, CB 1, located at the rear of the cabinet, in the down (OFF) position. b. Place OPERATE-TEST switch on the Linear Power Channel drawer in the ZERO position. c. Place the RPS Channel B circuit breakers located at the rear of the cabinet to OFF: • CB (B) • CB-2 14. **IF** the loss of 1Y02 caused A train ESFAS actuations, **THEN** de-energize ESFAS Actuation Logic Cabinet AL **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. (continue)	

VI. 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02)

ACTIONS	ALTERNATE ACTIONS
A. (continued) 15. **IF** the loss of 1Y02 caused A train AFAS actuations, **THEN** de-energize AFAS Actuation Logic Cabinet AL **PER** OI-32B, AFAS SYSTEM OPERATION. 16. Shutdown 12 Main Steam Effluent and N-16 Rad Monitors, 1-RIC-5422/5422A, **PER** OI-35, Radiation Monitoring System.	

VI. 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02)

ACTIONS	ALTERNATE ACTIONS
B. RESTORE POWER TO THE BUS.	
1. Determine the cause of the loss of power to the bus. 2. Determine the applicable TS/TRM requirements which may include the following: • 3.8.1, A.C. Sources - Operating • 3.8.2, A.C. Sources - Shutdown • 3.8.7, Inverters - Operating • 3.8.8, Inverters - Shutdown • 3.8.9, Distribution Systems - Operating • 3.8.10, Distribution Systems - Shutdown • 3.3.1, RPS Instrumentation - Operating • 3.3.2, RPS Instrumentation - Shutdown • 3.3.3, RPS Logic and Trip Initiation • 3.3.4, ESFAS Instrumentation • 3.3.5, ESFAS Logic and Manual Actuation • 3.3.6, DG - Loss of Voltage Start • 3.3.7, Containment Radiation Signal • 3.3.9, CVCS Isolation Signal • 3.3.10, Post Accident Monitoring Instrumentation • 3.3.11, Remote Shutdown Instrumentation • 3.3.12, WR Neutron Flux Monitoring TRM: • 15.3.1, Radiation Monitoring Instrumentation (continue)	

VI. 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02)

ACTIONS	ALTERNATE ACTIONS
B. (continued) 3. **IF** the bus can **NOT** be restored, **THEN** refer to 1E-22 and Appendix C of ES-013, LOSS OF POWER EFFECT/LOAD LIST, to determine equipment affected. **CAUTION** **Attempts should NOT be made to re-energize a bus if a fault is suspected.** 4. **WHEN** power can be restored to 1Y02, **THEN** perform the following actions. a. **IF EITHER** 12 Inverter is available, • INV1 • INV2 **THEN** energize 1Y02 **PER** OI-26B, 120 VOLT VITAL AC AND COMPUTER AC.	**NOTE** The Inverter Backup Bus is powered from MCC-104. Only one key, per unit, is provided to ensure that only one Inverter is transferred to the Inverter Backup Bus. a.1 **IF** 12 Inverter is **NOT** available, **AND** the Inverter Backup Bus is energized, **THEN** energize 1Y02 from the Inverter Backup Bus by performing the following: (1) Verify **BOTH** 12 Inverter AC OUTPUT breakers in OFF: • INV1 • INV2 (2) Verify the fused disconnect 1Y11-3 is shut. (3) Obtain the ALT A.C. INPUT breaker interlock key from the Shift Manager. (4) Insert the key into the ALT A.C. INPUT breaker interlock and rotate fully clockwise.
(continue)	(continue)

VI. 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02)

ACTIONS	ALTERNATE ACTIONS
B.4.a (continued)	B.4.a.1 (continued)
b. Energize RPS Channel B: (1) Place the Neutron Flux Monitor Wide Range - CH "B" power supply breaker, CB 1, located at the rear of the cabinet, in the up (ON) position. (2) Place the RPS Channel B circuit breakers located at the rear of the cabinet to ON: • CB (B) • CB-2 (3) Place OPERATE-TEST switch on the Linear Power Channel drawer in the OPERATE position.	(5) Place the ALT A.C. INPUT breaker in ON. (6) Shift the MAN TRANS SW to the ALT position.
(continue)	

VI. 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02)

ACTIONS	ALTERNATE ACTIONS

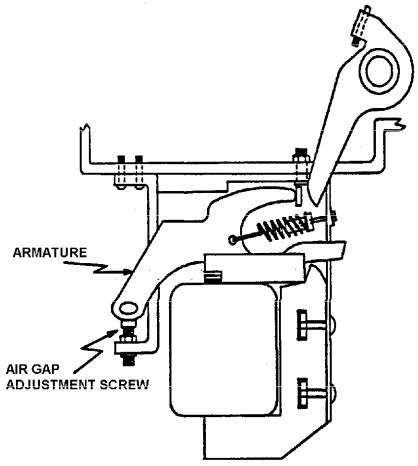
B.4 (continued)

c. Close TCBs 1, 2, 5 and 6 as follows:

NOTE
Manual assistance may be required to ensure UV device is fully positioned.

CAUTION
TCBs may fail to close properly if the UV devices have NOT fully picked up.

(1) Ensure U1 TCB 1, 2, 5 and 6 UV devices are in the full down position.



(2) On 1C15, close TCBs 1, 2, 5 and 6.

d. Energize ESFAS Sensor Cabinet ZE and reset the sensor modules **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM.

e. Energize ESFAS Actuation Logic Cabinets **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM.

(continue)

VI. 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02)

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) f. Energize AFAS Sensor Cabinet ZE and reset the sensor modules **PER** OI-32B, AFAS SYSTEM OPERATION. g. Energize AFAS Actuation Logic Cabinets **PER** OI-32B, AFAS SYSTEM OPERATION. h. Energize PAMS Channel B: (1) Close 1Y02-1 Breaker 25, STARTUP PAMS SYSTEM CABINETS 1C182B & 1PAMSB VIA 1X1P94-1 & 1P94. (2) Close 1Y02-1 Breaker 27, RUN PAMS SYSTEM CABINETS 1C182B & 1PAMSB VIA 1X1P94-1 & 1P94. (3) Open 1Y02-1 Breaker 25, STARTUP PAMS SYSTEM CABINETS 1C182B & 1PAMSB VIA 1X1P94-1 & 1P94. (4) Close 1Y02-1 Breaker 26, STARTUP PAMS SYSTEM CABINET 1C144B VIA 1X1P94-2 & 1P94. (5) Close 1Y02-1 Breaker 28, RUN PAMS SYSTEM CABINET 1C144B VIA 1X1P94-2 & 1P94. (6) Open 1Y02-1 Breaker 26, STARTUP PAMS SYSTEM CABINET 1C144B VIA 1X1P94-2 & 1P94. i. Check the "PZR CH Y LVL" alarm clear and place the PZR HTR LO LVL CUT-OFF SEL Switch to X/Y. (continue)	

VI. 12 120 VOLT VITAL AC INSTRUMENT BUS (1Y02)

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) j. On 1C31, restore RCS Loop 12 instruments to RRS Channel X by placing switch S2 to ON. k. Restore 12A/12B SRW HX SW OUT valve handswitches as required: • 1-SW-5211-CV • 1-SW-5212-CV l. Reset any RMS alarms **PER** OI-35, RADIATION MONITORING SYSTEM. m. Place the 12 Main Steam Effluent and N-16 Rad Monitors, 1-RIC-5422/5422A, in service **PER** OI-35, Radiation Monitoring System. 5. Return to the appropriate Operating Procedure. END of Section VI	

VII. 13 120 VOLT VITAL AC INSTRUMENT BUS (1Y03)

ACTIONS	ALTERNATE ACTIONS
A. RESPOND TO A LOSS OF 13 120 VOLT VITAL AC INSTRUMENT BUS (1Y03).	
1. The following alarms may actuate and indications may be affected upon loss of the bus: 1C03 • 11 and 12 SG Channel C pressure and level indicators fail low 1C04 • "AFAS LOSS OF POWER " alarm 1C06 • Channel C Total Core Cooling Flow indication, 1-PDI-101C, fails low • PZR pressure instrument, 1-PI-102C, fails low • TM/LP Trip Setpoint indication, 1-PIA-102C, fails low • Loss of 11 HOT LEG TEMP and 11A COLD LEG TEMP digital indication 1C08 • "ACTUATION SYS LOSS OF POWER" alarm • "ACTUATION SYS SENSOR CH ZF TRIP" alarm 1C10 • "CNMNT RAD HI" alarm 1C15 • Nuclear Instrumentation indication on Channel C is lost (continue)	

VII. 13 120 VOLT VITAL AC INSTRUMENT BUS (1Y03)

ACTIONS	ALTERNATE ACTIONS
A. (continued) 2. The following components will be affected by the loss of the bus: • TCBs 3, 4, 7, and 8 are open and the Reactor does **NOT** trip • Loss of ESFAS Sensor Cabinet ZF • Loss of AFAS Sensor Cabinet ZF • Loss of Channel C RPS Cabinet • CNTMT High Range Monitor Channel B, 1-RI-5317B, out of service • CNTMT Area Rad Monitor, 1-RI-5316C, out of service 3. De-energize the following components: • ESFAS Sensor Cabinet ZF **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. • AFAS Sensor Cabinet ZF **PER** OI-32B, AFAS SYSTEM OPERATION. 4. De-energize RPS Channel C: a. Place the Neutron Flux Monitor Wide Range - CH "C" power supply breaker, CB 1, located at the rear of the cabinet, in the down (OFF) position. b. Place OPERATE-TEST switch on the Linear Power Channel drawer in the ZERO position. c. Place the RPS Channel C circuit breakers located at the rear of the cabinet to OFF: • CB (C) • CB-3 (continue)	

VII. 13 120 VOLT VITAL AC INSTRUMENT BUS (1Y03)

ACTIONS	ALTERNATE ACTIONS
A. (continued) 5. **IF** the loss of 1Y03 caused ESFAS actuations, **THEN** de-energize ESFAS Actuation Logic Cabinet **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. 6. **IF** the loss of 1Y03 caused AFAS actuations, **THEN** de-energize AFAS Actuation Logic Cabinet **PER** OI-32B, AFAS SYSTEM OPERATION.	

VII. 13 120 VOLT VITAL AC INSTRUMENT BUS (1Y03)

ACTIONS	ALTERNATE ACTIONS
B. RESTORE POWER TO THE BUS.	
1. Determine the cause of the loss of power to the bus. 2. Determine the applicable TS requirements which may include the following: • 3.8.7, Inverters - Operating • 3.8.8, Inverters - Shutdown • 3.8.9, Distribution Systems - Operating • 3.8.10, Distribution Systems - Shutdown • 3.3.1, RPS Instrumentation - Operating • 3.3.2, RPS Instrumentation - Shutdown • 3.3.3, RPS Logic and Trip Initiation • 3.3.4, ESFAS Instrumentation • 3.3.5, ESFAS Logic and Manual Actuation • 3.3.6, DG - Loss of Voltage Start • 3.3.7, Containment Radiation Signal • 3.3.9, CVCS Isolation Signal • 3.3.10, Post Accident Monitoring Instrumentation • 3.3.11, Remote Shutdown Instrumentation • 3.3.12, WR Neutron Flux Monitoring 3. **IF** the bus can **NOT** be restored, **THEN** refer to 1E-22 and Appendix C of ES-013, LOSS OF POWER EFFECT/LOAD LIST, to determine equipment affected. (continue)	

VII. 13 120 VOLT VITAL AC INSTRUMENT BUS (1Y03)

ACTIONS	ALTERNATE ACTIONS
B. (continued) **CAUTION** **Attempts should NOT be made to re-energize a bus if a fault is suspected.** 4. **WHEN** power can be restored to 1Y03, **THEN** perform the following actions. a. **IF EITHER** 13 Inverter is available, • INV1 • INV2 Energize 1Y03 **PER** OI-26B, 120 VOLT VITAL AC AND COMPUTER AC.	**NOTE** The Inverter Backup Bus is powered from MCC-104. Only one key, per unit, is provided to ensure that only one Inverter is transferred to the Inverter Backup Bus. a.1 **IF** 13 Inverter is **NOT** available, **AND** the Inverter Backup Bus is energized, **THEN** energize 1Y03 from the Inverter Backup Bus by performing the following: (1) Verify **BOTH** 13 Inverter AC OUTPUT breakers in OFF: • INV1 • INV2 (2) Verify the fused disconnect 1Y11-4 is shut. (3) Obtain the ALT A.C. INPUT breaker interlock key from the Shift Manager. (4) Insert the key into the ALT A.C. INPUT breaker interlock and rotate fully clockwise. (5) Place the ALT A.C. INPUT breaker in ON. (6) Shift the MAN TRANS SW to the ALT position.

(continue)

VII. 13 120 VOLT VITAL AC INSTRUMENT BUS (1Y03)

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) b. Energize RPS Channel C: (1) Place the Neutron Flux Monitor Wide Range - CH "C" power supply breaker, CB 1, located at the rear of the cabinet, in the up (ON) position. (2) Place the RPS Channel C circuit breakers located at the rear of the cabinet to ON: • CB (C) • CB-3 (3) Place OPERATE-TEST switch on the Linear Power Channel drawer in the OPERATE position. (continue)	

VII. 13 120 VOLT VITAL AC INSTRUMENT BUS (1Y03)

ACTIONS	ALTERNATE ACTIONS

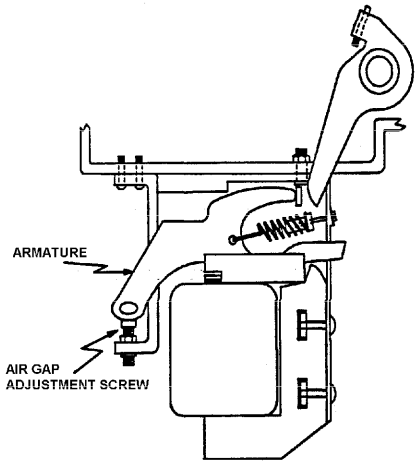
B.4 (continued)

c. Close TCBs 3, 4, 7 and 8 as follows:

NOTE
Manual assistance may be required to ensure UV device is fully positioned.

CAUTION
TCBs may fail to close properly if the UV devices have NOT fully picked up.

(1) Ensure U1 TCB 3, 4, 7 and 8 UV devices are in the full down position.



(2) On 1C15, close TCBs 3, 4, 7 and 8.

d. Energize ESFAS Sensor Cabinet ZF and reset the sensor modules **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM.

e. Energize ESFAS Actuation Logic Cabinets **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM.

(continue)

VII. 13 120 VOLT VITAL AC INSTRUMENT BUS (1Y03)

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) f. Energize AFAS Sensor Cabinet ZF and reset the sensor modules **PER** OI-32B, AFAS SYSTEM OPERATION. g. Energize AFAS Actuation Logic Cabinets **PER** OI-32B, AFAS SYSTEM OPERATION. h. Reset any RMS alarms **PER** OI-35, RADIATION MONITORING SYSTEM. 5. Return to the appropriate Operating Procedure. END of Section VII	

VIII. 14 120 VOLT VITAL AC INSTRUMENT BUS (1Y04)

ACTIONS	ALTERNATE ACTIONS
A. RESPOND TO A LOSS OF 14 120 VOLT VITAL AC INSTRUMENT BUS (1Y04).	

1. The following alarms may actuate and indications may be affected upon loss of the bus:
 	
1C03
 	
• 11 and 12 SG Channel D pressure and level indicators fail low
 	
1C04
 	
• "AFAS LOSS OF POWER " alarm
 	
• 11 and 12 SG WR level instruments fail low:
 	
  • 1-LI-1114D
  • 1-LI-1124D
 	
1C06
 	
• Channel D Total Core Cooling Flow indication, 1-PDI-101D, failed low
 	
• PZR pressure instrument, 1-PI-102D, fails low
 	
• TM/LP Trip Setpoint indication, 1-PIA-102D, fails low
 	
• Loss of 12 HOT LEG TEMP and 12B COLD LEG TEMP digital indication
 	
1C08
 	
• "ACTUATION SYS LOSS OF POWER" alarm
 	
• "ACTUATION SYS SENSOR CH ZG TRIP" alarm
 	
(continue)	

VIII. 14 120 VOLT VITAL AC INSTRUMENT BUS (1Y04)

ACTIONS	ALTERNATE ACTIONS
A.1 (continued) 1C15 • Nuclear Instrumentation indication on Channel D is lost 2. The following components will be affected by the loss of the bus: • TCBs 3, 4, 7,and 8 are open and the Reactor does **NOT** trip • Loss of ESFAS Sensor Cabinet ZG • Loss of AFAS Sensor Cabinet ZG • Loss of Channel D RPS Cabinet • CNTMT Area Rad Monitor, 1-RI-5316D, out of service 3. De-energize the following components: • ESFAS Sensor Cabinet ZG **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. • AFAS Sensor Cabinet ZG **PER** OI-32B, AFAS SYSTEM OPERATION. (continue)	

VIII. 14 120 VOLT VITAL AC INSTRUMENT BUS (1Y04)

ACTIONS	ALTERNATE ACTIONS
A. (continued) 4. De-energize RPS Channel D: a. Place the Neutron Flux Monitor Wide Range - CH "D" power supply breaker, CB 1, located at the rear of the cabinet, in the down (OFF) position. b. Place OPERATE-TEST switch on the Linear Power Channel drawer in the ZERO position. c. Place the RPS Channel D circuit breakers located at the rear of the cabinet to OFF: • CB (D) • CB-4 5. **IF** the loss of 1Y04 caused ESFAS actuations, **THEN** de-energize ESFAS Actuation Logic Cabinet **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. 6. **IF** the loss of 1Y04 caused AFAS actuations, **THEN** de-energize AFAS Actuation Logic Cabinet **PER** OI-32B, AFAS SYSTEM OPERATION.	

VIII. 14 120 VOLT VITAL AC INSTRUMENT BUS (1Y04)

ACTIONS	ALTERNATE ACTIONS
B. RESTORE POWER TO THE BUS.	
1. Determine the cause of the loss of power to the bus. 2. Determine the applicable TS requirements which may include the following: • 3.8.7, Inverters - Operating • 3.8.8, Inverters - Shutdown • 3.8.9, Distribution Systems - Operating • 3.8.10, Distribution Systems - Shutdown • 3.3.1, RPS Instrumentation - Operating • 3.3.2, RPS Instrumentation - Shutdown • 3.3.3, RPS Logic and Trip Initiation • 3.3.4, ESFAS Instrumentation • 3.3.5, ESFAS Logic and Manual Actuation • 3.3.6, DG - Loss of Voltage Start • 3.3.7, Containment Radiation Signal • 3.3.9, CVCS Isolation Signal • 3.3.10, Post Accident Monitoring Instrumentation • 3.3.11, Remote Shutdown Instrumentation • 3.3.12, WR Neutron Flux Monitoring 3. **IF** the bus can **NOT** be restored, **THEN** refer to 1E-22 and Appendix C of ES-013, LOSS OF POWER EFFECT/LOAD LIST, to determine equipment affected. (continue)	

VIII. 14 120 VOLT VITAL AC INSTRUMENT BUS (1Y04)

ACTIONS	ALTERNATE ACTIONS
B. (continued) **CAUTION** **Attempts should NOT be made to re-energize a bus if a fault is suspected.** 4. **WHEN** power can be restored to 1Y04, **THEN** perform the following actions.	
a. **IF EITHER** 14 Inverter is available, • INV1 • INV2 Energize 1Y04 **PER** OI-26B, 120 VOLT VITAL AC AND COMPUTER AC.	**NOTE** The Inverter Backup Bus is powered from MCC-104. Only one key, per unit, is provided to ensure that only one Inverter is transferred to the Inverter Backup Bus. a.1 **IF** 14 Inverter is **NOT** available, **AND** the Inverter Backup Bus is energized, **THEN** energize 1Y04 from the Inverter Backup Bus by performing the following: (1) Verify **BOTH** 14 Inverter AC OUTPUT breakers in OFF: • INV1 • INV2 (2) Verify the fused disconnect 1Y11-5 is shut. (3) Obtain the ALT A.C. INPUT breaker interlock key from the Shift Manager. (4) Insert the key into the ALT A.C. INPUT breaker interlock and rotate fully clockwise. (5) Place the ALT A.C. INPUT breaker in ON. (6) Shift the MAN TRANS SW to the ALT position.

(continue)

VIII. 14 120 VOLT VITAL AC INSTRUMENT BUS (1Y04)

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) b. Energize RPS Channel D: (1) Place the Neutron Flux Monitor Wide Range - CH "D" power supply breaker, CB 1, located at the rear of the cabinet, in the up (ON) position. (2) Place the RPS Channel D circuit breakers located at the rear of the cabinet to ON: • CB (D) • CB-4 (3) Place OPERATE-TEST switch on the Linear Power Channel drawer in the OPERATE position. (continue)	

VIII. 14 120 VOLT VITAL AC INSTRUMENT BUS (1Y04)

ACTIONS	ALTERNATE ACTIONS

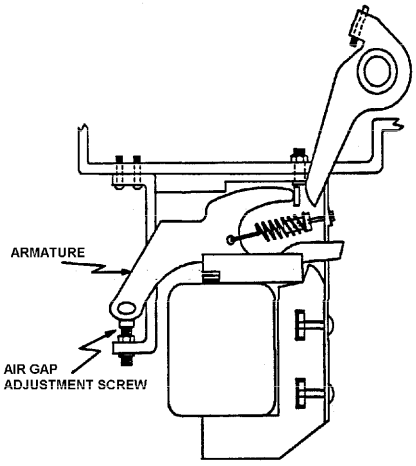
B.4 (continued)

c. Close TCBs 3, 4, 7 and 8 as follows:

NOTE
Manual assistance may be required to ensure UV device is fully positioned.

CAUTION
TCBs may fail to close properly if the UV devices have NOT fully picked up.

(1) Ensure U1 TCB 3, 4, 7 and 8 UV devices are in the full down position.



(2) On 1C15, close TCBs 3, 4, 7 and 8.

d. Energize ESFAS Sensor Cabinet ZG and reset the sensor modules **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM.

e. Energize ESFAS Actuation Logic Cabinets **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM.

(continue)

VIII. 14 120 VOLT VITAL AC INSTRUMENT BUS (1Y04)

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) f. Energize AFAS Sensor Cabinet ZG and reset the sensor modules **PER** OI-32B, AFAS SYSTEM OPERATION. g. Energize AFAS Actuation Logic Cabinets **PER** OI-32B, AFAS SYSTEM OPERATION. h. Reset any RMS alarms **PER** OI-35, RADIATION MONITORING SYSTEM. 5. Return to the appropriate Operating Procedure. END of Section VIII	

IX. 22 120 VOLT VITAL AC INSTRUMENT BUS (2Y02)

ACTIONS	ALTERNATE ACTIONS
A. RESPOND TO A LOSS OF 22 120 VOLT VITAL AC INSTRUMENT BUS (2YO2).	
1. Verify that the PRZR LVL CH SEL Switch is in the X position.	
2. Verify that the PZR HTR LO LVL CUT-OFF SEL Switch is in the X position.	
3. **IF** required, **THEN** reset the Proportional Heaters by placing 11 PROP HTRS, 1-HS-100-1 **AND** 12 PROP HTRS, 1-HS-100-2, to OFF and back to AUTO.	
(continue)	

IX. 22 120 VOLT VITAL AC INSTRUMENT BUS (2Y02)

ACTIONS	ALTERNATE ACTIONS

A. (continued)
 	
4. The following components are affected:
 	
• ESFAS Sensor ZE loses 11 and 12 SG pressure inputs
 	
• AFAS Sensor ZE loses 11 and 12 SG pressure and level inputs
 	
• AFAS Sensor ZE loses AFW flow to 11 and 12 SG inputs
 	
1C03
 	
• 11 and 12 SG Channel B pressure indicators fail low
 	
1C04
 	
• Inputs to 11 and 12 AFW Steam Train SG FLOW CONTRs lose power and flow indicates low:
  • 1-FIC-4511A
  • 1-FIC-4512A
 	
• 11 and 12 AFW Steam Train Control Valves fail open (manual FIC control available):
  • 1-AFW-4511-CV
  • 1-AFW-4512-CV
 	
• PAM CH B S/G Levels fail low
 	
• 12 CST Level Indicator, 1-LI-5611, fails low
 	
1C05
 	
• WRNI indication on Channel B is lost
 	
• PAM CH B Subcooled Margin fails
 	
(continue)	

IX. 22 120 VOLT VITAL AC INSTRUMENT BUS (2Y02)

ACTIONS	ALTERNATE ACTIONS
A.4 (continued) 1C06 • Loss of Channel Y PZR level control and indication • PAM CH B Pressurizer Pressure fails low • PAM CH B Loop Temperatures fail low 1C15 • RPS Channel B Trip Unit 5, SG Pressure Low trips • RPS Channel B TM/LP calculator inputs are lost; Trip Units 1, 7, and 10 are inoperable • WRNI indication on Channel B is lost; Trip Units 2 and 3 are inoperable (continue)	

IX. 22 120 VOLT VITAL AC INSTRUMENT BUS (2Y02)

ACTIONS	ALTERNATE ACTIONS

A. (continued)
 	
5. On the Safe Shutdown Panel, 1C43, the following controls and indicators lose power:
 	
• PZR Pressure Indicator, 1-PI-105B, fails low
 	
• 11 and 12 SG Level Indicators fail low:
  • 1-LI-1114B
  • 1-LI-1124B
 	
• 11 ADV Controller, 1-HC-4056A, is inoperable
 	
• 11 and 12 AFW Pump Speed Controllers are inoperable
  • 1-HC-3987B
  • 1-HC-3989B
 	
• 11 and 12 SG Steam Train Flow Controllers are inoperable:
  • 1-HC-4511B
  • 1-HC-4512B
 	
• 11 and 12 AFW Pump Flow Indicators fail low
  • 1-FI-4509B
  • 1-FI-4510B
 	
• 12 CST Level Indicator, 1-LI-5611A, fails low
 	
(continue)	

IX. 22 120 VOLT VITAL AC INSTRUMENT BUS (2Y02)

ACTIONS	ALTERNATE ACTIONS
A. (continued) 6. Determine the applicable TS requirements which may include the following: • 3.8.7, Inverters - Operating • 3.8.8, Inverters - Shutdown • 3.3.1, RPS Instrumentation - Operating • 3.3.2, RPS Instrumentation - Shutdown • 3.3.3, RPS Logic and Trip Initiation • 3.3.4, ESFAS Instrumentation • 3.3.5, ESFAS Logic and Manual Actuation • 3.3.10, Post Accident Monitoring Instrumentation • 3.3.11, Remote Shutdown Instrumentation • 3.3.12, WR Neutron Flux Monitoring • 3.7.3, Auxiliary Feedwater System **NOTE** Unit 2 will be responsible for restoring power to 2Y02. 7. **WHEN** power has been restored to 2Y02, **THEN** perform the following actions. a. Check the "PZR CH Y LVL" alarm clear and place the PZR HTR LOW LVL CUT-OFF SEL Switch to X/Y. b. Reset bistables on AFAS Sensor Channel ZE **PER** OI-32B, AFAS SYSTEM OPERATION. c. Reset bistables on ESFAS sensor Channel ZE **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. END of Section IX	

X. 24 120 VOLT VITAL AC INSTRUMENT BUS (2Y04)

ACTIONS	ALTERNATE ACTIONS
A. RESPOND TO A LOSS OF 24 120 VOLT VITAL AC INSTRUMENT BUS (2Y04).	
1. Upon the loss of 24 120 Volt Vital AC Instrument Bus, the following components on 1C15 will be lost: • WRNI indication on Channel D • WRNI indication for Channel D SUR and Power 2. Determine the applicable TS requirements which may include the following: • 3.8.7, Inverters - Operating • 3.8.8, Inverters - Shutdown • 3.8.9, Distribution Systems - Operating • 3.8.10, Distribution Systems - Shutdown • 3.3.1, RPS Instrumentation - Operating • 3.3.2, RPS Instrumentation - Shutdown • 3.3.3, RPS Logic and Trip Initiation • 3.3.4, ESFAS Instrumentation • 3.3.5, ESFAS Logic and Manual Actuation • 3.3.10, Post Accident Monitoring Instrumentation • 3.3.11, Remote Shutdown Instrumentation • 3.3.12, WR Neutron Flux Monitoring END of Section X	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. RESPOND TO A LOSS OF 11 125 VOLT DC BUS.	
1. Verify that the PRZR PRESS CH SEL Switch is in the Y position.	
2. Verify that the RRS CH SEL Switch is in the RRS-Y position.	
3. Verify that the PRZR LVL CH SEL Switch is in the 110Y position.	
4. Verify that the PZR HTR LO LVL CUT-OFF SEL Switch is in the Y position.	
NOTE Switch S1 is located inside the RRS Test Panel Drawer at 1C32.	
5. Isolate RCS Loop 11 instruments to RRS Channel Y by placing Switch S1 to OFF.	
(continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 6. **IF** the Reactor is critical, **THEN**, with the approval of the SM/CRS, perform the following actions: a. Trip the Reactor. b. Perform the Reactivity Control Immediate Actions of EOP-0, POST TRIP IMMEDIATE ACTIONS. c. On 1C06, trip 11B and 12B RCPs. **WARNING** **A Safety Observer, if available, should be stationed when working on energized equipment.** d. Dispatch an operator to locally trip the 11A and 12A RCP breakers located in the 27' Switchgear Room. • (11A RCP) 252-11P01: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button • (12A RCP) 252-12P01: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button • (11A RCP) 252-11P02: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button • (12A RCP) 252-12P02: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button e. Implement EOP-0, POST TRIP IMMEDIATE ACTIONS (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 7. **IF** the Reactor is **NOT** critical, **THEN**, with the approval of the SM/CRS, trip all RCPS: a. On 1C06, trip 11B and 12B RCPs. **WARNING** **A Safety Observer, if available, should be stationed when working on energized equipment.** b. Dispatch an operator to locally trip the 11A and 12A RCP breakers located in the 27' Switchgear Room. • (11A RCP) 252-11P01: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button • (12A RCP) 252-12P01: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button • (11A RCP) 252-11P02: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button • (12A RCP) 252-12P02: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button c. Determine the appropriate emergency response actions **PER** the ERPIP. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 8. The following components will be affected by the loss of the bus: • Loss of breaker position indication: • Normal power supply to the 11A and 12A RCPs • 11 and 12 13 KV Buses • 11, 12, 15, and 16 4 KV Buses • 11A, 11B, 12A, and 12B 480 Volt Buses • Loss of Unit 2 Annunciation • Turbine Bypass Valves fail shut **AND** loss of quick open signal and auto control of ADVs • CC CNTMT SUPPLY, 1-CC-3832-CV fails shut • 12 SG AFW STM SUPP & BYPASS valves, 1-MS-4071-CV, 1-MS-4071A-CV, fail shut • Loss of SRW to the Turbine Building • Channel A ESFAS and AFAS Actuation Cabinets de-energized • Channel ZD ESFAS and AFAS Sensor Cabinets de-energized • Channel A RPS Cabinet de-energized • Channel A PAMS de-energized • IA and PA may be lost due to loss of SRW to the Turbine Building • 11 CC and 11 ECCS Pump Room HX SW outlet valves fail open • 11SRW HX SW valves fail to their full HX flow positions (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A.8 (continued) • AUX SPRAY valve, 1-CVC-517, fails shut • IA downstream of the CNTMT IA Control Valve, 1-IA-2085-CV is isolated ("CNTMT IA ISOL 1-IA-2085-CV CLOSED" alarm does **NOT** actuate) • CNTMT High Range Monitor Channel A, 1-RI-5317A, out of service • CNTMT Area Rad Monitor, 1-RI-5316A, out of service • CNTMT Particulate Monitor, 1-RI-5280, and CNTMT Gaseous Monitor, 1-RI-5281, out of service • 11 Main Steam Effluent Rad Monitor, 1-RIC-5421, out of service • 11 and 12 SFP Heat Exchangers lose cooling flow due to SRW outlet CVs failing shut • Gaseous and Liquid Waste release control valves fail shut • RCP BLEED-OFF ISOL valve, 1-CVC-506-CV, fails shut • 11 MSIV loses position indication, but can still be closed from 1C03 • 11 and 12 POST LOCI FILTER FANs start (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) **CAUTION** **All PZR spray flowpaths will be inoperable after the RCPs are tripped.** 9. Operate PZR Backup and Proportional Heaters as necessary to maintain RCS pressure between 1850 and 2275 PSIA. a. **IF** 11 Proportional Heater is to be turned off, **THEN** locally trip 11 PZR Heater Proportional Controller Breaker 52-1130. 10. Operate Charging Pumps to Maintain PZR level between 80 and 180 inches: a. **IF** 11 Charging Pump is to be stopped, **THEN** locally trip 11 Charging Pump Breaker 52-1115. b. **IF** 13 Charging Pump is supplied from 11 480 Volt Bus, **THEN** locally trip 13 Charging Pump Breaker 52-1104, and align its power supply to the 14A 480 Volt Bus **PER** OI-27D, STATION POWER 480 VOLT SYSTEM. c. Shut the L/D CNTMT ISOL valves: • 1-CVC-515-CV • 1-CVC-516-CV 11. Shift ATMOSPHERIC STEAM DUMP CONTR, 1-HIC-4056 to MANUAL and operate the ADVs, as necessary, to control RCS temperature. 12. Place the CC CNTMT SUPPLY, 1-HS-3832, to CLOSE. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued)	
13. Start 11 and 12 SALTWATER AIR COMPRs.	
14. Throttle 11 SW Pump Discharge Valve, 1-SW-104, to maintain 11 SW Pump discharge pressure between 15 and 30 PSIG as indicated at the pump discharge pressure gauge.	
15. Trip 11 IA Compressor Breaker 52-1118.	
16. Trip 11 PA Compressor Breaker 52-1123.	
NOTE Due to 12 SG AFW STM SUPP & BYPASS valves, 1-MS-4071-CV and 1-MS-4071A-CV failing shut, there may be a difference in SG pressures. Under certain conditions an AFAS BLOCK signal could be generated.	**NOTE** AFW Motor Train Flow Control Valves, 1-AFW-4525 and AFW-4535, fail open on loss of power.
17. Initiate Steam train AFW flow:	17.1 Initiate Motor train AFW flow:
a. Open the 11 SG AFW STM SUPP & BYPASS valves, 1-MS-4070-CV, 1-MS-4070A-CV.	a. Shut the inlet isolation valves to the motor train flow control valves: • (1-AFW-4525-CV) 1-AFW-197 • (1-AFW-4535-CV) 1-AFW-198
b. Maintain SG levels between (-)170 and (+)30 inches.	b. Manually start 13 AFW Pump by depressing the CLOSE pushbutton at 13 AFW Pump Breaker 152-1116.
c. **IF** the AFW Motor train is in operation, **THEN** secure the AFW Motor train.	c. Throttle open the bypass valves to the motor train flow control valves to maintain SG levels between (-)170 and (+)30 inches. • (1-AFW-4525-CV) 1-AFW-195 • (1-AFW-4535-CV) 1-AFW-196

(continue)

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) **NOTE** The 11 COND PP, 11 and 12 COND BSTR PPs, 11 HTR DRN PP, and 11 SGFP have lost **ALL** protective trips and remote trip functions. 18. Secure Main Feedwater System lineup: a. Trip 12 SGFP. b. Locally trip 11 SGFP. c. Locally trip 11 HDP at Breaker 152-1206 by depressing the TRIP pushbutton. d. Stop 12 HTR DRN PP. e. Locally trip 11 and 12 CBPs at their respective breakers by depressing the TRIP pushbuttons: • (11 CBP) 152-1204 • (12 CBP) 152-1205 f. Place **ALL** COND BSTR PP handswitches in PULL TO LOCK. g. Locally trip 11 Condensate Pump at Breaker 152-1207 by depressing the TRIP pushbutton. h. Operate 12 or 13 COND PPs as necessary. i. Place 11 COND PP handswitch in PULL TO LOCK. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) **NOTE** Verification of RCS temperature response to a plant change during natural circulation takes approximately 5 to 15 minutes following the action due to increased loop cycle times. 19. Verify Natural Circulation in at least ONE loop by the following: • RCS subcooling is at least 30° F based on CET temperatures • T_{HOT} minus T_{COLD} less than 50° F • T_{COLD} constant or lowering • T_{HOT} constant or lowering • CET temperatures trend consistent with T_{HOT} • Steaming rate affects RCS temperatures 20. Locally trip the U-1 Main Generator Field Breaker at the Exciter Doghouse. 21. **IF** the Turbine was paralleled, **THEN** open the Turbine Generator Output breakers: • 11 GEN BUS BKR, 0-CS-552-22 • 11 GEN TIE BKR, 0-CS-552-23 22. **IF** 11 or 12 RC Waste Evaporator was running, **THEN** secure it concurrently **PER** OI-17E, REACTOR COOLANT WASTE EVAPORATOR OPERATION. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 23. De-energize the following components: • ESFAS Actuation Logic Cabinet AL and Sensor Cabinet ZD **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. • AFAS Actuation Logic Cabinet AL and Sensor Cabinet ZD **PER** OI-32, Auxiliary Feedwater System. 24. De-energize PAMS Channel A: a. Open 1Y01-1 Breaker 35, RUN PAMS SYSTEM CABINETS 1C182A & 1PAMSA VIA 1X1P93-1 & 1P93. b. Open 1Y01-1 Breaker 36, RUN PAMS SYSTEM CABINET 1C144A VIA 1X1P93-2 & 1P93. c. Ensure open 1Y01-1 Breaker 33, STARTUP PAMS SYSTEM CABINETS 1C182A & 1PAMSA VIA 1X1P93-1 & 1P93. d. Ensure open 1Y01-1 Breaker 34, STARTUP PAMS SYSTEM CABINET 1C144A VIA 1X1P93-2 & 1P93. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 25. De-energize RPS Channel A: a. Place the Neutron Flux Monitor Wide Range - CH "A" power supply breaker, CB 1, located at the rear of the cabinet, in the down (OFF) position. b. Place OPERATE-TEST switch on the Linear Power Channel drawer in the ZERO position. c. Place the RPS Channel A circuit breakers located at the rear of the cabinet to OFF: • CB (A) • CB-1 26. Monitor 11 SRW Head Tank level. a. **IF** 11 SRW Head Tank level is rising excessively, **THEN** manually control level: (1) Shut 11 SRW Head Tank Level Control Valve Inlet, 1-SRW-104. (2) Open 11 SRW Head Tank Level Control Valve Bypass Valve, 1-SRW-106, as necessary to maintain level. 27. Monitor CC Head Tank level. a. **IF** the CC Head Tank level is rising excessively, **THEN** manually control level: (1) Shut the 1-CC-3820-CV Inlet Isolation Valve, 1-CC-107. (2) Open the 1-CC-3820-CV Bypass Valve, 1-CC-108, as necessary to maintain level (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 28. **IF** a gaseous release is in progress **THEN** perform the following actions: a. Shut the Waste Gas Discharge Header Flow Control Valve, WGS-2191-PCV. b. Secure the discharge lineup **PER** OI-17B, WASTE GAS SYSTEM. 29. Stop the Unit 1 Containment Radiation Monitor pump. 30. Trip the SITE POWER FDR BREAKER (to 0X03), 252-1106.	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. RESTORE POWER TO THE BUS.	
1. Determine the cause of the loss of power to the bus. 2. Determine the applicable TS/TRM requirements which may include the following: • 3.8.1, A.C. Sources - Operating • 3.8.2, A.C. Sources - Shutdown • 3.8.4, D.C. Sources - Operating • 3.8.5, D.C. Sources - Shutdown • 3.8.7, Inverters - Operating • 3.8.8, Inverters - Shutdown • 3.8.9, Distribution Systems - Operating • 3.8.10, Distribution Systems - Shutdown • 3.3.1, RPS Instrumentation - Operating • 3.3.2, RPS Instrumentation - Shutdown • 3.3.3, RPS Logic and Trip Initiation • 3.3.4, ESFAS Instrumentation • 3.3.5, ESFAS Logic and Manual Actuation • 3.3.6, DG - Loss of Voltage Start • 3.3.7, Containment Radiation Signal • 3.3.9, CVCS Isolation Signal • 3.3.10, Post Accident Monitoring Instrumentation • 3.3.11, Remote Shutdown Instrumentation • 3.3.12, WR Neutron Flux Monitoring • 3.4.14, RCS Leakage Detection Instrumentation TRM: • 15.3.1, Radiation Monitoring Instrumentation (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. (continued) 3. Energize 1Y01 from the Inverter Backup Bus 1Y11 **PER** OI-26B, 120 VOLT VITAL AC AND COMPUTER AC. 4. **WHEN** power is restored to 1Y01, **THEN** perform the following actions: a. Energize RPS Channel A: (1) Place the Neutron Flux Monitor Wide Range - CH "A" power supply breaker, CB 1, located at the rear of the cabinet, in the up (ON) position. (2) Place the RPS Channel A circuit breakers located at the rear of the cabinet to ON: • CB (A) • CB-1 (3) Place OPERATE-TEST switch on the Linear Power Channel drawer in the OPERATE position. b. Energize ESFAS Sensor Cabinet ZD and reset the sensor modules **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. c. Energize ESFAS Actuation Logic Cabinet AL **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM d. Energize AFAS Sensor Cabinet ZD and reset the sensor modules **PER** OI-32B, AFAS SYSTEM OPERATION. e. Energize AFAS Actuation Logic Cabinet AL **PER** OI-32B, AFAS SYSTEM OPERATION. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) f. Energize PAMS Channel A: (1) Close 1Y01-1 Breaker 33, STARTUP PAMS SYSTEM CABINETS 1C182A & 1PAMSA VIA 1X1P93-1 & 1P93. (2) Close 1Y01-1 Breaker 35, RUN PAMS SYSTEM CABINETS 1C182A & 1PAMSA VIA 1X1P93-1 & 1P93. (3) Open 1Y01-1 Breaker 33, STARTUP PAMS SYSTEM CABINETS 1C182A & 1PAMSA VIA 1X1P93-1 & 1P93. (4) Close 1Y01-1 Breaker 34, STARTUP PAMS SYSTEM CABINET 1C144A VIA 1X1P93-2 & 1P93. (5) Close 1Y01-1 Breaker 36, RUN PAMS SYSTEM CABINET 1C144A VIA 1X1P93-2 & 1P93. (6) Open 1Y01-1 Breaker 34, STARTUP PAMS SYSTEM CABINET 1C144A VIA 1X1P93-2 & 1P93. g. Check the "PZR CH X LVL" alarm clear and place the PZR HTR LO LVL CUT-OFF SEL Switch to X/Y. h. On 1C32, restore the RCS Loop 11 instruments to RRS Channel Y by placing switch S1 to ON. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. (continued) 5. **IF** the bus can **NOT** be restored, **THEN** refer to 1E-24 and Appendix A of ES-013, LOSS OF POWER EFFECT/LOAD LIST, to determine equipment affected. **CAUTION** **Attempts should NOT be made to re-energize a bus if a fault is suspected.** 6. **WHEN** power can be restored to 11 125 Volt DC Bus, **THEN** energize the bus **PER** OI-26A, 125 VOLT VITAL DC. 7. Energize 1Y01 from 11 Inverter **PER** OI-26B, 120 VOLT VITAL AC AND COMPUTER AC. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. (continued) 8. **WHEN** power has been restored, **THEN** restore plant systems to normal: a. Restore SRW Head Tank level control to normal: (1) Open 11 SRW Head Tank Level Control Valve Inlet, 1-SRW-104. (2) Shut 11 SRW Head Tank Level Control Valve Bypass Valve, 1-SRW-106. b. Restore CC Head Tank level control to normal: (1) Open the 1-CC-3820-CV Inlet Isolation Valve, 1-CC-107. (2) Shut the 1-CC-3820-CV Bypass Valve, 1-CC-108. c. Restore IA Header to normal **PER** OI-19, INSTRUMENT AIR. **NOTE** 1-HS-2085 is located on the West wall of the 27 ft Switchgear Room and is operated by a T112 key (#85 from the Control Room Key Locker). The TBO key ring also has a T112 key. d. Open the Containment Instrument Air Supply Valve, 1-IA-2085-CV, by momentarily placing 1-HS-2085 in OPEN. e. Restore letdown **PER** OI-2A, CHEMICAL AND VOLUME CONTROL SYSTEM. f. Stop 11 and 12 SALTWATER AIR COMPRs. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.8 (continued) g. Restore CC to Containment. **NOTE** RCP CBO and LOWER SEAL temperatures may be obtained from computer trend block 9. (1) Record the highest attained RCP CBO and LOWER SEAL temperatures for each RCP: • 11A RCP:____° F/____° F • 11B RCP:____° F/____° F • 12A RCP:____° F/____° F • 12B RCP:____° F/____° F **CAUTION** **Uncontrolled restoration of cooling to hot RCP seals may cause a water hammer and could result in thermal shock of the RCP seal coolers.** (2) **IF ALL** RCP LOWER SEAL temperatures are less than 280° F, **AND** the RCP Controlled Bleed-off temperatures have been recorded, **THEN** open CC CNTMT SUPPLY valve, 1-CC-3832-CV. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.8.g (continued) (3) **IF ANY** RCP LOWER SEAL temperature is greater than 280° F, **AND** the RCP Controlled Bleed-off temperatures have been recorded, **THEN** perform the following actions: (a) Shut CONTAINMENT SUPPLY HEADER ISOLATION valve, 1-CC-284, located in the 5 ft East Penetration Room. (b) Open CC CNTMT SUPPLY valve, 1-CC-3832-CV. (c) Slowly open 1-CC-284 to restore component cooling flow. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.8 (continued) h. Restore 11 SW header to normal. **NOTE** Steps (1) and (2) must be performed concurrently. (1) Slowly open 11 SW Pump Discharge Valve, 1-SW-104. (2) Maintain 11 SW Pump discharge pressure between 15 and 30 PSIG as indicated at the pump discharge pressure gauge by adjusting the CC HX SW Flow Controller, 1-HIC-5206. (3) Lock open 11 SW Pump Discharge Valve, 1-SW-104. (4) Verify 11 CC and 11 ECCS Pump Room HX SW outlet valves are restored. (5) Verify 11 SRW HX SW valves are restored. (6) Restart the 11A/11B SRW HX strainer Timer by placing the MODE SELECTOR switch, 1-HS-5148A at 1C200, to OFF and return to AUTO. i. Reset any RMS alarms **PER** OI-35, RADIATION MONITORING SYSTEM. j. Place the Containment Radiation Monitors in service **PER** OI-35, RADIATION MONITORING SYSTEM. k. Restore 11 and 12 POST LOCI FILTER FANs **PER** OI-22F, CONTROL ROOM AND CABLE SPREADING ROOMS VENTILATION. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. (continued) 9. Return to the appropriate Operating Procedure. a. **IF** the Unit was initially in Mode 1 or 2, **THEN** return to EOP-8. b. **IF** the Unit was initially in Mode 3, 4, or 5, **THEN IMPLEMENT** AOP-3E, LOSS OF ALL RCP FLOW, MODES 3, 4, OR 5 and other applicable Operating Procedures. END of Section XI	

XII. 12 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. RESPOND TO A LOSS OF 12 125 VOLT DC BUS.	
1. The following components will be affected by the loss of the bus: • 1B DG field flash and control power lose power and the start solenoids fail shut • TCBs 3, 4, 7, and 8 trip • Loss of ESFAS Sensor Cabinet ZF • Loss of AFAS Sensor Cabinet ZF • Loss of Channel C RPS Cabinet • CNTMT High Range Monitor Channel B, 1-RI-5317B, out of service. • CNTMT Area Rad Monitor, 1-RI-5316C, out of service. 2. De-energize the following components: • ESFAS Sensor Cabinet ZF **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. • AFAS Sensor Cabinet ZF **PER** OI-32B, AFAS SYSTEM OPERATION. (continue)	

XII. 12 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 3. De-energize RPS Channel C: a. Place the Neutron Flux Monitor Wide Range - CH "C" power supply breaker, CB 1, located at the rear of the cabinet, in the down (OFF) position. b. Place OPERATE-TEST switch on the Linear Power Channel drawer in the ZERO position. (1) Place the RPS Channel C circuit breakers located at the rear of the cabinet to OFF: • CB (C) • CB-3 4. Determine the appropriate emergency response actions **PER** the ERPIP.	

XII. 12 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. RESTORE POWER TO THE BUS.	
1. Determine the cause of the loss of power to the bus. 2. Energize 1Y03 from the inverter backup Bus 1Y11 **PER** OI-26B, 120 VOLT VITAL AC **AND** COMPUTER AC. 3. **WHEN** power is restored to 1Y03, **THEN** energize the following components: a. RPS Channel C: (1) Place the Neutron Flux Monitor Wide Range - CH "C" power supply breaker, CB 1, located at the rear of the cabinet, in the up (ON) position. (2) Place the RPS Channel C circuit breakers located at the rear of the cabinet to ON: • CB (C) • CB-3 (3) Place OPERATE-TEST switch on the Linear Power Channel drawer in the OPERATE position. b. ESFAS Sensor Cabinet ZF **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. c. AFAS Sensor Cabinet ZF **PER** OI-32B, AFAS SYSTEM OPERATION. (continue)	

XII. 12 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. (continued) 4. Determine the applicable TS/TRM requirements which may include the following: • 3.8.1, A.C. Sources - Operating • 3.8.2, A.C. Sources - Shutdown • 3.8.4, D.C. Sources - Operating • 3.8.5, D.C. Sources - Shutdown • 3.8.7, Inverters - Operating • 3.8.8, Inverters - Shutdown • 3.8.9, Distribution Systems - Operating • 3.8.10, Distribution Systems - Shutdown • 3.3.1, RPS Instrumentation - Operating • 3.3.2, RPS Instrumentation - Shutdown • 3.3.3, RPS Logic and Trip Initiation • 3.3.4, ESFAS Instrumentation • 3.3.5, ESFAS Logic and Manual Actuation • 3.3.6, DG - Loss of Voltage Start • 3.3.7, Containment Radiation Signal • 3.3.9, CVCS Isolation Signal • 3.3.10, Post Accident Monitoring Instrumentation • 3.3.11, Remote Shutdown Instrumentation • 3.3.12, WR Neutron Flux Monitoring TRM: • 15.3.1, Radiation Monitoring Instrumentation 5. **IF** the bus can **NOT** be restored, **THEN** refer to 1E-25 and Appendix A of ES-013, LOSS OF POWER EFFECT/LOAD LIST, to determine equipment affected. (continue)	

XII. 12 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. (continued) **CAUTION** **Attempts should NOT be made to re-energize a bus if a fault is suspected.** 6. **WHEN** power can be restored to 12 125 Volt DC Bus, **THEN** energize the bus **PER** OI-26A, 125 VOLT VITAL DC. 7. Place 1Y03 on 13 Inverter **PER** OI-26B, 120 VOLT VITAL AC AND COMPUTER AC. (continue)	

XII. 12 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS

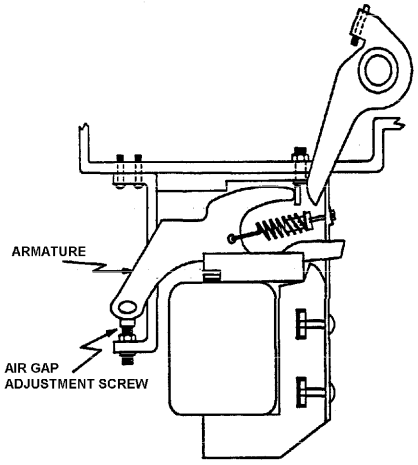
B. (continued)

8. Close TCBs 3, 4, 7 and 8 as follows:

NOTE
Manual assistance may be required to ensure UV device is fully positioned.

CAUTION
TCBs may fail to close properly if the UV devices have NOT fully picked up.

a. Ensure U1 TCB 3, 4, 7 and 8 UV devices are in the full down position.



b. On 1C15, close TCBs 3, 4, 7 and 8.

9. Reset any RMS alarms **PER** OI-35, RADIATION MONITORING SYSTEM.

10. Return to the appropriate Operating Procedure.

END of Section XII

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. RESPOND TO A LOSS OF 21 125 VOLT DC BUS.	
1. Verify that the PRZR PRESS CH SEL Switch is in the X position.	
2. Verify that the RRS CH SEL Switch is in the RRS-X position.	
3. Verify that the PRZR LVL CH SEL Switch is in the 110X position.	
4. Verify that the PZR HTR LO LVL CUT-OFF SEL Switch is in the X position.	
NOTE Switch S2 is located inside the RRS Test Panel Drawer at 1C31	
5. Isolate RCS Loop 12 instruments to RRS Channel X by placing switch S2 to OFF.	
(continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) **CAUTION** **The Turbine will NOT automatically trip AND Main Feedwater will NOT reconfigure to the post trip state when the Reactor is tripped due to ESFAS BL Actuation Cabinet deenergized.** 6. **IF** the Reactor is critical, **THEN** perform the following actions: a. Station personnel at 1C05 and 1C02. b. Trip the Reactor. c. **WHEN** the Reactor is tripped, **THEN** immediately trip the Turbine. d. Perform the Reactivity Control immediate actions of EOP-0, POST TRIP IMMEDIATE ACTIONS. e. Isolate the 13 KV Bus power supplies to **ALL** RCPs: (1) Place Unit 1 RCP Bus Feeder Breaker Control Switch, 1-CS-252-1201, in PULL TO LOCK. (2) Place Unit 1 RCP Bus Feeder Breaker Control Switch, 2-CS-252-2202 in PULL TO LOCK. f. **IMPLEMENT** EOP-0, POST TRIP IMMEDIATE ACTIONS. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 7. **IF** the Reactor is **NOT** critical, **THEN** isolate the 13 KV Bus power supplies to **ALL** RCPs: a. Place Unit 1 RCP Bus Feeder Breaker Control Switch, 1-CS-252-1201, in PULL TO LOCK. b. Place Unit 1 RCP Bus Feeder Breaker Control Switch, 2-CS-252-2202 in PULL TO LOCK. c. Determine the appropriate emergency response actions **PER** the ERPIP. 8. The following components will be affected by the loss of the bus: • **ALL** Unit 1 Annunciator lights deenergized (Status Panels remain energized) • Loss of breaker position indication: • Normal power supply to the 11B and 12B RCPs • 13 and 14 4 KV Buses • 13A, 13B, 14A and 14B 480 Volt Buses • 11B and 12B RCPs are untrippable from 1C06 • CC CNTMT RETURN, 1-CC-3833-CV, fails shut • Loss of SRW to the Turbine Building • IA and PA may be lost due to loss of SRW to the Turbine Building • Channel B ESFAS and AFAS Actuation Cabinets de-energized (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS

A.8 (continued)
 	
• Channel A CSAS and SGIS will **NOT** actuate the following:
 	
  • 11 SGFP
  • 12 SGFP
  • 11 COND BSTR PP
  • 12 COND BSTR PP
  • 13 COND BSTR PP
  • 11 HTR DRN PP
  • 12 HTR DRN PP
 	
• Channel ZE ESFAS and AFAS Sensor Cabinets de-energized
 	
• Channel B RPS Cabinet de-energized
 	
• Channel B PAMS de-energized
 	
• 11 SG AFW STM SUPP & BYPASS valves, 1-MS-4070-CV, 1-MS-4070A-CV fail shut
 	
• Loss of quick open signal to the Turbine Bypass Valves **AND** loss of quick open signal and auto control of ADVs
 	
• 12 CC and 12 ECCS Pump Room HX SW outlet valves fail open
 	
• 12 SRW HX SW valves fail to their full HX flow position
 	
• Loss of letdown, due to 1-CVC-516-CV failing shut
 	
• 11 and 12 SFP Heat Exchangers lose cooling flow due to SRW inlet CVs failing shut
 	
• AFW Turbine Driven Train Flow Control Valves fail open:
 	
  • (11 SG) 1-AFW-4511-CV
  • (12 SG) 1-AFW-4512-CV
 	
(continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A.8 (continued) • PORV-404 inoperable in MPT ENABLE • CNTMT Area Rad Monitor, 1-RI-5316B, out of service • 12 Main Steam Effluent Rad Monitor, 1-RIC-5422, out of service • 12 MSIV loses position indication, but can still be closed from 1C03 • RCP BLEED-OFF ISOL valve, 1-CVC-505-CV, fails shut	
	CAUTION **If the difference between the PRZR WTR TEMP and CHG OUT TEMP is greater than 400° F, then TRM 15.4.2 must be complied with.**
9. Operate Pressurizer HTRs as necessary to maintain RCS pressure between 1850 and 2275 PSIA. a. **IF** 12 Proportional Heater is to be turned off, **THEN** locally trip NO. 12 PZR Heater Proportional Controller Breaker, 52-1430.	9.1 **IF** RCS pressure is greater than 2275 PSIA, **THEN** initiate AUX SPRAY. a. Record the following information: • PRZR WTR TEMP (1-TI-101) • CHG OUT TEMP (1-TI-229) b. Open the AUX SPRAY valve, 1-CVC-517-CV. c. Operate the LOOP CHG valves as necessary to adjust AUX SPRAY flow: • 1-CVC-518-CV • 1-CVC-519-CV d. Shift the PRESSURIZER SPRAY VLV CONTROLLER, 1-HIC-100, to MANUAL.
(continue)	(continue)

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A.9 (continued)	A.9.1 (continued) e. Shut the PRZR SPRAY VLVs by adjusting the output of 1-HIC-100 to 0%: • 1-RC-100E-CV • 1-RC-100F-CV f. **WHEN** AUX SPRAY is **NO** longer needed, **THEN** perform the following actions: (1) Open LOOP CHG valves: • 1-CVC-518-CV • 1-CVC-519-CV (2) Shut AUX SPRAY valve, 1-CVC-517-CV.
10. Operate Charging Pumps to maintain PZR level between 80 and 180 inches: a. **IF** 12 Charging Pump is to be stopped, **THEN** locally trip 12 Charging Pump Breaker 52-1415. b. **IF** 13 Charging Pump is supplied from 14 480 Volt Bus, **THEN** locally trip 13 Charging Pump Breaker 52-1404 and align its power supply from the 11A 480 Volt Bus **PER** OI-27D, STATION POWER 480 VOLT SYSTEM. c. Shut the L/D CNTMT ISOL valves: • 1-CVC-515-CV • 1-CVC-516-CV 11. Place the CC CNTMT RETURN, 1-HS-3833 to CLOSE. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued)	
12. Start 11 and 12 SALTWATER AIR COMPRs.	
13. Throttle 12 SW Pump Discharge Valve, 1-SW-108, to maintain 12 SW Pump discharge pressure between 15 and 30 PSIG as indicated at the pump discharge pressure gauge.	
14. Trip 12 IA Compressor Breaker 52-1418.	
	NOTE Due to 11 SG AFW STM SUPP & BYPASS valves, 1-MS-4070-CV and 1-MS-4070A-CV failing shut, there may be a difference in SG pressures. Under certain conditions an AFAS BLOCK signal could be generated.
	NOTE AFW Steam Train Flow Control Valves, 1-AFW-4511 and 1-AFW-4512, fail open on loss of power.
15. Initiate Motor train AFW flow: a. Start 13 AFW PP. b. Maintain SG levels between (-)170 and (+)30 inches. c. **IF** the AFW Steam train is in operation, **THEN** secure the AFW Steam train.	15.1 Initiate Steam train AFW flow: a. Shut the inlet isolation valves to the steam train flow control valves: • (1-AFW-4511-CV) 1-AFW-162 • (1-AFW-4512-CV) 1-AFW-164 b. Open the 12 SG AFW STM SUPP & BYPASS valves, 1-MS-4071-CV, 1-MS-4071A-CV.
(continue)	(continue)

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A.15 (continued)	A.15.1 (continued) c. Throttle open the bypass valves to the steam train flow control valves to maintain SG levels between (-)170 and (+)30 inches. • (1-AFW-4511-CV) 1-AFW-163 • (1-AFW-4512-CV) 1-AFW-165
NOTE The 12 and 13 COND PPs, 13 COND BSTR PP, 12 HTR DRN PP, and 12 SGFP have lost **ALL** protective trips and remote trip functions. 16. Secure Main Feedwater System lineup: a. Trip 11 SGFP. b. Locally trip 12 SGFP. c. Locally trip 12 HTR DRN PP at Breaker 152-1306 by depressing the TRIP pushbutton. d. Stop 11 HTR DRN PP. e. Locally trip 13 Condensate Booster Pump at Breaker 152-1304 by depressing the TRIP pushbutton. f. Place **ALL** COND BSTR PP handswitches in PULL TO LOCK. g. Locally trip 12 and 13 Condensate Pumps at their respective breakers by depressing the TRIP pushbuttons: • (12 COND PP) 152-1307 • (13 COND PP) 152-1308 h. Operate 11 COND PP as necessary. i. Place 12 and 13 COND PP handswitches in PULL TO LOCK. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) **NOTE** Verification of RCS temperature response to a plant change during natural circulation takes approximately 5 to 15 minutes following the action due to increased loop cycle times. 17. Verify Natural Circulation in at least ONE loop by the following: • RCS subcooling is at least 30° F based on CET temperatures • T_{HOT} minus T_{COLD} less than 50° F • T_{COLD} constant or lowering • T_{HOT} constant or lowering • CET temperatures trend consistent with T_{HOT} • Steaming rate affects RCS temperatures 18. **IF** 11 or 12 RC Waste Evaporator was running, **THEN** secure it **PER** OI-17E, REACTOR COOLANT WASTE EVAPORATOR OPERATION. 19. De-energize the following components: • ESFAS Actuation Logic Cabinet BL and Sensor Cabinet ZE **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. • AFAS Actuation Logic Cabinet BL and Sensor Cabinet ZE **PER** OI-32B, AFAS SYSTEM OPERATION. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 20. De-energize PAMS Channel B: a. Open 1Y02-1 Breaker 27, RUN PAMS SYSTEM CABINETS 1C182B & 1PAMSB VIA 1X1P94-1 & 1P94. b. Open 1Y02-1 Breaker 28, RUN PAMS SYSTEM CABINET 1C144B VIA 1X1P94-2 & 1P94. c. Ensure open 1Y02-1 Breaker 25, STARTUP PAMS SYSTEM CABINETS 1C182B & 1PAMSB VIA 1X1P94-1 & 1P94. d. Ensure open 1Y02-1 Breaker 26, STARTUP PAMS SYSTEM CABINET 1C144B VIA 1X1P94-2 & 1P94. 21. De-energize RPS Channel B: a. Place the Neutron Flux Monitor Wide Range - CH "B" power supply breaker, CB 1, located at the rear of the cabinet, in the down (OFF) position. b. Place OPERATE-TEST switch on the Linear Power Channel drawer in the ZERO position. c. Place the RPS Channel B circuit breakers located at the rear of the cabinet to OFF: • CB (B) • CB-2 22. Stop the Unit 1 Containment Radiation Monitor pump. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 23. Monitor 12 SRW Head Tank level. a. **IF** 12 SRW Head Tank level is rising excessively, **THEN** manually control level: (1) Shut 12 SRW Head Tank Level Control Valve Inlet, 1-SRW-112. (2) Open 12 SRW Head Tank Level Control Valve Bypass Valve, 1-SRW-114, as necessary to maintain level. 24. Trip the SITE POWER FDR BREAKER (to 0X04), 252-2106.	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. RESTORE POWER TO THE BUS.	
1. Determine the cause of the loss of power to the bus. 2. Determine the applicable TS/TRM requirements which may include the following: • 3.8.1, A.C. Sources - Operating • 3.8.2, A.C. Sources - Shutdown • 3.8.4, D.C. Sources - Operating • 3.8.5, D.C. Sources - Shutdown • 3.8.7, Inverters - Operating • 3.8.8, Inverters - Shutdown • 3.8.9, Distribution Systems - Operating • 3.8.10, Distribution Systems - Shutdown • 3.3.1, RPS Instrumentation - Operating • 3.3.2, RPS Instrumentation - Shutdown • 3.3.3, RPS Logic and Trip Initiation • 3.3.4, ESFAS Instrumentation • 3.3.5, ESFAS Logic and Manual Actuation • 3.3.6, DG - Loss of Voltage Start • 3.3.7, Containment Radiation Signal • 3.3.9, CVCS Isolation Signal • 3.3.10, Post Accident Monitoring Instrumentation • 3.3.11, Remote Shutdown Instrumentation • 3.3.12, WR Neutron Flux Monitoring TRM: • 15.3.1, Radiation Monitoring Instrumentation (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. (continued) 3. Energize 1Y02 from the Inverter Backup Bus 1Y11 **PER** OI-26B, 120 VOLT VITAL AC **AND** COMPUTER AC. 4. **WHEN** power is restored to 1Y02, **THEN** perform the following actions: a. Energize RPS Channel B: (1) Place the Neutron Flux Monitor Wide Range - CH "B" power supply breaker, CB 1, located at the rear of the cabinet, in the up (ON) position. (2) Place the RPS Channel B circuit breakers located at the rear of the cabinet to ON: • CB (B) • CB-2 (3) Place OPERATE-TEST switches on the Linear Power Channel drawer in the OPERATE position. b. Energize ESFAS Sensor Cabinet ZE and reset sensor modules **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. c. Energize EFAS Actuation Logic Cabinet BL **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. d. Energize AFAS Sensor Cabinet ZE and reset the sensor modules **PER** OI-32B, AFAS SYSTEM OPERATION. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) e. Energize AFAS Actuation Logic Cabinet BL **PER** OI-32B, AFAS SYSTEM OPERATION. f. Energize PAMS Channel B: (1) Close 1Y02-1 Breaker 25, STARTUP PAMS SYSTEM CABINETS 1C182B & 1PAMSB VIA 1X1P94-1 & 1P94. (2) Close 1Y02-1 Breaker 27, RUN PAMS SYSTEM CABINETS 1C182B & 1PAMSB VIA 1X1P94-1 & 1P94. (3) Open 1Y02-1 Breaker 25, STARTUP PAMS SYSTEM CABINETS 1C182B & 1PAMSB VIA 1X1P94-1 & 1P94. (4) Close 1Y02-1 Breaker 26, STARTUP PAMS SYSTEM CABINET 1C144B VIA 1X1P94-2 & 1P94. (5) Close 1Y02-1 Breaker 28, RUN PAMS SYSTEM CABINET 1C144B VIA 1X1P94-2 & 1P94. (6) Open 1Y02-1 Breaker 26, STARTUP PAMS SYSTEM CABINET 1C144B VIA 1X1P94-2 & 1P94. g. Check the "PZR CH Y LVL" alarm clear and place the PZR HTR LO LVL CUT-OFF SEL Switch to X/Y. h. On 1C31, restore RCS Loop 12 instruments to RRS Channel X by placing switch S2 to ON. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. (continued) 5. **IF** the bus can **NOT** be restored, **THEN** refer to 1E-24 and Appendix B of ES-013, LOSS OF POWER EFFECT/LOAD LIST, to determine equipment affected. **CAUTION** **Attempts should NOT be made to re-energize a bus if a fault is suspected.** 6. **WHEN** power can be restored to 21 125 Volt DC Bus, **THEN** energize the bus **PER** OI-26A, 125 Volt Vital DC. 7. Energize 1Y02 from 12 Inverter **PER** OI-26B, 120 VOLT VITAL AC AND COMPUTER AC. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. (continued) 8. **WHEN** power has been restored, **THEN** restore plant systems to normal: a. Restore SRW Head Tank level control to normal: (1) Open 12 SRW Head Tank Level Control Valve Inlet Valve, 1-SRW-112. (2) Shut 12 SRW Head Tank Level Control Valve Bypass Valve, 1-SRW-114. b. Restore IA Header to normal **PER** OI-19, INSTRUMENT AIR. c. Stop 11 and 12 SALTWATER AIR COMPRs. **NOTE** 1-HS-2085 is located on the West wall of the 27 ft Switchgear Room and is operated by a T112 key (#85 from the Control Room Key Locker). The TBO key ring also has a T112 key. d. Open the Containment Instrument Air Supply Valve, 1-IA-2085-CV, by momentarily placing 1-HS-2085 in OPEN. e. Restore letdown **PER** OI-2A, CHEMICAL AND VOLUME CONTROL SYSTEM. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.8 (continued) f. Restore CC to Containment. **NOTE** RCP CBO and LOWER SEAL temperatures may be obtained from computer trend block 9. (1) Record the highest attained RCP CBO and LOWER SEAL temperatures for each RCP: • 11A RCP:____° F/____° F • 11B RCP:____° F/____° F • 12A RCP:____° F/____° F • 12B RCP:____° F/____° F **CAUTION** **Uncontrolled restoration of cooling to hot RCP seals may cause a water hammer and could result in thermal shock of the RCP seal coolers.** (2) **IF ALL** RCP LOWER SEAL temperatures are less than 280° F, **AND** the RCP Controlled Bleed-off temperatures have been recorded, **THEN** open CC CNTMT RETURN valve, 1-CC-3833-CV. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.8.f (continued) (3) **IF ANY** RCP LOWER SEAL temperature is greater than 280° F, **AND** the RCP Controlled Bleed-off temperatures have been recorded, **THEN** perform the following actions: (a) Shut CONTAINMENT SUPPLY HEADER ISOLATION valve, 1-CC-284, located in the 5 ft East Penetration Room. (b) Open CC CNTMT RETURN valve, 1-CC-3833-CV. (c) Slowly open 1-CC-284 to restore component cooling flow. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.8 (continued) g. Restore 12 SW header to normal. **NOTE** Steps (1) and (2) must be performed concurrently. (1) Slowly open 12 SW Pump Discharge Valve, 1-SW-108. (2) Maintain 12 SW Pump discharge pressure between 15 and 30 PSIG as indicated at the pump discharge pressure gauge by adjusting the CC HX SW Flow Controller, 1-HIC-5208. (3) Lock open 12 SW Pump Discharge Valve, 1-SW-108. (4) Verify 12 CC and 12 ECCS Pump Room HX SW outlet valves are restored. (5) Verify 12 SRW HX SW valves are restored. (6) Restart the 12A/12B SRW HX Strainer Timer by placing the MODE SELECTOR switch, 1-HS-5158A at 1C201, to OFF and return to AUTO. h. Reset any RMS alarms **PER** OI-35, RADIATION MONITORING SYSTEM. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. (continued) 9. Return to the appropriate Operating Procedure. a. **IF** the Unit was initially in Mode 1 or 2, **THEN** return to EOP-8. b. **IF** the Unit was initially in Mode 3, 4, or 5, **THEN IMPLEMENT** AOP-3E, LOSS OF ALL RCP FLOW, MODES 3, 4, OR 5 and other applicable Operating Procedures. END of Section XIII	

XIV. 22 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. RESPOND TO A LOSS OF 22 125 VOLT DC BUS.	
1. The following components will be affected by the loss of the bus: • Loss of the plant oscillograph • TCBs 3, 4, 7 and 8 trip • Loss of ESFAS Sensor Cabinet ZG • Loss of AFAS Sensor Cabinet ZG • Loss of Channel D RPS Cabinet • CNTMT Area Rad Monitor, 1-RI-5316D, out of service. 2. De-energize the following components: • ESFAS Sensor Cabinet ZG **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. • AFAS Sensor Cabinet ZG **PER** OI-32B, AFAS SYSTEM OPERATION. (continue)	

XIV. 22 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 3. De-energize RPS Channel D: a. Place the Neutron Flux Monitor Wide Range - CH "D" power supply breaker, CB 1, located at the rear of the cabinet, in the down (OFF) position. b. Place OPERATE-TEST switch on the Linear Power Channel drawer in the ZERO position. c. Place the RPS Channel D circuit breakers located at the rear of the cabinet to OFF: • CB (D) • CB-4 4. Determine the appropriate emergency response actions **PER** the ERPIP.	

XIV. 22 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. RESTORE POWER TO THE BUS.	
1. Determine the cause of the loss of power to the bus. 2. Energize 1Y04 from the inverter backup Bus 1Y11 **PER** OI-26B 120 VOLT VITAL AC AND COMPUTER AC. 3. **WHEN** power is restored to 1Y04, **THEN** energize the following components: a. RPS Channel D: (1) Place the Neutron Flux Monitor Wide Range - CH "D" power supply breaker, CB 1, located at the rear of the cabinet, in the up (ON) position. (2) Place the RPS Channel D circuit breakers located at the rear of the cabinet to ON: • CB (D) • CB-4 (3) Place OPERATE-TEST switch on the Linear Power Channel drawer in the OPERATE position. b. ESFAS Sensor Cabinet ZG **PER** OI-34, ENGINEERED SAFETY FEATURES ACTUATION SYSTEM. c. AFAS Sensor Cabinet ZG **PER** OI-32B, AFAS SYSTEM OPERATION. (continue)	

XIV. 22 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. (continued) 4. Determine the applicable TS/TRM requirements which may include the following: • 3.8.4, D.C. Sources - Operating • 3.8.5, D.C. Sources - Shutdown • 3.8.7, Inverters - Operating • 3.8.8, Inverters - Shutdown • 3.8.9, Distribution Systems - Operating • 3.8.10, Distribution Systems - Shutdown • 3.3.1, RPS Instrumentation - Operating • 3.3.2, RPS Instrumentation - Shutdown • 3.3.3, RPS Logic and Trip Initiation • 3.3.4, ESFAS Instrumentation • 3.3.5, ESFAS Logic and Manual Actuation • 3.3.6, DG - Loss of Voltage Start • 3.3.7, Containment Radiation Signal • 3.3.9, CVCS Isolation Signal • 3.3.10, Post Accident Monitoring Instrumentation • 3.3.11, Remote Shutdown Instrumentation • 3.3.12, WR Neutron Flux Monitoring TRM: • 15.3.1, Radiation Monitoring Instrumentation 5. **IF** the bus can **NOT** be restored, **THEN** refer to 1E-25 and Appendix B of ES-013, LOSS OF POWER EFFECT/LOAD LIST, to determine equipment affected. (continue)	

XIV. 22 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. (continued) **CAUTION** **Attempts should NOT be made to re-energize a bus if a fault is suspected.** 6. **WHEN** power can be restored to 22 125 Volt DC Bus, **THEN** energize the bus **PER** OI-26A, 125 VOLT VITAL DC. 7. Place 1Y04 on 14 Inverter **PER** OI-26B, 120 VOLT VITAL AC AND COMPUTER AC. (continue)	

XIV. 22 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS

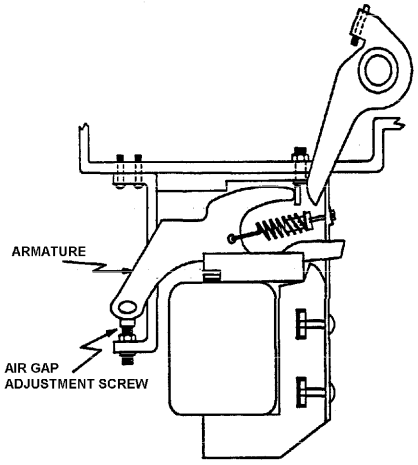
B. (continued)

8. Close TCBs 3, 4, 7 and 8 as follows:

NOTE
Manual assistance may be required to ensure UV device is fully positioned.

CAUTION
TCBs may fail to close properly if the UV devices have NOT fully picked up.

a. Ensure U1 TCB 3, 4, 7 and 8 UV devices are in the full down position.



b. On 1C15, close TCBs 3, 4, 7 and 8.

9. Reset any RMS alarms **PER** OI-35, RADIATION MONITORING SYSTEM.

10. Return to the appropriate Operating Procedure.

END of Section XIV

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	A.7 Maintain PZR level		
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	A.9 Restore 11 Saltwater header flow		
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	A.13 De-energize AL and ZD ESFAS; AL and ZD AFAS		
	A.14 De-energize PAMS Ch. A		
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	B.4.f Energize ESFAS sensor ZD		
	B.4.g Energize ESFAS logic		
	B.4.h Energize AFAS sensor ZD		
	B.4.i Energize AFAS logic		
	B.4.j Energize PAMS Ch. A		
	B.4.k Return PZR low level cutout switch to X/Y		
	B.4.l Restore 11 loop inputs to Ch. Y RRS		
	B.4.m Reset RMS alarms		
	B.4.n Return 1-HS-5151 to AUTO		
	B.4.o Place Containment Radiation Monitors in service		
	B.5 Return to appropriate procedure		

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	A.11 De-energize BL and ZE ESFAS; BL and ZE AFAS		
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	B. RESTORE POWER TO THE BUS		31
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	B.3 Reference E Prints & ES-013		
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	B.4.c Close TCBs 1, 2, 5 and 6		
	B.4.d Energize ESFAS sensor ZE		
	B.4.e Energize ESFAS logic		
	B.4.f Energize AFAS sensor ZE		
	B.4.g Energize AFAS logic		
	B.4.h Energize PAMS Ch. B		
	B.4.i Return PZR low level cutout switch to X/Y		
	B.4.j Restore 12 loop inputs to Ch. X RRS		
	B.4.k Return 1-HS-5154 to AUTO		
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	B.5 Return to appropriate procedure		

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	B.1 Determine cause of loss of bus		
	B.2 Determine applicable Tech Specs		
	B.3 Reference E Prints & ES-013		
	B.4.a Energize 1Y03		
	B.4.b Energize RPS Ch. C		
	B.4.c Close TCBs 3, 4, 7 and 8		
	B.4.d Energize ESFAS sensor ZF		
	B.4.f Energize AFAS sensor ZF		
	B.4.h Reset RMS alarms		
	B.5 Return to appropriate procedure		

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	B.4.a Energize 1Y04		
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	B.4.c Close TCBs 3, 4, 7 and 8		
	B.4.d Energize ESFAS sensor ZG		
	B.4.f Energize AFAS sensor ZG		
	B.4.h Reset RMS alarms		
	B.5 Return to appropriate procedure		

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	A.1 Verify PZR level in X position		
	A.2 Verify PZR Heater Low Level Cutoff in X		
	A.6 Determine applicable Tech Specs		
	A.7.a Return PZR Low Level Cutoff switch to X/Y		
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	A.7.c Reset ESFAS sensor ZE bistables		

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	A. RESPOND TO A LOSS OF 24 120 VOLT VITAL AC INSTRUMENT BUS (2Y04)		58
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	A. RESPOND TO A LOSS OF 11 125 VOLT DC BUS		59
	A.1-5 Stabilize PZR pressure and level controls		
	A.6 Trip RX, RCPs tripped, EOP 0 Implemented		
	A.7 RCPs tripped (Mode 3 and below)		
	A.9 Control PZR pressure		
	A.10 Control PZR Level		
	A.11 Operate ADVs in MANUAL		
	A.12 CC Supply to CNTMT in CLOSE		
	A.13 Start SWACs		
	A.14 Throttle 11 SW Pump Discharge		
	A.15 Trip 11 IA Compressor breaker		
	A.16 Trip 11 PA Compressor breaker		
	A.17 Initiate AFW		
	A.18 Isolate Main Feed		
	A.19 Verify Natural Circulation		
	A.20 Trip Main Gen Field Breaker		
	A.21 Trip Turbine Generator Output Breakers		
	A.22 Secure Evaporators		
	A.23 De-energize AL and ZD ESFAS; AL and ZD AFAS		
	A.24 De-energize Channel A PAMS		

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	A.25 De-energize Channel A RPS		
	A.26 Monitor 11 SRW Headtank		
	A.27 Monitor CC Head Tank		
	A.28 Shut WGS-2191-PCV		
	A.29 Stop CNTMT RMS Pump		
	A.30 Trip SITE POWER FDR BREAKER (to 0X03), 252-1106		
	B. RESTORE POWER TO THE BUS		71
	B.1 Determine cause of loss of bus		
	B.2 Determine applicable Tech Specs		
	B.3 Energize 1Y01 from Inverter Backup Bus		
	B.4.a Energize RPS Ch. A		
	B.4.b Energize ESFAS sensor ZD		
	B.4.c Energize ESFAS AL logic		
	B.4.d Energize AFAS sensor ZD		
	B.4.e Energize AFAS AL logic		
	B.4.f Energize PAMS Ch. A		
	B.4.g Return PZR low level cutout switch to X/Y		
	B.4.h Restore 11 loop input to Ch. Y RRS		
	B.5 Reference E Prints & ES-013		
	B.6 Restore power to 11 DC bus		

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	SECTION XI. 11 125 VOLT DC BUS (continued)		
	B.7 Energize 1Y01 from 11 Inverter		
	B.8.a Restore SRW Head Tank level control		
	B.8.b Restore CC Head Tank level control		
	B.8.c Restore IA to normal		
	B.8.d Restore IA to CNTMT		
	B.8.e Restore letdown		
	B.8.f Stop SWACs		
	B.8.g Restore CC to CNTMT		
	B.8.h Restore 11 SW header to normal		
	B.8.i Reset RMS alarms		
	B.4.j Place Containment Radiation Monitors in service		
	B.9 Return to appropriate procedure		

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START	FUNCTION	DONE	PAGE
	SECTION XII. 12 125 VOLT DC BUS		
	A. RESPOND TO A LOSS OF 12 125 VOLT DC BUS		80
	A.2 De-energize ZF ESFAS and ZF AFAS		
	A.3 De-energized RPS channel C		
	A.4 Determine the appropriate emergency response actions **PER** the ERPIP		
	B. RESTORE POWER TO THE BUS		82
	B.1 Determine cause of loss of bus		
	B.2 Energize 1Y03 from Inverter Backup Bus		
	B.3.a Energize RPS Ch. C		
	B.3.b Energize ESFAS sensor ZF		
	B.3.c Energize AFAS sensor ZF		
	B.4 Determine applicable Tech Specs		
	B.5 Reference E Prints & ES-013		
	B.6 Restore power to 12 DC bus		
	B.7 Energize 1Y03 from 13 Inverter		
	B.8 Close TCBs 3, 4, 7, and 8		
	B.9 Reset RMS alarms		
	B.10 Return to applicable procedure		

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START	FUNCTION	DONE	PAGE
	SECTION XIII. 21 125 VOLT DC BUS		
	A. RESPOND TO A LOSS OF 21 125 VOLT DC BUS		86
	A.1-5 Stabilize PZR pressure and level controls		
	A.6 RX and turbine tripped, RCP bus de-energized; EOP 0 Implemented		
	A.7 RCP bus de-energized (Mode 3 and below)		
	A.9 Control PZR pressure		
	A.10 Control PZR Level		
	A.11 CC Return to CNTMT in CLOSE		
	A.12 Start SWACs		
	A.13 Throttle 12 SW Pump Discharge		
	A.14 Trip 12 IA Compressor breaker		
	A.15 Initiate AFW		
	A.16 Isolate Main Feed		
	A.17 Verify Natural Circulation		
	A.18 Secure Evaporators		
	A.19 De-energize BL and ZE ESFAS; BL and ZE AFAS		
	A.20 De-energize Ch. B PAMS		
	A.21 De-energize Ch. B RPS		
	A.22 Stop CNTMT RMS Pump		
	A.23 Monitor 12 SRW Head Tank		
	A.24 Trip SITE POWER FDR BREAKER (to 0X04), 252-2106		

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START	FUNCTION	DONE	PAGE
	SECTION XIII. 21 125 VOLT DC BUS (continued)		
	B. RESTORE POWER TO THE BUS		97
	B.1 Determine cause of loss of bus		
	B.2 Determine applicable Tech Specs		
	B.3 Energize 1Y02 from Inverter Backup Bus		
	B.4.a Energize RPS Ch. B		
	B.4.b Energize ESFAS sensor ZE		
	B.4.c Energize ESFAS BL logic		
	B.4.d Energize AFAS sensor ZE		
	B.4.e Energize AFAS BL logic		
	B.4.f Energize PAMS Ch. B		
	B.4.g Return PZR low level cutout switch to X/Y		
	B.4.h Restore 12 loop input to Ch. X RRS		
	B.5 Reference E Prints & ES-013		
	B.6 Restore power to 21 DC bus		
	B.7 Energize 1Y02 from 12 Inverter		
	B.8.a Restore SRW Head Tank level control		
	B.8.b Restore IA to normal		
	B.8.c Stop SWACs		
	B.8.d Restore IA to CNTMT		

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START	FUNCTION	DONE	PAGE
	SECTION XIII. 21 125 VOLT DC BUS (continued)		
	B.8.e Restore letdown		
	B.8.f Restore CC to CNTMT		
	B.8.g Restore 12 SW header to normal		
	B.8.h Reset RMS alarms		
	B.9 Return to appropriate procedure		

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START	FUNCTION	DONE	PAGE
	SECTION XIV. 22 125 VOLT DC BUS		
	A. RESPOND TO A LOSS OF 22 125 VOLT DC BUS		106
	A.2 De-energize ZG ESFAS and ZG AFAS		
	A.3 De-energized RPS channel D		
	A.4 Determine the appropriate emergency response actions **PER** the ERPIP		
	B. RESTORE POWER TO THE BUS		108
	B.1 Determine cause of loss of bus		
	B.2 Energize 1Y04 from Inverter Backup Bus		
	B.3.a Energize RPS Channel D		
	B.3.b Energize ESFAS sensor ZG		
	B.3.c Energize AFAS sensor ZG		
	B.4 Determine applicable Tech Specs		
	B.5 Reference E Prints & ES-013		
	B.6 Restore power to 22 DC bus		
	B.7 Energize 1Y04 from 14 Inverter		
	B.8 Close TCBs 3, 4, 7, and 8		
	B.9 Reset RMS alarms		
	B.10 Return to applicable procedure		