

Program Title: OPERATOR LICENSED CANDIDATE

Course Title: PROCEDURES NORMAL, ABNORMAL, and EMERGENCY

Lesson Title: ABNORMAL OPERATING PROCEDURES

Approximate Time:

Revision No.: 00

Date: 8510

Resource Materials for the Instructor:

Job Aids: Applicable Abnormal Procedure

Audio/Visual Equipment Needed: Overhead Projector

List of Transparencies:

Equipment/Tools: N/A

Safety Requirements: N/A

Instructional Setting: Classroom

Student Materials: Pen or Pencil, Paper, Handout

Special Considerations: N/A

Instructor References: AD 1828.10, AD 1805.00, AB 1203,
Reg Guide 1, 33 10 CFR 50,
Technical Specifications

Student References: AB 1203 Applicable

OBJECTIVE. NUMBER	OBJECTIVE TEXT
0	UPON SUCCESSFUL COMPLETION OF START-UP TRAINING, THE REACTOR OPERATORS AND SENIOR REACTOR OPERATORS WILL BE ABLE TO PROPERLY APPLY THE ABNORMAL PROCEDURES NECESSARY FOR PROPER TASK PERFORMANCE.
00	THE FOLLOWING ENABLING OBJECTIVES ASSOCIATED WITH THIS LESSON PLAN ARE DESIGNED TO SUPPORE THE "KNOWLEDGE" REQUIREMENTS FOR THE ABOVE TERMINAL OBJECTIVE.
000	THE TRAINEE, WITHOUT REFERENCES (UNLESS OTHERWISE SPECIFIED), ACCORIDNG TO APPROVED PROCEDURES, WILL BE ABLE TO:
01	GIVEN SPECIFIC SYMPTOMS, CORRECTLY RECOGNIZE THE APPLICABLE ABNORMAL PROCEDURE.
02	LIST/STATE THE FINAL PLANT CONDITION THAT THE ABNORMAL PROCEDURE DIRECTS THE PLANT TO BE PLACED IN.
03	RECALL/IDENTIFY THE PLANT EQUIPMENT/SYSTEMS AVAILBLE TO THE OPERATOR DURING THE PERFORMANCE OF THE ABNORMAL PROCEDURE.
04	LIST/STATE THE FINAL CONDITION OF SELECTED PLANT SYSTEM, WHEN THE ABNORMAL PROCEDURE IS COMPLETE.
05	WHEN PROVIDED WITH A SPECIFIC NOTE AND/OR CAUTION, CORRECTLY LIST/STATE THE REASON FOR THE NOTE AND/OR CAUTION.
06	LIST/STATE THE EMERGENCY ACTION LEVEL THE STATION/SITE IS IN WHEN THE ABNORMAL PROCEDURE IS: ENTERED, IN PROGRESS, COMPLETED (SRO ONLY).
07	BRIEFLY DESCRIBE THE ACTION(S) THAT EACH INDIVIDUAL IS DIRECTED TO PERFORM, IN ACCORDANCE WITH THE ABNORMAL PROCEDURE (SRO ONLY - ALL INDIVIDUALS ACTIONS).

1.0 INTRODUCTION

The intent of this lesson is to introduce/review the Loss of AC Bus Power Sources Abnormal Procedure. The material(s) that you are responsible for is/are stated in the objectives for this lesson.

TP-1

2.0 PRESENTATION

A. Symptoms that indicate entrance into this abnormal procedure.

OBJ. #1

1. Zero volts on the following buses.

- a. A
- b. B
- c. C1
- d. C2
- e. D1
- f. D2

2. Loss of Normal Station Lighting

B. The following Automatic Actions will occur

OBJ #3 & 7

- 1. Reactor/Turbine Trip
- 2. Emergency Diesel Generators START and Energize C1/E1 and D1/F1 Buses
- 3. SFRCS Actuation

C. Operator Actions

- 1. Determine the proper procedure section to enter and perform the actions.
 - a. Complete loss of AC power section 6.0
 - b. Loss of AC to 13.8KV buses (D.G(s) available) Section 3.

Details of actions are given in the AB

2. Action for a complete loss of AC Section 6.0
 - a. Dispatch operators to locally attempt to start the Diesel Generators and energize C1 or D1 Bus.
 - (1) If either C1 or D1 can be energized, proceed to EP 1202.01 RPS, SFAS, SFRCS Trip Step 4.1.2.
 - (2) If not contact Load Dispatcher "take necessary steps to restore offsite power.:
 - b. Dispatch operators to line up and commence feeding the Steam Generators with the Auxiliary Feedwater System.
 - c. Strip A, B, C2 and D2 buses TP-2, TP-3
 - d. If offsite power is available attempt to energize A, B, C1 and D1 buses. If so, go to EP 1202.01 Step 4.1.2.
 - e. Preserve RCS inventory
 - (1) Isolate Letdown MU-3
 - (2) Isolate Seal return MU-38
 - (3) Isolate Pressurizer sample line RC-240B
 - f. Place Diesel Air Compressor in Service
 - g. Trip previously running MU pump isolate seal supply.
 - h. IF offsite power is not restored within 20 minutes reduce load on the station batteries. Attachment 1
of A.B.
 - i. Wait for offsite Power to be Restored.
3. Actions for loss of AC to 13.8KV buses Diesel Generator(s) available.
 - a. Take Control of Atmospheric Vent Valves (SFRCS blocked)

b. Trip the following breakers:

- | | |
|--|------|
| (1) Source Bkrs. to A and B Buses | TP-2 |
| (2) Load Bkrs. on A and B Buses | |
| (3) Source Bkrs to C2 and D2 Buses | TP-3 |
| (4) Load Bkrs on C2 and D2 Buses except lighting bkrs. | |

READ CAUTION:

Care should be taken not to overload the D.G.'s when supplying C2 and D2 buses. If an SFAS trip occurs, C2 and D2 may have to be deenergized to prevent overloading the D.G.s.

Read aloud
and emphasize
OBJ #5

- | | |
|--|--------------------|
| c. <u>If</u> DG-1 is on C1 close AC110 to energize C2 | TP-4
Addendum 3 |
| d. <u>If</u> DG-2 is on D1 close AD110 to energize D2 | TP-4 |
| e. Turn the essential pressurizer heater control switch to "ON" then "AUTO" | |
| f. Try to Restore Offsite Power | |
| g. <u>If Not</u> restored and <u>Both</u> D.G.s are available and <u>No</u> cooldown required go to PP 1102.10 (Plant Shutdown) | |
| h. <u>If Not</u> restored and <u>Both</u> D.G.s are available and <u>cooldown</u> required, go to AB 1203.04 (Depressurization with only Safety Grade Equipment) | |
| i. <u>If Not</u> restored and <u>only one</u> D.G. available | |
| (1) Recover essential bus F1 or E1 | Addendum 1
TP-5 |

By supplying from:

#1 D.G. available C1 to C2 to D1

or

C1 to D2 to D1

#2 D.G. available D1 to D2 to C1

TP-6

or

D1 to C2 to C1

j. If restored, reenergize the buses from their normal or alternate sources.

(1) C2 and D2 buses to normal AC source
"dead bus" transfer isolate from diesel
by opening bus tie breakers.

Emphasize
Addendum 2

(a) Energize C2 and D2 buses from AC
or BD transformers.

(b) Place Isocronous droop switch in
"droop"

DOUBLE EMPHASIZE

(c) Place voltage regulator droop switch
in "On"

(d) Parallel the D.G. with the normal
power source close incoming bus
breaker unload the D.G. trip D.G.
breaker.

k. Restart one RCP per loop

l. Restart a TPCW pump

m. Start a Station Air Compressor

n. Refer to either PP 1102.10 or AB 1203.03
depending on plant conditions.

D. Initial and Final Plant Conditions

1. The plant is assumed to be in mode 1 or 2 at the start
of the event.

2. The plant is taken to Mode 3 (hot standby)
when the procedure is followed.

Obj. #2

3. RCS Heat Removal is via the Steam Generators, Auxiliary Feedwater is supplying the S.G.'s, the AVVs or steam safeties are maintaining pressure (Tsat; RCS Temp) Natural circulation is in progress. Obj. #4
4. The Emergency Action Level the plant is in at the: Obj. #6
- a. Start is: Unusual Event
 - b. During: Dependent on plant conditions
AC lost > 15 minutes - Site
Emergency
 - c. Completed: Dependent on plant conditions
refer to (b.) above.

READ CAUTION: If D.G.s are supplying C1 and C2 buses, DO NOT reset SFAS until off-site power is available.

Read Aloud

3.0 SUMMARY

- A. Review symptoms
- B. Review initial plant conditions
- C. Review final plant conditions
- D. Review Emergency Action levels
- E. Review cautions

4.0 EVALUATION

- A. Ask students to answer the objectives

5.0 ASSIGNMENT

ADDENDUM 1 TO ATTACHMENT 28

Reasons(s) for recovering of the opposite side essential bus with only one Diesel Generator operating.

1. Restore Power to the Battery Chargers and the Instrument Buses - Prevent Degradation of Plant Control and recovery.
 - a. Loss of E-1 Buss will result in loss of the following: (assuming no operator action).
 1. Inverter YVA - Bus YAU
 2. Dip 125VDC
 3. Rectifier YRFI - Alt. Pwr. to Inv YVI
 4. Inverter YFI
 5. Channel #1 120VAC Y1
 6. Inverter YA - Emerg. Pwr to Channel #1 (Y1)
 7. Din 125VDC
 8. Rectifier YRF3 - Alt Pwr to Inv. YV3
 9. Inverter YF3
 10. Channel #3 120VAC Y3

Example of Loads Lost

SFAS Solenoid Valves Channel

Emg. D.G. 1-1 and ACT
RPS 1 and 3
SFAS 1 and 3
SFRCS

- b. Loss of F-1 Buss will result in loss of the following:
(Assuming no operator action)

1. Inverter YVB - Bus YBU
2. D2P 125VDC
3. Rectifier YRF-4 - Alt Pwr to Inv. YV4
4. Inverter YV4
5. Channel #4 120 VAC Y4
6. Inverter YB - Emerg Pwr to Channel #4 (Y4)
7. D2N 125VDC
8. Rectifier YRF-2 - Alt Pwr to Inv YV2
9. Inverter YF3
10. Channel #2 120 VAC Y2

Examples of loads lost:

SFAS Solenoid Valves Channel 2
Emg DG 1-2 and Alt
RPS 2 and 4
SFAS 2 and 4
SFRCS

2. Restore Power to a needed safety function
 - a. Loss of C1 or D1 Bus will result in Loss of the following:
 1. Service Water Pump
 2. HP Inj. Pump
 3. DH Pump
 4. CC Pump

CAUTION: Closely monitor the Diesel Generator Load

Procedure For Removing Diesel Generator 1-1 (1-2) from Service by Powering 1 (D1) from Buss Tie Transformers or C2 (D2).

No. 1-1 (1-2) Diesel Generator is running and tied to Bus C1 (D1).

Bus C1 (D1) is isolated from the system. Breakers AC110 (AD110) and ABDC1 (AACD1) are TRIPPED.

The Emergency Control Transfer Switches located on Bus C1 (D1) cubicles for Breakers AC110 (AD110) and ABDC1 (AACD1) are in the NORMAL position.

The Shift Supervisor has given his permission to parallel with the system.

Bus C2 (D2) is energized by the system with Breaker AC110 (AD110) TRIPPED or XFMR BD (AC) is energized by the system with Breaker ABDC1 (AACD1) TRIPPED.

Place ISOCHRONOUTS-DROOP SWITCH on Panel C3617 (C3618) in DG Room 1 (2) in the "DROOP" position unless in this position.

Place VOLTAGE REGULATOR DROOP SWITCH on Panel C3617 (C3618) in DG Room 1 (2) in the "ON" position unless in this position.

Place DG1 (2) SYNC SELECTOR switch in the BKR TO C2 (D2) or TIE BKR TO XBD (XAC) position on Local Control Panel C3615 (C3616).

Adjust the Diesel Generator speed using DG1 (2) SPD control switch on Local Control Panel C3615 (C3616) so that the DG1 (2) SYNCHRONOSCOPE pointer is revolving slowly in the FAST (clockwise) direction. Adjust the DG voltage using Voltage Reg. Control switch until the INCOMING voltage \geq the RUNNING voltage.

Close the BUS C1 (D1) to BUS C2 (D2) TIE BREAKER control switch for AC110 (AD110) or XFMR BD (AC) to BUS C1 (D1) Control Switch for ABDC1 (AACD1) on Local Control Panel C3615 (C3616) when the DG1 (2) SYNCHRONOSCOPE pointer is at the twelve o'clock position or slightly before the twelve o'clock position.

CAUTION: When the DG's receive an auto start signal, they automatically go to isochronous mode and remain in isochronous mode. Therefore, when the DG is paralleled to the system immediately decrease load and trip the DG output breaker AC101 (AD101).

Completed _____ Time _____ Date _____

Procedure for Powering Buss C2 (D2) from C1 (D1) with C1 (D1) being Powered Only from DG 1-1 (1-2).

The Diesel Generator is running and serving C1 (D1) bus load only.

Bus C2 (D2) is de-energized and all breakers are TRIPPED including Breakers AACC2 (ABDD2) and AC110 (AD110).

The Shift Supervisor has given his permission to apply load from Bus C2 (D2) to No. 1-1 (1-2) Diesel Generator.

The Emergency Control Transfer Switch located on Bus C1 (D1) for Breaker AC110 (AD110) is in the NORMAL position.

Place the DG1 (2) SYNC switch HS 6221 (HS6231) in the BKR TO C2 (D2) position on Control Room Panel C5715 or place DG1 (2) SYNC SELECTOR switch in the BKR TO C2 (D2) position on Local Control Panel C3615 (C3616).

Place the BUS C1 (D1) TO BUS C2 (D2) TIE BRKR control switch for AC110 (AD110) located on Control Room Panel C5715 in the CLOSE position or place the BUS C1 (D1) to BUS C2 (D2) TIE BRKR control switch for AC110 (AD110) located on Local Control panel C3615 (C3616) in the CLOSE position.

Apply load to Bus C2 (D2) as directed by the Shift Supervisor.

CAUTION: Do not exceed rating limitations of the Diesel Generator.

Completed _____ Time _____ Date _____