CALVERT CLIFFS NUCLEAR POWER PLANT
TECHNICAL PROCEDURE

UNIT TWO

AOP-7J

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

REVISION 14

Safety Related

Approval Authority: Tim Riti 7/11/2006
signature/date

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LIST OF EFFECTIVE PAGES

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PROCEDURE ALTERATIONS

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01404	20,31,38,45,49

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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 22 120 Volt Vital AC Instrument Bus (2Y02) 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., 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01) 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. 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.	
2. **GO TO** 1C24A.	
3. **IF** 21 120 Volt Vital AC Instrument Bus (2Y01) is de-energized, **AND** 11 125 Volt DC Bus is energized, **THEN PROCEED** to Section V., 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01).	
4. **IF** 21 and 11 120 Volt Vital AC Instrument Busses (2Y01 and 1Y01) are de-energized, **AND** 11 125 Volt DC Bus is de-energized, **THEN PROCEED** to Section XI., 11 125 VOLT DC BUS.	

(continue)

IV. PRELIMINARY

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

IV. PRELIMINARY

ACTIONS	ALTERNATE ACTIONS
A. (continued) 11. **IF** 11 120 Volt Vital AC Instrument Bus (1Y01) is de-energized, **THEN PROCEED** to Section IX., 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01). 12. **IF** 13 120 Volt Vital AC Instrument Bus (1Y03) is de-energized, **THEN PROCEED** to Section X., 13 120 VOLT VITAL AC INSTRUMENT BUS (1Y03). END of Section IV	

V. 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01)

ACTIONS	ALTERNATE ACTIONS
A. RESPOND TO A LOSS OF 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01).	
1. Verify that the PZR 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 PZR LVL CH SEL switch is in the 110Y position.	
4. Verify that the PZR HTR LO LVL CUTOFF SEL switch is in the Y position.	
NOTE Switch S1 is located inside the RRS Test Panel Drawer at 2C32.	
5. Isolate the RCS Loop 21 instruments to RRS Channel Y by placing switch S1 to OFF.	
6. Shut the L/D CNTMT ISOL valves: • 2-CVC-515-CV • 2-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. 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01)

ACTIONS	ALTERNATE ACTIONS
A. (continued)	**CAUTION** **If the difference between the PZR 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 SPRAY as necessary to maintain RCS pressure between 2225 and 2275 PSIA.	8.1 **IF** the PZR SPRAY valves are **NOT** available, **THEN** operate AUX SPRAY as necessary. a. Record the following information: • PZR WTR TEMP (2-TI-101) • CHG OUT TEMP (2-TI-229) b. Open the AUX SPRAY valve, 2-CVC-517-CV. c. Operate the LOOP CHG valves as necessary to adjust AUX SPRAY flow: • 2-CVC-518-CV • 2-CVC-519-CV d. Shift the PZR SPRAY VLV CONTR, 2-HIC-100, to MANUAL. e. Shut the PZR SPRAY VLVs by adjusting the output of 2-HIC-100 to 0%: • 2-RC-100E-CV • 2-RC-100F-CV
(continue)	(continue)

V. 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01)

ACTIONS	ALTERNATE ACTIONS
A.8 (continued)	A.8.1 (continued) f. **WHEN** AUX SPRAY is **NO** longer needed, **THEN** perform the following actions: (1) Open LOOP CHG valves: • 2-CVC-518-CV • 2-CVC-519-CV (2) Shut AUX SPRAY valve, 2-CVC-517-CV.
NOTE Loss of power to 2Y01 causes 21 CC HX SW OUT, 2-SW-5206-CV and 21A/21B SRW HX SW BYPASS VLV, 2-SW-5154-CV to close. 9. Restore 21 Saltwater header: a. Verify 22 CC HX is in service. b. Verify 21A/21B SRW HX SW OUT valve handswitches are in OPEN: • 2-SW-5209-CV • 2-SW-5210-CV 10. Stop the Unit 2 Containment Radiation Monitor pump. (continue)	

V. 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01)

ACTIONS	ALTERNATE ACTIONS

A. (continued)
 	
11. The following alarms may actuate and indications may be affected upon loss of the bus:
 	
2C03
 	
• 21 and 22 SG Channel A pressure and level indicators fail low
 	
2C04
 	
• "AFAS LOSS OF POWER " alarm
 	
• 12 CST level indicator, 2-LI-5610
 	
• 21 and 22 AFW Steam Train S/G FLOW CONTRs fail and flow indicates setpoint:
 	
  • 2-FIC-4511A
  • 2-FIC-4512A
 	
• 21 and 22 AFW Steam Train S/G Flow Control Valves fail open:
 	
  • 2-FIC-4511-CV
  • 2-FIC-4512-CV
 	
• Loss of PAM CH A FPD, 2-CRT-2C04A
 	
2C05
 	
• Loss of PAM CH A FPD, 2-CRT-2C05A
 	
(continue)	

V. 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01)

ACTIONS	ALTERNATE ACTIONS
A.11 (continued) 2C06 • 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, 2-PDI-101A, fails low • PZR Low Range pressure indicator, 2-PIC-103, fails low • PZR pressure instrument, 2-PI-102A, fails low • TM/LP Trip Setpoint indication, 2-PIA-102A fails low • Loss of PAM CH A FPD, 2-CRT-2C06A 2C08 • "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 2C15 • Nuclear Instrumentation indication on Channel A is lost (continue)	

V. 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01)

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 B CSAS and SGIS will **NOT** actuate the following: • 21 SGFP • 22 SGFP • 21 CBP • 22 CBP • 23 CBP • 21 HDT PP • 22 HDT PP • Channel ZD ESFAS and AFAS Sensor Cabinets de-energized • Channel A RPS Cabinet de-energized • Channel A PAMS de-energized • IA downstream of the CNTMT IA Control Valve, 2-IA-2085-CV is isolated ("CONTAINMENT I/A ISOLATION IA-2085-CV SHUT" alarm does **NOT** actuate) • Loss of speed control for the AFW steam driven train. If 21 or 22 AFW Pump is running, it will fail to the maximum speed setting. • TCBs 1, 2, 5, and 6 are open and the Reactor does **NOT** trip • PORV-402 inoperable in MPT ENABLE • 21 CC HX SW FLOW CONTR, 2-HIC-5206, loses power • 21A/21B SRW HX SW BYPASS, 2-PIC-5154, loses power (continue)	

V. 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01)

ACTIONS	ALTERNATE ACTIONS

A.12 (continued)
• CNTMT High Range Monitor Channel A, 2-RI-5317A, out of service
• CNTMT Area Rad Monitor, 2-RI-5316A, out of service
• 21 Main Steam Effluent Rad Monitor, 2-RIC-5421, out of service
• 21 Main Steam N-16 Rad Monitor, 2-RIC-5421A, out of service
• CAC SRW INL valves fail open:
  • (21 CAC) 2-SRW-1581-CV
  • (22 CAC) 2-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. 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01)

ACTIONS	ALTERNATE ACTIONS
A. (continued) 14. De-energize PAMS Channel A: a. Open 2Y01-1 Breaker 27, RUN PAMS SYSTEM CABINETS 2C182A & 2PAMSA VIA 2X2P93-1 & 2P93. b. Open 2Y01-1 Breaker 28, RUN PAMS SYSTEM CABINET 2C144A VIA 2X2P93-2 & 2P93. c. Ensure open 2Y01-1 Breaker 25, STARTUP PAMS SYSTEM CABINETS 2C182A & 2PAMSA VIA 2X2P93-1 & 2P93. d. Ensure open 2Y01-1 Breaker 26, STARTUP PAMS SYSTEM CABINET 2C144A VIA 2X2P93-2 & 2P93. 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 2Y01 caused B train ESFAS actuations, **THEN** de-energize ESFAS Actuation Logic Cabinet BL **PER** OI-34, Engineered Safety Features Actuation System. (continue)	

V. 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01)

ACTIONS	ALTERNATE ACTIONS
A. (continued) 17. **IF** the loss of 2Y01 caused B train AFAS actuations, **THEN** de-energize AFAS Actuation Logic Cabinet BL **PER** OI-32B, AFAS System Operation. 18. Shutdown 21 Main Steam Effluent and N-16 Rad Monitors, 2-RIC-5421/5421A, **PER** OI-35, Radiation Monitoring System.	
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 (continue)	

V. 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01)

ACTIONS	ALTERNATE ACTIONS
B.2 (continued) • 3.3.11, Remote Shutdown Instrumentation • 3.3.12, WR Neutron Flux Monitoring • 3.4.14, RCS Leakage Detection Instrumentation • 3.7.3, Auxiliary Feedwater System TRM: • 15.3.1, Radiation Monitoring Instrumentation	
3. **IF** the bus can **NOT** be restored, **THEN** refer to 2E-22 and Appendix D 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 2Y01, **THEN** perform the following actions.	
	NOTE The Inverter Backup Bus is powered from MCC-204. Only one key, per unit, is provided to ensure that only one Inverter is transferred to the Inverter Backup Bus.
a. **IF EITHER** 21 Inverter is available, • INV1 • INV2 **THEN** energize 2Y01 **PER** OI-26B, 120 Volt Vital AC and Computer AC.	a.1 **IF** 21 Inverter is **NOT** available, **AND** the Inverter Backup Bus is energized, **THEN** energize 2Y01 from the Inverter Backup Bus by performing the following: (1) Verify **BOTH** 21 Inverter AC OUTPUT breakers in OFF: • INV1 • INV2
(continue)	(continue)

V. 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01)

ACTIONS	ALTERNATE ACTIONS
B.4.a (continued)	B.4.a.1 (continued) (2) Verify the fused disconnect 2Y11-2 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. (5) Place the ALT A.C. INPUT breaker in ON. (6) Shift the MAN TRANS SW to the ALT position.
NOTE 2-HS-2085 is located on the West wall of the 27 ft Switchgear Room and is operated by a T112 key (#80 from the Control Room Key Locker). The TBO key ring also has a T112 key. b. Open the Containment Instrument Air Supply Valve, 2-IA-2085-CV, by momentarily placing 2-HS-2085 in OPEN. c. Restore charging and letdown **PER** OI-2A, Chemical and Volume Control System. (continue)	

V. 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01)

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) d. Energize RPS Channel A: (1) Place the RPS Channel A circuit breakers located at the rear of the cabinet to ON: • CB (A) • CB-1 (2) 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. (3) Place Operate-Test switch on the Linear Power Channel drawer in the Operate position. e. On 2C15, close TCBs 1, 2, 5 and 6. f. Energize ESFAS Sensor Cabinet ZD and reset the sensor modules **PER** OI-34, ESFAS. g. Energize ESFAS Actuation Logic Cabinet AL **PER** OI-34, ESFAS. 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. (continue)	01404

V. 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01)

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) j. Energize PAMS Channel A: (1) Close 2Y01-1 Breaker 25, STARTUP PAMS SYSTEM CABINETS 2C182A & 2PAMSA VIA 2X2P93-1 & 2P93. (2) Close 2Y01-1 Breaker 27, RUN PAMS SYSTEM CABINETS 2C182A & 2PAMSA VIA 2X2P93-1 & 2P93. (3) Open 2Y01-1 Breaker 25, STARTUP PAMS SYSTEM CABINETS 2C182A & 2PAMSA VIA 2X2P93-1 & 2P93. (4) Close 2Y01-1 Breaker 26, STARTUP PAMS SYSTEM CABINET 2C144A VIA 2X2P93-2 & 2P93. (5) Close 2Y01-1 Breaker 28, RUN PAMS SYSTEM CABINET 2C144A VIA 2X2P93-2 & 2P93. (6) Open 2Y01-1 Breaker 26, STARTUP PAMS SYSTEM CABINET 2C144A VIA 2X2P93-2 & 2P93. k. Check the "PZR CH X LVL" alarm clear and place the PZR HTR LO LVL CUTOFF SEL switch to X/Y. l. On 2C32, restore the RCS Loop 21 instruments to RRS Channel Y by placing switch S1 to ON. m. Reset any RMS alarms **PER** OI-35, Radiation Monitoring System. (continue)	

V. 21 120 VOLT VITAL AC INSTRUMENT BUS (2Y01)

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) n. Restore 21A/21B SRW HX SW OUT valve handswitches as required: • 2-SW-5209-CV • 2-SW-5210-CV o. Place the Containment Radiation Monitors in service **PER** OI-35, Radiation Monitoring System. p. Place the 21 Main Steam and N-16 Rad Monitors, 2-RIC-5421/5421A, in service **PER** OI-35, Radiation Monitoring System. 5. Return to the appropriate Operating Procedure. END of Section V	

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

ACTIONS	ALTERNATE ACTIONS
A. RESPOND TO A LOSS OF 22 120 VOLT VITAL AC INSTRUMENT BUS (2Y02).	
1. Verify that the PZR PRESS CH SEL switch is in the X position.	
2. Verify that the LETDOWN VALVE CONTROLLER, 2-HIC-110, is in MANUAL.	
3. Verify that the RRS CH SEL Switch is in the RRS-X position.	
4. Verify that the PZR LVL CH SEL switch is in the 110X position.	
5. Verify that the PZR HTR LO LVL CUTOFF SEL switch is in the X position.	
NOTE Switch S2 is located inside the RRS Test Panel Drawer at 2C31.	
6. Isolate the RCS Loop 22 instruments to RRS Channel X by placing switch S2 to OFF.	
7. Place the LETDOWN VALVE CONTROLLER, 2-HIC-110, to AUTO and maintain PZR level near its programmed setpoint.	
(continue)	

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

ACTIONS	ALTERNATE ACTIONS
A. (continued) **NOTE** Loss of power to 2Y02 causes 22 CC HX SW OUT, 2-SW-5208-CV and 22A/22B SRW HX SW BYPASS VLV, 2-SW-5157-CV to close. 8. Restore 22 Saltwater header: a. Verify 21 CC HX is in service. b. Verify 22A/22B SRW HX SW OUT valve handswitches are in OPEN: • 2-SW-5211-CV • 2-SW-5212-CV 9. The following alarms may actuate and indications may be affected upon loss of the bus: 2C03 • 21 and 22 SG Channel B pressure and level indicators fail low 2C04 • "AFAS LOSS OF POWER " alarm • 12 CST level indicator, 2-LI-5611 fails low • AFW Motor Driven Train SG FLOW CONTRs fail and flow indicates setpoint: • (21 SG) 2-FIC-4525A-CV • (22 SG) 2-FIC-4535A-CV • Loss of PAM CH B FPD, 2-CRT-2C04B 2C05 • Loss of PAM CH B FPD, 2-CRT-2C05B (continue)	

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

ACTIONS	ALTERNATE ACTIONS
A.9 (continued) 2C06 • 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, 2-PDI-101B, fails low • PZR LO RANGE PRESS indicator, 2-PIC-103-1, fails low • PZR pressure instrument, 2-PI-102B, fails low • TM/LP Trip Setpoint indication, 2-PIA-102B fails low • Loss of PAM CH B FPD, 2-CRT-2C06B 2C08 • "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 2C15 • Nuclear Instrumentation indication on Channel B is lost (continue)	

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

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 • The Turbine will **NOT** trip on SG high level or Reactor trip • Main Feedwater will **NOT** reconfigure to the 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 • AFW Motor Driven Train Flow Control Valves fail open and indication is lost: • (21 SG) 2-AFW-4525-CV • (22 SG) 2-AFW-4535-CV • Portions of the Unit 1 and Unit 2 Auxiliary Shutdown Panels, 1C43 and 2C43, de-energized • TCBs 1, 2, 5, and 6 are open and the Reactor does **NOT** trip • PORV-404 inoperable in MPT ENABLE • 22 CC HX SW FLOW CONTR, 2-HIC-5208, loses power • 22A/22B SRW HX SW BYPASS, 2-PIC-5157, loses power • CNTMT Area Rad Monitor, 2-RI-5316B, out of service • 22 Main Steam Effluent Rad Monitor, 2-RIC-5422, out of service (continue)	

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

ACTIONS	ALTERNATE ACTIONS

A.10 (continued)
• 22 Main Steam N-16 Rad Monitor, 2-RIC-5422A, out of service
• CAC SRW INL valves fail open:
  • (23 CAC) 2-SRW-1589-CV
  • (24 CAC) 2-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
 	
12. De-energize PAMS Channel B:
a. Open 2Y02-1 Breaker 33, RUN PAMS SYSTEM CABINETS 2C182B & 2PAMSB VIA 2X2P94-1 & 2P94.
b. Open 2Y02-1 Breaker 34, RUN PAMS SYSTEM CABINET 2C144B VIA 2X2P94-2 & 2P94.
c. Ensure open 2Y02-1 Breaker 31, STARTUP PAMS SYSTEM CABINETS 2C182B & 2PAMSB VIA 2X2P94-1 & 2P94.
d. Ensure open 2Y02-1 Breaker 32, STARTUP PAMS SYSTEM CABINET 2C144B VIA 2X2P94-2 & 2P94.
 	
(continue)	

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

ACTIONS	ALTERNATE ACTIONS
A. (continued) 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 2Y02 caused A train ESFAS actuations, **THEN** de-energize ESFAS Actuation Logic Cabinet AL **PER** OI-34, Engineered Safety Features Actuation System. 15. **IF** the loss of 2Y02 caused A train AFAS actuations, **THEN** de-energize AFAS Actuation Logic Cabinet AL **PER** OI-32B, AFAS System Operation. 16. Shutdown 22 Main Steam Effluent and N-16 Rad Monitors, 2-RIC-5422/5422A, **PER** OI-35, Radiation Monitoring System.	

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

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 • 3.7.3, Auxiliary Feedwater System TRM: • 15.3.1, Radiation Monitoring Instrumentation (continue)	

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

ACTIONS	ALTERNATE ACTIONS
B. (continued) 3. **IF** the bus can **NOT** be restored, **THEN** refer to 2E-22 and Appendix D 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 2Y02, **THEN** perform the following actions. a. **IF EITHER** 22 Inverter is available, • INV1 • INV2 **THEN** energize 2Y02 **PER** OI-26B, 120 Volt Vital AC and Computer AC. (continue)	**NOTE** The Inverter Backup Bus is powered from MCC-204. Only one key, per unit, is provided to ensure that only one Inverter is transferred to the Inverter Backup Bus. a.1 **IF** 22 Inverter is **NOT** available, **AND** the Inverter Backup Bus is energized, **THEN** energize 2Y02 from the Inverter Backup Bus by performing the following: (1) Verify **BOTH** 22 Inverter AC OUTPUT breakers in OFF: • INV1 • INV2 (2) Verify the fused disconnect 2Y11-3 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)

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

ACTIONS	ALTERNATE ACTIONS
B.4.a (continued)	B.4.a.1 (continued)
b. Energize RPS Channel B: (1) Place the RPS Channel B circuit breakers located at the rear of the cabinet to ON: • CB (B) • CB-2 (2) 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. (3) Place Operate-Test switch on the Linear Power Channel drawer in the Operate position. c. On 2C15, 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. 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.	(5) Place the ALT A.C. INPUT breaker in ON. (6) Shift the MAN TRANS SW to the ALT position.

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(continue)

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

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) h. Energize PAMS Channel B: (1) Close 2Y02-1 Breaker 31, STARTUP PAMS SYSTEM CABINETS 2C182B & 2PAMSB VIA 2X2P94-1 & 2P94. (2) Close 2Y02-1 Breaker 33, RUN PAMS SYSTEM CABINETS 2C182B & 2PAMSB VIA 2X2P94-1 & 2P94. (3) Open 2Y02-1 Breaker 31, STARTUP PAMS SYSTEM CABINETS 2C182B & 2PAMSB VIA 2X2P94-1 & 2P94. (4) Close 2Y02-1 Breaker 32, STARTUP PAMS SYSTEM CABINET 2C144B VIA 2X2P94-2 & 2P94. (5) Close 2Y02-1 Breaker 34, RUN PAMS SYSTEM CABINET 2C144B VIA 2X2P94-2 & 2P94. (6) Open 2Y02-1 Breaker 32, STARTUP PAMS SYSTEM CABINET 2C144B VIA 2X2P94-2 & 2P94. i. Check the "PZR CH Y LVL" alarm clear and place the PZR HTR LO LVL CUTOFF SEL Switch to X/Y. j. On 2C31, restore RCS Loop 22 instruments to RRS Channel X by placing switch S2 to ON. k. Reset any RMS alarms **PER** OI-35, Radiation Monitoring System. (continue)	

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

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) l. Restore 22A/22B SRW HX SW OUT valve handswitches as required: • 2-SW-5211-CV • 2-SW-5212-CV m. Place the 21 Main Steam and N-16 Rad Monitors, 2-RIC-5422/5422A, in service **PER** OI-35, Radiation Monitoring System. 5. Return to the appropriate Operating Procedure. END of Section VI	

VII. 23 120 VOLT VITAL AC INSTRUMENT BUS (2Y03)

ACTIONS	ALTERNATE ACTIONS
A. RESPOND TO A LOSS OF 23 120 VOLT VITAL AC INSTRUMENT BUS (2Y03).	
1. The following alarms may actuate and indications may be affected upon loss of the bus: 2C03 • 21 and 22 SG Channel C pressure and level indicators fail low 2C04 • "AFAS LOSS OF POWER " alarm 2C06 • Channel C Total Core Cooling Flow indication, 2-PDI-101C, fails low • PZR pressure instrument, 2-PI-102C, fails low • TM/LP Trip Setpoint indication, 2-PIA-102C, fails low • Loss of 21 HOT LEG TEMP and 21A COLD LEG TEMP digital indication 2C08 • "ACTUATION SYS LOSS OF POWER" alarm • "ACTUATION SYS SENSOR CH ZF TRIP" alarm 2C10 • "CNMNT RAD LVL HI" alarm 2C15 • Nuclear Instrumentation indication on Channel C is lost (continue)	

VII. 23 120 VOLT VITAL AC INSTRUMENT BUS (2Y03)

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, 2-RI-5317B, out of service • CNTMT Area Rad Monitor, 2-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. 23 120 VOLT VITAL AC INSTRUMENT BUS (2Y03)

ACTIONS	ALTERNATE ACTIONS
A. (continued) 5. **IF** the loss of 2Y03 caused ESFAS actuations, **THEN** de-energize the associated ESFAS Actuation Logic Cabinet **PER** OI-34, Engineered Safety Features Actuation System. 6. **IF** the loss of 2Y03 caused AFAS actuations, **THEN** de-energize the associated AFAS Actuation Logic Cabinet **PER** OI-32B, AFAS System Operation.	
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 (continue)	

VII. 23 120 VOLT VITAL AC INSTRUMENT BUS (2Y03)

ACTIONS	ALTERNATE ACTIONS
B.2 (continued) • 3.3.11, Remote Shutdown Instrumentation • 3.3.12, WR Neutron Flux Monitoring	
3. **IF** the bus can **NOT** be restored, **THEN** refer to 2E-22 and Appendix D 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 2Y03, **THEN** perform the following actions.	
	NOTE The Inverter Backup Bus is powered from MCC-204. Only one key, per unit, is provided to ensure that only one Inverter is transferred to the Inverter Backup Bus.
a. **IF EITHER** 23 Inverter is available, • INV1 • INV2 **THEN** energize 2Y03 **PER** OI-26B, 120 Volt Vital AC and Computer AC.	a.1 **IF** 23 Inverter is **NOT** available, **AND** the Inverter Backup Bus is energized, **THEN** energize 2Y03 from the Inverter Backup Bus by performing the following: (1) Verify **BOTH** 23 Inverter AC OUTPUT breakers in OFF: • INV1 • INV2 (2) Verify the fused disconnect 2Y11-4 is shut. (3) Obtain the ALT A.C. INPUT breaker interlock key from the Shift Manager.
(continue)	(continue)

VII. 23 120 VOLT VITAL AC INSTRUMENT BUS (2Y03)

ACTIONS	ALTERNATE ACTIONS
B.4.a (continued)	B.4.a.1 (continued) (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.
b. Energize RPS Channel C: (1) Place the RPS Channel C circuit breakers located at the rear of the cabinet to ON: • CB (C) • CB-3 (2) 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. (3) Place Operate-Test switch on the Linear Power Channel drawer in the Operate position. c. On 2C15, 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 Cabinets **PER** OI-34, Engineered Safety Features Actuation System. f. Energize AFAS Sensor Cabinet ZF and reset the sensor modules **PER** OI-32B, AFAS System Operation. (continue)	

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VII. 23 120 VOLT VITAL AC INSTRUMENT BUS (2Y03)

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) 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. 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. The following alarms may actuate and indications may be affected upon loss of the bus: 2C03 • 21 and 22 SG Channel D pressure and level indicators fail low 2C04 • "AFAS LOSS OF POWER " alarm • 21 and 22 SG WR level indicators fail low: • 2-LI-1114D • 2-LI-1124D 2C06 • Channel D Total Core Cooling Flow indication, 2-PDI-101D, fails low • PZR pressure instrument, 2-PI-102D, fails low • TM/LP Trip Setpoint indication, 2-PIA-102D, fails low • Loss of 22 HOT LEG TEMP and 22B COLD LEG TEMP digital indication 2C08 • "ACTUATION SYS LOSS OF POWER" alarm • "ACTUATION SYS SENSOR CH ZG TRIP" alarm (continue)	

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

ACTIONS	ALTERNATE ACTIONS
A.1 (continued) 2C15 • 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, 2-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. 24 120 VOLT VITAL AC INSTRUMENT BUS (2Y04)

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 2Y04 caused ESFAS actuations, **THEN** de-energize the associated ESFAS Actuation Logic Cabinet **PER** OI-34, Engineered Safety Features Actuation System. 6. **IF** the loss of 2Y04 caused AFAS actuations, **THEN** de-energize the associated AFAS Actuation Logic Cabinet **PER** OI-32B, AFAS System Operation.	
B. RESTORE POWER TO THE BUS.	
1. Determine the cause of the loss of power to the bus. (continue)	

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

ACTIONS	ALTERNATE ACTIONS
B. (continued) 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 2E-22 and Appendix D of ES-013, Loss of Power Effect/Load List, to determine equipment affected. (continue)	

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

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 2Y04, **THEN** perform the following actions.	
a. **IF EITHER** 24 Inverter is available, • INV1 • INV2 **THEN** energize 2Y04 **PER** OI-26B, 120 Volt Vital AC and Computer AC.	**NOTE** The Inverter Backup Bus is powered from MCC-204. Only one key, per unit, is provided to ensure that only one Inverter is transferred to the Inverter Backup Bus. a.1 **IF** 24 Inverter is **NOT** available, **AND** the Inverter Backup Bus is energized, **THEN** energize 2Y04 from the Inverter Backup Bus by performing the following: (1) Verify **BOTH** 24 Inverter AC OUTPUT breakers in OFF: • INV1 • INV2 (2) Verify the fused disconnect 2Y11-5 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. 24 120 VOLT VITAL AC INSTRUMENT BUS (2Y04)

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) b. Energize RPS Channel D: (1) Place the RPS Channel D circuit breakers located at the rear of the cabinet to ON: • CB (D) • CB-4 (2) 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. (3) Place Operate-Test switch on the Linear Power Channel drawer in the Operate position. c. On 2C15, 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 Cabinets **PER** OI-34, Engineered Safety Features Actuation System. 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	01404

IX. 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 PZR LVL CH SEL Switch is in the Y position. 2. Verify that the PZR HTR LO LVL CUTOFF SEL switch is in the Y position. 3. **IF** required, **THEN** reset the Proportional Heaters by placing 21 PROP HTRS, 2-HS-100-1 **AND** 22 PROP HTRS, 2-HS-100-2, to OFF and back to AUTO. (continue)	

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

ACTIONS	ALTERNATE ACTIONS

A. (continued)
 	
4. The following components are affected:
 	
• ESFAS Sensor ZD loses 21 and 22 SG pressure inputs
 	
• AFAS Sensor ZD loses 21 and 22 SG pressure and level inputs
 	
• AFAS Sensor ZD loses AFW flow to 21 and 22 SG inputs
 	
2C03
 	
• 21 and 22 SG Channel A pressure indicators fail low
 	
2C04
 	
• Inputs to 21 and 22 AFW Steam Train SG FLOW CONTRs lose power and flow indicates low:
  • 2-FIC-4511A
  • 2-FIC-4512A
 	
• 21 and 22 AFW Steam Train SG Flow Control Valves fail open (manual FIC control available):
  • 2-AFW-4511-CV
  • 2-AFW-4512-CV
 	
• PAM CH A S/G Levels fail low
 	
2C05
 	
• WRNI indication on Channel A SUR and Power is lost
 	
• PAM CH A Subcooled Margin fails
 	
(continue)	

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

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

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

ACTIONS	ALTERNATE ACTIONS

A. (continued)
 	
5. On the Safe Shutdown Panel, 2C43, the following controls and indicators lose power:
 	
• PZR Pressure Indicator, 2-PI-105AA, fails low
 	
• 21 and 22 SG Level Indicators fail low:
  • 2-LI-1114A
  • 2-LI-1124A
 	
• 21 and 22 SG Pressure Indicators fail low:
  • 2-PI-1013AA
  • 2-PI-1023AA
 	
• 22 ADV Controller, 2-HC-4056B, is inoperable
 	
• 21 and 22 AFW PP SPD CONTRs are inoperable
  • 2-HC-3987B
  • 2-HC-3989B
 	
• 21 and 22 S/G STM DRIVEN AFW FLOW CONTRs are inoperable:
  • 2-HC-4511B
  • 2-HC-4512B
 	
• 21 and 22 AFW Pump Flow Indicators fail low
  • 2-FI-4509
  • 2-FI-4510
 	
• WRNI indication on Channel A and C are lost
 	
(continue)
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IX. 11 120 VOLT VITAL AC INSTRUMENT BUS (1Y01)

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 1 will be responsible for restoring power to 1Y01. 7. **WHEN** power has been restored, **THEN** perform the following actions. a. Check the "PZR CH X LVL" alarm clear and place the PZR HTR LO LVL CUTOFF SEL switch to X/Y. b. Reset bistables on AFAS Sensor Channel ZD **PER** OI-32B, AFAS System Operation. c. Reset bistables on ESFAS sensor Channel ZD **PER** OI-34, Engineered Safety Features Actuation System. END of Section IX	

X. 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. Upon the loss of 13 120 Volt Vital AC Instrument Bus (1Y03), WRNI indication for Channel C SUR and Power on 2C05, 2C15, and 2C43 will be lost: 2. 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 • 3.3.10, 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 PZR 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 PZR LVL CH SEL switch is in the 110Y position. 4. Verify that the PZR HTR LO LVL CUTOFF SEL switch is in the Y position. **NOTE** Switch S1 is located inside the Reactor Regulating System Test Panel Drawer at 2C32 5. Isolate the 21 RCS loop instruments to RRS Channel Y by placing switch S1 to OFF on 2C32. (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 or CRS, perform the following actions. a. Dispatch an operator to the Unit 2 Main Turbine Front Standard. b. **WHEN** notified that the operator is stationed at the Unit 2 Main Turbine Front Standard, **THEN** coordinate the following actions: (1) Trip the Reactor from 2C05. (2) **WHEN** the Reactor is tripped, **THEN** immediately trip the Turbine from the Front Standard. c. Perform the Reactivity Control Immediate Actions of EOP-0, Post Trip Immediate Actions. d. Isolate the 13 KV Bus power supplies to **ALL** RCPs: (1) Place Unit 2 RCP Bus Feeder Breaker Control Switch, 2-CS-252-2201, in PULL TO LOCK. (2) Place Unit 2 RCP Bus Feeder Breaker Control Switch, 1-CS-252-1202, in PULL TO LOCK. 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** isolate the 13 KV Bus power supplies to **ALL** RCPs: a. Place Unit 2 RCP Bus Feeder Breaker Control Switch, 2-CS-252-2201, in PULL TO LOCK. b. Place Unit 2 RCP Bus Feeder Breaker Control Switch, 1-CS-252-1202, 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: • Loss of breaker position indication: • Normal power supply to the 21A and 22A RCP's • 21, 22, 25, and 26 4 KV Buses • 21A, 21B, 22A, and 22B 480 Volt Buses • Loss of Unit 2 Annunciation • 2A DG field flash and control power lose power and the start solenoids fail shut • Channel A ESFAS and AFAS Actuation Cabinets de-energized • Channel ZD ESFAS and AFAS Sensor Cabinets de-energized (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS

A.8 (continued)
• Channel B CSAS and SGIS will **NOT** actuate the following:
  • 21 SGFP
  • 22 SGFP
  • 21 CBP
  • 22 CBP
  • 23 CBP
  • 21 HDT PP
  • 22 HDT PP
• Channel A RPS Cabinet de-energized
• Channel A PAMS de-energized
• 21 MSIV loses position indication, but can still be closed from 2C03
• IA downstream of the CNTMT IA Control Valve, 2-IA-2085-CV isolated
• Loss of quick open signal to the Turbine Bypass Valves **AND** loss of quick open signal and auto control of ADVs
• CC CNTMT SUPP valve, 2-CC-3832-CV fails shut
• 22 SG AFW MAIN STM SUPP valve, 2-MS-4071-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
• 21 CC and 21 ECCS Pump Room HX SW outlet valves fail open
• 21 SRW HX SW valves fail to their full HX flow positions
• AUX SPRAY valve, 2-CVC-517, fails shut
(continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A.8 (continued) • CNTMT High Range Monitor Channel A, 2-RI-5317A, out of service. • CNTMT Area Rad Monitor, 2-RI-5316A, out of service. • 21 Main Steam Effluent Rad Monitor, 2-RIC-5421, out of service. • RCP CBO INBD ISOL, 2-CVC-506-CV, fails shut • 11 and 12 POST LOCI FILTER FANs start **CAUTION** **All PZR spray flowpaths will be inoperable after the RCP's are tripped.** 9. Operate PZR Backup and Proportional Heaters as necessary to maintain RCS pressure between 1850 and 2275 PSIA. a. **IF** 21 Proportional Heater is to be turned off, **THEN** locally trip 21 PZR Heater Proportional Controller Breaker 52-2130. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 10. Operate Charging Pumps to maintain PZR level between 80 and 180 inches: a. **IF** 21 CHG Pump is to be stopped, **THEN** locally trip 21 CHG Pump Breaker 52-2115. b. **IF** 23 CHG Pump is supplied from 21 480 Volt Bus, **THEN** locally trip 23 CHG Pump Breaker 52-2104, and align its power supply to the 24A 480 Volt Bus **PER** OI-27D, Station Power 480 Volt System. c. Shut the L/D CNTMT ISOL valves: • 2-CVC-515-CV • 2-CVC-516-CV 11. Shift ATMOSPHERIC STEAM DUMP CONTR, 2-HIC-4056, to MANUAL and operate the ADVs, as necessary, to control RCS temperature. 12. Place the CC CNTMT SUPP valve, 2-HS-3832, to CLOSE. 13. Start 21 and 22 SW AIR COMPRs. 14. Throttle 21 SW Pump Discharge Valve, 2-SW-104, to maintain 21 SW Pump discharge pressure between 15 and 30 PSIG as indicated at the pump discharge pressure gauge. 15. Trip 21 IA Compressor Breaker 52-2118. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued)	
	NOTE Due to 22 SG AFW MAIN STM SUPP & BYP valves, 2-MS-4071-CV, and 2-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 Steam Train Flow Control Valves, 2-AFW-4511 and 2-AFW-4512, fail open on loss of power.
16. Initiate Motor train AFW flow:	16.1 Initiate Steam train AFW flow:
a. Start 23 AFW Pump.	a. Shut the inlet isolation valves to the Steam Train Flow Control Valves: • (2-AFW-4511-CV) 2-AFW-162 • (2-AFW-4512-CV) 2-AFW-164
b. Maintain SG levels between (-)170 and (+)30 inches.	b. Open the 21 SG AFW MAIN STM SUPP & BYP valves, 2-MS-4070-CV and 2-MS-4070A-CV.
c. **IF** the AFW Steam train is in operation, **THEN** secure the AFW Steam train.	c. Throttle open the bypass valves to the Steam Train Flow Control Valves to maintain SG levels between (-)170 and (+)30 inches. • (2-AFW-4511-CV) 2-AFW-163 • (2-AFW-4512-CV) 2-AFW-165
(continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) **NOTE** The 21 Condensate Pump, 21 and 22 CBP, 21 HDP, and 21 SGFP have lost **ALL** protective trips and remote trip functions. 17. Secure Main Feedwater System lineup: a. Trip 22 SGFP. b. Locally trip 21 SGFP. c. Locally trip 21 HDT PP at Breaker 152-2206 by depressing the TRIP pushbutton. d. Stop 22 HDT PP. e. Locally trip 21 and 22 CBPs at their respective breakers by depressing the TRIP pushbuttons: • (21 CBP) 152-2204 • (22 CBP) 152-2205 f. Place **ALL** CBP handswitches in PULL TO LOCK. g. Locally trip 21 COND PP at Breaker 152-2207 by depressing the TRIP pushbutton. h. Operate 22 or 23 COND PPs as necessary. i. Place 21 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. 18. 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 19. **IF** 11 or 12 RC Waste Evaporator was running, **THEN** secure it concurrently **PER** OI-17E, Reactor Coolant Waste Evaporator Operation. 20. 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)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 21. De-energize PAMS Channel A: a. Open 2Y01-1 Breaker 27, RUN PAMS SYSTEM CABINETS 2C182A & 2PAMSA VIA 2X2P93-1 & 2P93. b. Open 2Y01-1 Breaker 28, RUN PAMS SYSTEM CABINET 2C144A VIA 2X2P93-2 & 2P93. c. Ensure open 2Y01-1 Breaker 25, STARTUP PAMS SYSTEM CABINETS 2C182A & 2PAMSA VIA 2X2P93-1 & 2P93. d. Ensure open 2Y01-1 Breaker 26, STARTUP PAMS SYSTEM CABINET 2C144A VIA 2X2P93-2 & 2P93. 22. 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-Teat 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 (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 23. Monitor 21 SRW Head Tank level. a. **IF** 21 SRW Head Tank level is rising excessively, **THEN** manually control level: (1) Shut 21 SRW Head Tank Level Control Valve Inlet, 2-SRW-104. (2) Open 21 SRW Head Tank Level Control Valve Bypass Valve, 2-SRW-106, as necessary to maintain level. 24. Monitor CC Head Tank level. a. **IF** the CC Head Tank level is rising excessively, **THEN** manually control level: (1) Shut the 2-CC-3820-CV Inlet Isolation Valve, 2-CC-107. (2) Open the 2-CC-3820-CV Bypass Valve, 2-CC-108, as necessary to maintain level 25. Stop the Unit 2 Containment Radiation Monitor pump. 26. 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 2Y01 from the Inverter Backup Bus 2Y11 **PER** OI-26B, 120 Volt Vital AC and Computer AC. 4. **WHEN** power is restored to 2Y01, **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 2Y01-1 Breaker 25, STARTUP PAMS SYSTEM CABINETS 2C182A & 2PAMSA VIA 2X2P93-1 & 2P93. (2) Close 2Y01-1 Breaker 27, RUN PAMS SYSTEM CABINETS 2C182A & 2PAMSA VIA 2X2P93-1 & 2P93. (3) Open 2Y01-1 Breaker 25, STARTUP PAMS SYSTEM CABINETS 2C182A & 2PAMSA VIA 2X2P93-1 & 2P93. (4) Close 2Y01-1 Breaker 26, STARTUP PAMS SYSTEM CABINET 2C144A VIA 2X2P93-2 & 2P93. (5) Close 2Y01-1 Breaker 28, RUN PAMS SYSTEM CABINET 2C144A VIA 2X2P93-2 & 2P93. (6) Open 2Y01-1 Breaker 26, STARTUP PAMS SYSTEM CABINET 2C144A VIA 2X2P93-2 & 2P93. g. Check the "PZR CH X LVL" alarm clear and place the PZR HTR LO LVL CUTOFF SEL switch to X/Y. h. On 2C32, restore the RCS Loop 21 instruments to RRS Channel Y by placing switch S1 to ON. 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. (continue)	

XI. 11 125 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 11 125 Volt DC Bus, **THEN** energize the bus **PER** OI-26A, 125 Volt Vital DC. 7. Energize 2Y01 from 21 Inverter **PER** OI-26B, 120 Volt Vital AC and Computer AC. 8. **WHEN** power has been restored, **THEN** restore plant systems to normal: a. Restore SRW Head Tank level control to normal: (1) Open 21 SRW Head Tank Level Control Valve Inlet, 2-SRW-104. (2) Shut 21 SRW Head Tank Level Control Valve Bypass Valve, 2-SRW-106. b. Restore CC Head Tank level control to normal: (1) Open the 2-CC-3820-CV Inlet Isolation Valve, 2-CC-107. (2) Shut the 2-CC-3820-CV Bypass Valve, 2-CC-108. c. Restore IA Header to normal **PER** OI-19, Instrument Air. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.8 (continued) **NOTE** 2-HS-2085 is located on the West wall of the 27 ft Switchgear Room and is operated by a T112 key (#80 from the Control Room Key Locker). The TBO key ring also has a T112 key. d. Open the Containment Instrument Air Supply Valve, 2-IA-2085-CV, by momentarily placing 2-HS-2085 in OPEN. e. Restore letdown **PER** OI-2A, Chemical and Volume Control System. f. Stop 21 and 22 SW AIR COMPRs. 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: • 21A RCP:____° F/____° F • 21B RCP:____° F/____° F • 22A RCP:____° F/____° F • 22B RCP:____° F/____° F (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.8.g (continued) **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 SUPP valve, 2-CC-3832-CV. (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, 2-CC-284, located in the 5 ft East Penetration Room. (b) Open CC CNTMT SUPP valve, 2-CC-3832-CV. (c) Slowly open 2-CC-284 to restore component cooling flow. (continue)	

XI. 11 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.8 (continued) h. Restore 21 SW header to normal. **NOTE** Steps (1) and (2) must be performed concurrently. (1) Slowly open 21 SW Pump Discharge Valve, 2-SW-104. (2) Maintain 21 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, 2-HIC-5206. (3) Lock open 21 SW Pump Discharge Valve, 2-SW-104. (4) Verify 21 CC and 21 ECCS Pump Room HX SW outlet valves are restored. (5) Verify 21 SRW HX SW valves are restored. (6) Restart the 21A/21B SRW HX Strainer Timer by placing the MODE SELECTOR switch, 2-HS-5148A at 2C200, 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: • 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, 2-RI-5317B, out of service. • CNTMT Area Rad Monitor, 2-RI-5316C, out of service 2. De-energize the following components: a. ESFAS Sensor Cabinet ZF **PER** OI-34, Engineered Safety Features Actuation System. b. 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. c. 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.	
B. RESTORE POWER TO THE BUS.	
1. Determine the cause of the loss of power to the bus. 2. Energize 2Y03 from the inverter backup Bus 2Y11 **PER** OI-26B, 120 Volt Vital AC and Computer AC. (continue)	

XII. 12 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B. (continued) 3. **WHEN** power is restored to 2Y03, **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 • 3.7.3, Auxiliary Feedwater System 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 2Y03 on 23 Inverter **PER** OI-26B, 120 Volt Vital AC and Computer AC. 8. On 2C15, 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 PZR 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 PZR LVL CH SEL switch is in the 110X position. 4. Verify that the PZR HTR LO LVL CUTOFF SEL switch is in the X position. **NOTE** Switch S2 is located inside the RRS Test Panel Drawer at 2C31 5. Isolate RCS Loop 22 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 de-energized.** 6. **IF** the Reactor is critical, **THEN** perform the following actions: a. Station personnel at 2C05 and 2C02. 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. On 2C06, trip 21A and 22A RCPs. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A.6 (continued) **WARNING** **A Safety Observor, if available, should be stationed when working on energized equipment.** f. Dispatch an operator to locally trip the 21B and 22B RCP breakers located in the 45 Foot Switchgear Room. • (21B RCP) 252-23P01: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button • (21B RCP) 252-23P02: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button • (22B RCP) 252-24P01: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button • (22B RCP) 252-24P02: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button g. 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**, with the approval of the SM or CRS, perform the following actions. a. On 2C06, trip 21A and 22A RCPs. **WARNING** **A Safety Observor, if available, should be stationed when working on energized equipment.** b. Dispatch an operator to locally trip the 21B and 22B RCP breakers located in the 45 Foot Switchgear Room. • (21B RCP) 252-23P01: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button • (21B RCP) 252-23P02: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button • (22B RCP) 252-24P01: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button • (22B RCP) 252-24P02: • Remove the CLOSE CIR fuses • Push the PUSH TO TRIP button c. Determine the appropriate emergency response actions **PER** the ERPIP. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS

A. (continued)
 	
8. The following components will be affected by the loss of the bus:
 	
• **ALL** Unit 1 Annunciator lights de-energized (Status Panels remain energized)
 	
• Loss of breaker position indication:
 	
  • Normal power supply to the 21B and 22B RCPs
 	
  • 21 and 22 13 KV Buses
 	
  • 23 and 24 4 KV Buses
 	
  • 23A, 23B, 24A and 24B 480 Volt Buses
 	
• Loss of 2B DG field flash and control power; the start solenoids fail shut
 	
• 21B and 22B RCPs are untrippable from 2C06
 	
• CC CNTMT RTN valve, 2-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
 	
• Channel ZE ESFAS and AFAS Sensor Cabinets de-energized
 	
• Channel B RPS Cabinet de-energized
 	
• Channel B PAMS de-energized
 	
• 21 SG AFW MAIN STM SUPP valve, 2-MS-4070-CV, fails shut
 	
(continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A.8 (continued) • Turbine Bypass Valves fail shut **AND** loss of quick open signal and auto control of ADVs • 22 CC and 22 ECCS Pump Room HX SW valves fail open • 22 SRW HX SW valves fail to their full HX flow positions • Loss of letdown due to 2-CVC-516-CV failing shut • CNTMT Area Rad Monitor, 2-RI-5316B, out of service • 22 Main Steam Effluent Rad Monitor, 2-RIC-5422, out of service • 22 MSIV loses position indication, but can still be closed from 2C03 • RCP CBO OUTBD ISOL, 2-CVC-505-CV, fails shut (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued)	**CAUTION** **If the difference between the PZR 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.	9.1 **IF** RCS pressure is greater than 2275 PSIA, **THEN** initiate AUX SPRAY.
a. **IF** 22 Proportional Heater is to be turned off, **THEN** locally trip NO. 22 PZR Heater Proportional Controller Breaker, 52-2430.	a. Record the following information: • PZR WTR TEMP (2-TI-101) • CHG OUT TEMP (2-TI-229)
	b. Open the AUX SPRAY valve, 2-CVC-517-CV.
	c. Operate the LOOP CHG valves as necessary to adjust AUX SPRAY flow: • 2-CVC-518-CV • 2-CVC-519-CV
	d. Shift the PZR SPRAY VLV CONTR, 2-HIC-100, to MANUAL.
	e. Shut the PZR SPRAY VLVs by adjusting the output of 2-HIC-100 to 0%: • 2-RC-100E-CV • 2-RC-100F-CV
(continue)	(continue)

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A.9 (continued)	A.9.1 (continued) f. **WHEN** AUX SPRAY is **NO** longer needed, **THEN** perform the following actions: (1) Open LOOP CHG valves: • 2-CVC-518-CV • 2-CVC-519-CV (2) Shut AUX SPRAY valve, 2-CVC-517-CV.
10. Operate Charging Pumps to maintain PZR level between 80 and 180 inches: a. **IF** 22 CHG Pump is to be stopped, **THEN** locally trip 22 CHG Pump Breaker 52-2415. b. **IF** 23 CHG Pump is supplied from 24 480 Volt Bus, **THEN** locally trip 23 CHG Pump Breaker 52-2404 and align its power supply from the 21A 480 Volt Bus **PER** OI-27D, Station Power 480 Volt System. c. Shut the L/D CNTMT ISOL valves: • 2-CVC-515-CV • 2-CVC-516-CV	
11. Shift ATMOSPHERIC STEAM DUMP CONTR, 2-HIC-4056, to MANUAL and operate the ADVs, as necessary, to control RCS temperature.	
12. Place the CC CNTMT RTN valve, 2-HS-3833 to CLOSE.	
13. Start 21 and 22 SW AIR COMPRs.	
(continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued)	
14. Throttle 22 SW Pump Discharge Valve, 2-SW-108, to maintain 22 SW Pump discharge pressure between 15 and 30 PSIG as indicated at the pump discharge pressure gauge.	
15. Trip 22 IA Compressor Breaker 52-2418.	
16. Trip 21 PA Compressor Breaker 52-2423.	
NOTE Due to 21 SG AFW MAIN STM SUPP & BYP valves, 2-MS-4070-CV, and 2-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 Motor Train Flow Control Valves, 2-AFW-4525 and 2-AFW-4535, fail open on loss of power.
17. Initiate Steam train AFW flow:	17.1 Initiate Motor train AFW flow:
a. Open the 22 SG AFW MAIN STM SUPP & BYP valves, 2-MS-4071-CV, and 2-MS-4071A-CV.	a. Shut the inlet isolation valves to the motor train flow control valves: • (2-AFW-4525-CV) 2-AFW-197 • (2-AFW-4535-CV) 2-AFW-198
b. Maintain SG levels between (-)170 and (+)30 inches.	b. Manually start 23 AFW Pump by depressing the CLOSE pushbutton at 23 AFW Pump Breaker 152-2415.
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. • (2-AFW-4525-CV) 2-AFW-195 • (2-AFW-4535-CV) 2-AFW-196

(continue)

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) **NOTE** The 22 and 23 Condensate Pumps, 23 CBP, 22 HDP, and 22 SGFP have lost **ALL** protective trips and remote trip functions. 18. Secure Main Feedwater System lineup: a. Trip 21 SGFP. b. Locally trip 22 SGFP. c. Locally trip 22 HDT PP at Breaker 152-2306 by depressing the TRIP pushbutton. d. Stop 21 HDT PP. e. Locally trip 23 CBP at Breaker 152-2304 by depressing the TRIP pushbutton. f. Place **ALL** CBP handswitches in PULL TO LOCK. g. Locally trip 22 and 23 COND PP at their respective breakers by depressing the TRIP pushbuttons: • (22 COND PP) 152-2307 • (23 COND PP) 152-2308 h. Operate 21 COND PP as necessary. i. Place 22 and 23 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. 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-2 Main Generator Field Breaker located inside Panel 2E01 at the south end of the Turbine Building, 12 Foot elevation. 21. **IF** the Turbine was paralleled to the grid, **THEN** open the Turbine Generator Output breakers: • 21 GEN BUS BKR, 0-CS-552-61 • 21 GEN TIE BKR, 0-CS-552-63 22. **IF** 11 or 12 RC Waste Evaporator was running, **THEN** secure it **PER** OI-17E, Reactor Coolant Waste Evaporator Operation. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 23. 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 24. De-energize PAMS Channel B: a. Open 2Y02-1 Breaker 33, RUN PAMS SYSTEM CABINETS 2C182B & 2PAMSB VIA 2X2P94-1 & 2P94. b. Open 2Y02-1 Breaker 34, RUN PAMS SYSTEM CABINET 2C144B VIA 2X2P94-2 & 2P94. c. Ensure open 2Y02-1 Breaker 31, STARTUP PAMS SYSTEM CABINETS 2C182B & 2PAMSB VIA 2X2P94-1 & 2P94. d. Ensure open 2Y02-1 Breaker 32, STARTUP PAMS SYSTEM CABINET 2C144B VIA 2X2P94-2 & 2P94. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 25. 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 26. Stop the Unit 2 Containment Radiation Monitor pump. 27. Monitor 22 SRW Head Tank level. a. **IF** 22 SRW Head Tank level is rising excessively, **THEN** manually control level: (1) Shut 22 SRW Head Tank Level Control Valve Inlet, 2-SRW-112. (2) Open 22 SRW Head Tank Level Control Valve Bypass Valve, 2-SRW-114, as necessary to maintain level. 28. 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 2Y02 from the Inverter Backup Bus 2Y11 **PER** OI-26B, 120 Volt Vital AC and Computer AC. 4. **WHEN** power is restored to 2Y02, **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 switch 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. e. Energize AFAS Actuation Logic Cabinet BL **PER** OI-32B, AFAS System Operation. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.4 (continued) f. Energize PAMS Channel B: (1) Close 2Y02-1 Breaker 31, STARTUP PAMS SYSTEM CABINETS 2C182B & 2PAMSB VIA 2X2P94-1 & 2P94. (2) Close 2Y02-1 Breaker 33, RUN PAMS SYSTEM CABINETS 2C182B & 2PAMSB VIA 2X2P94-1 & 2P94. (3) Open 2Y02-1 Breaker 31, STARTUP PAMS SYSTEM CABINETS 2C182B & 2PAMSB VIA 2X2P94-1 & 2P94. (4) Close 2Y02-1 Breaker 32, STARTUP PAMS SYSTEM CABINET 2C144B VIA 2X2P94-2 & 2P94. (5) Close 2Y02-1 Breaker 34, RUN PAMS SYSTEM CABINET 2C144B VIA 2X2P94-2 & 2P94. (6) Open 2Y02-1 Breaker 32, STARTUP PAMS SYSTEM CABINET 2C144B VIA 2X2P94-2 & 2P94. g. On 2C31, restore RCS Loop 22 instruments to RRS Channel X by placing switch S2 to ON. h. Check the "PZR CH Y LVL" alarm clear and place the PZR HTR LO LVL CUTOFF SEL switch to X/Y. 5. **IF** the bus can **NOT** be restored, **THEN** refer to 2E-24 and Appendix B of ES-013, Loss of Power Effect/Load List, to determine equipment affected. (continue)	

XIII. 21 125 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 21 125 Volt DC Bus, **THEN** energize the bus **PER** OI-26A, 125 Volt Vital DC. 7. Energize 2Y02 from 22 Inverter **PER** OI-26B, 120 Volt Vital AC and Computer AC. 8. **WHEN** power has been restored, **THEN** restore plant systems to normal: a. Restore SRW Head Tank level control to normal: (1) Open 22 SRW Head Tank Level Control Valve Inlet Valve, 2-SRW-112. (2) Shut 22 SRW Head Tank Level Control Valve Bypass Valve, 2-SRW-114. b. Restore IA Header to normal **PER** OI-19, Instrument Air. c. Stop 21 and 22 SW AIR COMPRs. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.8 (continued) **NOTE** 2-HS-2085 is located on the West wall of the 27 ft Switchgear Room and is operated by a T112 key (#80 from the Control Room Key Locker). The TBO key ring also has a T112 key. d. Open the Containment Instrument Air Supply Valve, 2-IA-2085-CV, by momentarily placing 2-HS-2085 in OPEN. e. Restore letdown **PER** OI-2A, Chemical and Volume Control System. 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: • 21A RCP:____° F/____° F • 21B RCP:____° F/____° F • 22A RCP:____° F/____° F • 22B RCP:____° F/____° F (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.8.f (continued) **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 RTN valve, 2-CC-3833-CV. (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, 2-CC-284, located in the 5 ft East Penetration Room. (b) Open CC CNTMT RTN valve, 2-CC-3833-CV. (c) Slowly open 2-CC-284 to restore component cooling flow. (continue)	

XIII. 21 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.8 (continued) g. Restore 22 SW header to normal. **NOTE** Steps (1) and (2) must be performed concurrently. (1) Slowly open 22 SW Pump Discharge Valve, 2-SW-108. (2) Maintain 22 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, 2-HIC-5208. (3) Lock open 22 SW Pump Discharge Valve, 2-SW-108. (4) Verify 22 CC and 22 ECCS Pump Room HX SW outlet valves are restored. (5) Verify 22 SRW HX SW valves are restored. (6) Restart the 22A/22B SRW HX Strainer Timer by placing the MODE SELECTOR switch, 2-HS-5158A at 2C201, 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: • 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, 2-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 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 (continue)	

XIV. 22 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
A. (continued) 4. Determine the appropriate emergency response actions **PER** the ERPIP.	
B. RESTORE POWER TO THE BUS.	
1. Determine the cause of the loss of power to the bus. 2. Energize 2Y04 from the inverter backup Bus 2Y11 **PER** OI-26B 120 Volt Vital AC and Computer AC. 3. **WHEN** power is restored to 2Y04, **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. (continue)	

XIV. 22 125 VOLT DC BUS

ACTIONS	ALTERNATE ACTIONS
B.3 (continued) c. AFAS Sensor Cabinet ZG **PER** OI-32B, AFAS System Operation. 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 2Y04 on 24 Inverter **PER** OI-26B, 120 Volt Vital AC and Computer AC. 8. On 2C15, 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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	B.4.j Energize PAMS CH. A		
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	B.4.e Energize ESFAS logic		
	B.4.f Energize AFAS sensor ZE		
	B.4.g Energize AFAS logic		
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	B.4.k Reset RMS alarms		
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	B.3.c	Energize AFAS sensor ZG		
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CALVERT CLIFFS NUCLEAR POWER PLANT

UNIT ONE

OI-21A

1A DIESEL GENERATOR

REVISION 20

SAFETY RELATED

CONTINUOUS USE

Approval Authority: Tim Riti

Effective Date: 1/15/2008

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ATTACHMENT 1G, PAGES 1 - 2	
ATTACHMENT 1H, PAGE 1	
ATTACHMENT 2A, PAGES 1 - 2	
ATTACHMENT 2B, PAGES 1 - 2	
ATTACHMENT 2C, PAGES 1 - 2	
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ATTACHMENT 2E, PAGE 1	

PROCEDURE ALTERATIONS

PAGES	REV/CHG
56-59,124,125	02000

1.0 PURPOSE

This procedure provides the prerequisites, precautions, and instructions for the starting, loading, and shutdown operation of 1A Diesel Generator and associated auxiliary systems.

2.0 APPLICABILITY/SCOPE

A. This procedure provides specific instructions for operation of 1A Diesel Generator during startup, operation, and standby modes.

B. This procedure provides specific instructions for operation of 1A Diesel Generator auxiliary and support systems.

C. Conditional steps may be marked N/A if the condition does not exist or apply.

3.0 REFERENCES AND DEFINITIONS

3.1 DEVELOPMENTAL REFERENCES

A. Procedures

1. Technical Procedure Writer's Manual
2. MN-1-110, Troubleshooting and Procedure Controlled Activities
3. Wartsila SACM Operation and Maintenance Manual
4. Wartsila SACM Electrical Wiring Diagram Local Control Panel (ACC) #18002-0083 Sh. 1 - 189
5. CCNPP Technical Specifications

3.1 DEVELOPMENTAL REFERENCES (Continued)

B. P&IDs

1. 61-007-E Sh. 1, METER AND RELAY DIAGRAM 4KV SYSTEM UNIT BUS 17
2. 61-010-E Sh. 2, METER AND RELAY DIAGRAM 480V SYSTEM UNIT BUS 17
3. 61-027-E Sh. 1, DIESEL GENERATOR 1A 480V MCC 123
4. 61-027-E Sh. 2, DIESEL GENERATOR 1A 480V MCC 124
5. 61-035-E Sh. 2, LOGIC DIAGRAM DIESEL GENERATOR 1A
6. 62-426-E, COOLANT DRAINS AND DEMINERALIZED WATER SYSTEM
7. 62-429-E Sh. 1 and 2, HVAC SYSTEMS
8. 62-430-E Sh. 1 and 2, LUBE OIL SYSTEM
9. 62-431-E Sh. 1 and 2, COMBUSTION AIR INTAKE AND EXHAUST
10. 62-437-E, FUEL OIL STORAGE & TRANSFER SYSTEM
11. 62-438-E, GENERATOR AND MISCELLANEOUS INSTRUMENTATION
12. 62-467-E Sh. 1 and 2, STARTING AIR SYSTEM
13. 62-468-E Sh. 1 and 2, HT COOLING WATER SYSTEM
14. 62-469-E Sh. 1 and 2, LT COOLING WATER SYSTEM
15. 62-470-E, LUBE OIL DRAIN SYSTEM
16. 62-471-E Sh. 1 and 2, FUEL OIL SYSTEM

3.2 PERFORMANCE REFERENCES

A. 1C188-ALM, 1A DG Local Control Panel Alarm Manual

B. CH-1-100, Controlled Materials Management

C. CH-1-101, Hazardous Waste Management

D. NO1-103, Conduct of Lower Mode Operations

E. NO-1-205, Locked Valves

F. OI-22M, 1A and 0C DG Building HVAC

G. OI-26A, 125 Volt Vital DC

3.2 PERFORMANCE REFERENCES (Continued)

H. OI-27C, 4.16KV System

I. OI-27D, Station Power 480 Volt System

J. OI-49, Operability Verification

3.3 DEFINITIONS

A. SACM - Societe Alsacienne de Constructions Mechanices de Mulhouse (Mulhouse, France)

B. MRD - Maintenance and Reliability Diagnostics Monitoring System

C. Unloaded Operation - operation of the genset with load less than 1.620 MW.

D. Reset mode - isochronous operation without speed control. Used when **NOT** parallel to offsite power.

E. Parallel mode - operation providing load control. Automatically selected when the 1A DG output breaker is closed with the Normal or Alternate feeder breaker supplying 11 4KV Bus (152-1101 or 152-1115).

F. Transfer mode - parallel mode with non-essential trips bypassed. Used during transfer of 11 and 17 4KV Buses from 1A DG power to the Normal or Alternate power source.

G. Cleanout - operation of the DG with at least 2.700 MW load to clean accumulated carbon residue from the engine cylinders and exhaust piping due to low load or unloaded operation.

H. Elective maintenance - any activity to repair or maintain equipment where the equipment is operable/fully functional prior to performing the activity. Surveillance testing is **NOT** considered maintenance for this purpose.

4.0 PREREQUISITES

A. A pre-evolution briefing should be held as determined by the CRS **OR** Shift Manager.

B. The 1A DG Building HVAC shall be in service **PER** OI-22M, 1A AND 0C DG BUILDING HVAC, prior to operating 1A DG.

C. Prerequisites will vary depending on which section of the procedure is being performed. Prerequisites for each section are listed as Initial Conditions at the beginning of each applicable section.

5.0 PRECAUTIONS

A. Hearing protection shall be worn in marked areas of the 1A DG Building during engine operation.

5.0 PRECAUTIONS (Continued)

B. 1A DG load shall **NOT** exceed the following limitations during normal operations:

- 5.4 MW
- 500 KVARS
- 752 AMPS

C. The HT **AND** LT Coolant Systems contain propylene glycol and water. Any leakage from these systems shall be collected **AND** handled as a controlled waste that can **NOT** be discharged to the environment.

D. Locked valves are controlled by NO-1-205.

E. Manual operation of 4KV disconnects should be performed by two people who are, as a minimum, qualified Turbine Building Operators. One Operator shall perform the switching. The second Operator shall act as an observer to ensure the operation is performed correctly. Prior to operation of a disconnect, the person performing the switching must demonstrate to the observer that they are operating the correct disconnect and that they have satisfied the following conditions:

- The breaker handswitch associated with the disconnect to be operated is in PULL-TO-LOCK.
- The breakers associated with the disconnects to be operated are open.

F. Whenever the 1A Diesel is started during non-emergency conditions, it should be loaded within one hour. Unloaded operation beyond one hour shall be minimized and approved by the Shift Manager. **[B0257]**

G. For emergency conditions, the 1A DG can operate, with only DG support loads, up to 7 days without engine damage. **[B0646]**

H. The 1A DG is considered OPERABLE with ONE radiator fan on each engine removed from service PROVIDED outside air temperature is LESS THAN 85.5° F at Tech Spec Load of 4.0 MW. The 1A DG can operate at 100% load with a total of ONE radiator fan removed from service PROVIDED outside air temperature is LESS THAN 59.5° F. **[B0513]**

5.0 PRECAUTIONS *(Continued)*

I. Prior to taking 1A DG out of service, EXCEPT for short periods, the CRS or Shift Manager must perform the following actions: **[B0138]** (Basis INPO SER 10-91 Loss of Offsite Power due to Switchyard Testing)

- Contact the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts.

- Determine whether other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

- **IF** 1A DG will be out of service at the same time reliability of the offsite power supplies is reduced,
  THEN the Shift Manager will determine how to minimize both the time 1A DG is out of service **AND** the time that offsite power supplies are at reduced reliability.

- **IF** in Lower Mode Operation,
  THEN ENSURE the requirements of the applicable Minimum Essential Equipment section of NO-1-103, Conduct of Lower Mode Operations, are satisfied. **[B0138]**

5.0 PRECAUTIONS (Continued)

J. In Modes 1, 2, 3, and 4, to ensure defense in depth, the following actions should be performed anytime 1A DG is out of service for greater than 72 hours, **AND SHALL** be performed prior to removing 1A DG from service for elective maintenance greater than 72 hours. **[B0906]**

NOTE
Patuxent River Naval Air Station is the preferred source for the weather report. However, any government sponsored weather agency may be used.

- Weather conditions will be evaluated within 12 hours prior to removing 1A DG from service. 1A DG will **NOT** be removed from service if official weather forecasts are predicting severe conditions for CCNPP or any of the 500 KV transmission lines rights of way.
  - Severe Thunderstorm
  - Gale/High Wind - greater than 50 mph
  - Tornado
  - Hurricane
  - Blizzard
  - Ice Storm
- The ESOP Outage Scheduler or SO-TSO will be contacted within 12 hours prior to removing 1A DG from service and after it has been returned to service.

  1. Ensure 1A DG will **NOT** be out of service when grid stress conditions are considered "high".
     - 5051, 5052 and 5072 circuits are in service.
     - PJM is **NOT** in a Warning or implementing an Emergency Action for capacity shortages.
       - Primary Reserve - Warning
       - Voltage Reduction - Warning or Action
       - Manual Load Dump - Warning or Action
       - Maximum Emergency Generation - Action
     - PJM is **NOT** in Conservative Operations.
       - Thunderstorms
       - Solar Magnetic Disturbances
       - Crisis Response
       - Heavy Load, Low Voltage - Warning or Action
       - Post Contingency Local Load Relief Warning that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard
     - **NO** other known condition exists on the PJM or BGE system at this time that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard.

5.0.J **PRECAUTIONS (Continued)**

2. Determine that **NO** other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

- **NO** elective maintenance will be performed in the switchyard, on the 4 KV Distribution System, or on the 13 KV Distribution System.

NOTE
The Unit-1 AFW system includes 23 AFW pump and its cross-tie.

- Planned maintenance or testing will **NOT** be performed on the Unit-1 AFW System.
- **NO** maintenance or testing that affects the reliability of Unit-1 B train will be scheduled. If testing or maintenance activities must be performed, a Risk Assessment Evaluation will be performed according to NO-1-117, INTEGRATED RISK MANAGEMENT.
- Elective maintenance will **NOT** be performed on 0C DG. Personnel will be made aware of the dedication of 0C DG to 11 4KV Bus.
- The operations crews will be briefed concerning the unit activities, including compensatory measures established and the importance of promptly starting and aligning the 0C DG.
- The on-shift operations crew will discuss and review the appropriate normal and emergency operating procedures within 24 hours prior to or shortly after assuming the watch for the first time after having scheduled days off while 1A DG is out of service.
  - AOP-7I, LOSS OF 4KV, 480 VOLT OR 208/120 VOLT INSTRUMENT BUS POWER
  - EOP-0, POST-TRIP IMMEDIATE ACTIONS
  - EOP-2, LOSS OF OFFSITE POWER/LOSS OF FORCED CIRCULATION
  - EOP-7, STATION BLACKOUT
  - AOP-3F, LOSS OF OFFSITE POWER WHILE IN MODES 3, 4, 5 OR 6

6.0 PERFORMANCE

6.1 1A DG NORMAL STANDBY

A. Initial Conditions

1. 1A DG valve, switch, **AND** breaker alignments have been verified by completion of the following attachments:

   - ATTACHMENT 1A, 1A STARTING AIR SYSTEM VALVE LINEUP
   - ATTACHMENT 1B, 1A FUEL OIL SYSTEM VALVE LINEUP
   - ATTACHMENT 1C, 1A LUBE OIL SYSTEM VALVE LINEUP
   - ATTACHMENT 1D, 1A HT/LT COOLANT SYSTEM VALVE LINEUP
   - ATTACHMENT 1E, 1A COMBUSTION AIR INTAKE SYSTEM VALVE LINEUP
   - ATTACHMENT 1F, 1A DG SWITCH POSITION VERIFICATION
   - ATTACHMENT 1G, 1A DG LOCAL BREAKER POSITION VERIFICATION
   - ATTACHMENT 1H, 1A DG BUILDING MAINTENANCE AIR SYSTEM
   - ATTACHMENT 2A, 1A AIR START SYSTEM INSTRUMENT VALVE LINEUP
   - ATTACHMENT 2B, 1A FUEL OIL SYSTEM INSTRUMENT VALVE LINEUP
   - ATTACHMENT 2C, 1A LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP
   - ATTACHMENT 2D, 1A HT/LT COOLANT SYSTEM INSTRUMENT VALVE LINEUP
   - ATTACHMENT 2E, 1A COMBUSTION AIR INTAKE SYSTEM INSTRUMENT VALVE LINEUP

2. 1A DG Building HVAC is in operation **PER** OI-22M, 1A And 0C DG Building HVAC.

3. The 1A DG 125 VDC system is in operation **PER** OI-26A, 125 Volt Vital DC.

4. The 1A DG 4.16KV system is in operation **PER** OI-27C, 4.16KV System.

5. The 1A DG 480V switchgear **AND** MCCs are in operation **PER** OI-27D, Station Power 480 Volt System.

6.1 1A DG NORMAL STANDBY (Continued)

B. Procedure

NOTE

- Steps in this section may be performed in any order.
- The Load Shed Relay Position Verification light indicates that the 11 4KV bus feeder breaker indication switch is functioning properly. The light should be on when either bus feeder breaker is closed.

CAUTION

Damage to 1A DG may occur if an 11 4KV bus feeder breaker is closed **AND** the Load Shed Relay Position Verification light is **NOT** lit. Under this condition 1A DG may attempt to automatically load on 11 4KV bus.

1. **CHECK** the Load Shed Relay Position Verification light is illuminated on the 11 4KV Bus Auxiliary Cabinet.

2. **CHECK** the 1A DG annunciator panel as follows:

   a. **DEPRESS** LAMP TEST PB, 1-HS-10339, **AND CHECK** ALL alarm windows flash.

   b. **DEPRESS** ALARM RESET PB, 1-HS-10340, **AND CHECK** ALL windows **NOT** in valid alarm go out.

   c. **CHECK** that any valid alarms do **NOT** prevent the desired status of 1A DG (standby, startup, etc).

3. **IF** in operation,
   THEN CHECK the MRD System for any valid 1A DG alarms.

6.1.B Procedure (Continued)

4. **VERIFY** the following equipment in standby by observing the associated indicating light is illuminated on 1C188:
   - 1A1 RAD FAN SEL SW, 1-HS-10082, Green light
   - 1A2 RAD FAN SEL SW, 1-HS-10102, Green light
   - 1A1 FO B/U PP SEL SW, 1-HS-10051, Green light
   - 1A2 FO B/U PP SEL SW, 1-HS-10061, Green light
   - 1A1 PREHEAT PP SEL SW, 1-HS-10081, Red light
   - 1A2 PREHEAT PP SEL SW, 1-HS-10101, Red light
   - 1A1 PRELUBE PP SEL SW, 1-HS-10161, Red light
   - 1A2 PRELUBE PP SEL SW, 1-HS-10201, Red light
5. **VERIFY** the barring device handles are removed from the engines.
6. **VERIFY** Starting Air Oiler levels are greater than 1/4 full on each dipstick:
   - 1A1 Oiler 11 (B side)
   - 1A1 Oiler 12 (A side)
   - 1A2 Oiler 11 (A side)
   - 1A2 Oiler 12 (B side)

NOTE
Sump levels drop approximately 1 inch when 1A DG is running.

7. **VERIFY** Engine Oil Sump levels are within the normal shutdown range on the dipsticks:
   - 1A1 LO LVL IND, 1-LI-10165
   - 1A2 LO LVL IND, 1-LI-10204
8. **CHECK** Lube Oil temperatures for both engines greater than 80° F. (1-TI-10163, 1-TI-10161, 1-TI-10201 and 1-TI-10203)
9. **CHECK** HT Coolant System temperatures are at **OR** above 95° F:
   - 1A1 HT WTR OUT TEMP IND, 1-TI-10084
   - 1A2 HT WTR OUT TEMP IND, 1-TI-10104

6.1.B Procedure (Continued)

10. **IF** 1A1 **OR** 1A2 Starting Air Compressor is running,
THEN CHECK the following parameters on the running compressor(s) (66' level):

- Compressor lube oil pressure is greater than 30 psig:

Compr :	PI
1A1 :	1A1 SA LUBE PP DISCH PRESS IND, 1-PI-10250
1A2 :	1A2 SA LUBE PP DISCH PRESS IND, 1-PI-10280

NOTE
The hygrometer reading is accurate only after the compressor has operated a minimum of five minutes.

- The Starting Air Hygrometer is reading (-)45° F or colder:

Compr :	Hygrometer
1A1 :	1A1 STARTING AIR HYGROMETER, 1-MIS-10241
1A2 :	1A2 STARTING AIR HYGROMETER, 1-MIS-10271

- The air filter DP indicator is less than 3/4 of the indication:

Compr :	PDI
1A1 :	1A1-11 SA FILT DIFF PRESS IND, 1-PDI-10260
1A2 :	1A2-11 SA FILT DIFF PRESS IND, 1-PDI-10290

6.1.B Procedure (Continued)

11. **IF** 1A1 **OR** 1A2 Starting Air Compressor is **NOT** running, **THEN PERFORM** the following on the stopped compressor(s):

NOTE

The following annunciators will alarm when the switchs are taken out of AUTOMATIC:

- Local annunciator "SEL SWS NOT IN AUTO POSITION"
- Control Room annunciator "1A DG"

a. **NOTIFY** the Control Room to expect 1C18 and 1C18A, 1A DG common annunciator alarms.

b. **PLACE** the following Starting Air Compressor handswitches to OFF:

DG :	HANDSWITCH
1A1 :	1A1 SA COMPR, 1-HS-10241
1A2 :	1A2 SA COMPR, 1-HS-10271

c. **VERIFY** Starting Air Compressor crankcase oil level is between the FULL AND ADD marks.

d. **CHECK** compressor 3-stage pressures are zero:

Compr :	Pressure Ind.
:	1A1-11 SA I/CLR PRESS IND, 1-PI-10252
1A1 :	1A1-12 SA I/CLR PRESS IND, 1-PI-10251
:	1A1-13 SA COMPR DISCH PRESS IND, 1-PI-10253
:	1A2-11 SA I/CLR PRESS IND, 1-PI-10282
1A2 :	1A2-12 SA I/CLR PRESS IND, 1-PI-10281
:	1A2-13 SA COMPR DISCH PRESS IND, 1-PI-10283

6.1.B.11 Procedure (Continued)

e. **CHECK** air filter DP indicators are **NOT** tripped:

Compr :	PDI
1A1 :	1A1-11 SA FILT DIFF PRESS IND, 1-PDI-10260
1A2 :	1A2-11 SA FILT DIFF PRESS IND, 1-PDI-10290

f. **PLACE** the following Starting Air Compressor handswitches to AUTO:

DG :	HANDSWITCH
1A1 :	1A1 SA COMPR, 1-HS-10241
1A2 :	1A2 SA COMPR, 1-HS-10271

g. **ENSURE** 1C188, SEL SWS NOT IN AUTO POSITION annunciator alarm has cleared

NOTE
Draining may be skipped if multiple 1A DG starts are being performed.

12. **DRAIN** the 1A Dirty Fuel Oil Tank to a suitable container through 1A DIRTY FUEL OIL TANK DRAIN VALVE, 1A-DFO-74.

****** END ******

6.2 START 1A DG

6.2.1 1A DG EMERGENCY START FROM CONTROL ROOM

A. Initial Conditions

1. 1A DG is in Standby **PER** Section 6.1, 1A DG NORMAL STANDBY, Subsection A.

2. For testing only, 1A HT Coolant System temperatures are at or above 118° F.

B. Procedure **INITIALS**

1. **IF** the 1A DG is being started for testing,
THEN PERFORM 1A DG system checks **PER** Section 6.1, 1A DG NORMAL STANDBY, Subsection B. ____

NOTE
In a casualty situation **ONLY**, the 5 minute limit of no prelube can be extended to 30 minutes. **[B0255]**

2. **IF** the 1A AC Prelube Pumps are unavailable **AND** have been off longer than five minutes,
THEN OPERATE the 1A Pneumatic Prelube Pumps **PER** Section 6.7.5, OPERATE THE 1A PNEUMATIC PRELUBE PUMPS.
[B0255] ____

CAUTION
Non-essential trips are bypassed.

3. **DEPRESS** 1A DG EMERGENCY START, 1-HS-1707, pushbutton. ____

4. **CHECK** 1A DG reaches rated frequency (58.8 to 61.2 Hz) **AND** voltage (3.74 to 4.58KV).

   - 1A DG FREQUENCY, 1-SI-1701
   - 1A DG VOLTS, 1-EI-1701

5. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 1C188:

   - 1A1 HT RAD FAN SEL SW, 1-HS-10082 ____
   - 1A2 HT RAD FAN SEL SW, 1-HS-10102 ____
   - 1A1 FO B/U PP SEL SW, 1-HS-10051 ____
   - 1A2 FO B/U PP SEL SW, 1-HS-10061 ____

6.2.1.B Procedure (Continued) **INITIALS**

6. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 1C188:

   - 1A1 AC PRELUB PP SEL SW, 1-HS-10161 ____
   - 1A2 AC PRELUB PP SEL SW, 1-HS-10201 ____
   - 1A1 HT PRHT PP SEL SW, 1-HS-10081 ____
   - 1A2 HT PRHT PP SEL SW, 1-HS-10101 ____

7. **CHECK** 1A DG generator phase voltages are balanced (highest to lowest phase voltage difference is less than 400 volts). **[B0248]**

   - 1A DG VOLTS, 1-EI-1701

8. **IF** flags are dropped **AND** the associated 1C188 alarm is clear, **THEN RESET** the following relay flags in Panel 1C188 Cabinet 5: (N/A if flags are not dropped or alarm is not clear.) ____

ALARM:	"GENERATOR UNDERVOLTAGE [27]"
RELAY:	UNDERVOLTAGE PROTECTIVE RELAY, 1ESL 0997-27
ALARM:	"GENERATOR UNDERFREQ [81/U]"
RELAY:	UNDERFREQUENCY PROTECTIVE RELAY, 1SSL 0998-81.U

NOTE

After 30 minutes of unloaded operation (<1.620 MW), 1A DG should be run loaded for at least 1 hour at greater than or equal to 2.700 MW for cleanout.

9. **IF** 1A DG will be paralleled to the 11/17 4KV Bus, **THEN GO TO** Section 6.3, PARALLEL 1A DG TO THE 11/17 4KV BUS. ____

10. **IF** 1A DG is to be stopped, **THEN GO TO** Section 6.5.1, 1A DG NORMAL SHUTDOWN FROM CONTROL ROOM. ____

****** END ******

6.2.2 1A DG SLOW START FROM CONTROL ROOM

A. Initial Conditions

1. 1A DG is in Standby **PER** Section 6.1, 1A DG NORMAL STANDBY, Subsection A.

2. 1A HT Coolant Systems should be at **OR** above minimum preheat temperature of 118° F.

3. 1A HT Coolant System temperatures are above the 95° F slow start permissive.

4. 11/17 4KV Bus is powering 1A DG auxiliary equipment.

5. The AC prelube pump on each engine is operating for the prelube oil pressure start permissive. **[B0255]**

6. **IF** manual speed control below 1176 rpm (58.8 Hz) is required due to maintenance or testing,
THEN a temporary alteration is installed to prevent 1A DG from tripping on low coolant pump pressure two minutes after starting 1A DG.

B. Procedure

INITIALS

1. **PERFORM** 1A DG system checks **PER** Section 6.1, 1A DG NORMAL STANDBY, Subsection B. ____

2. **IF** manual speed control below 1176 RPM (58.8 Hz) is necessary due to maintenance or testing,
THEN PERFORM the following:

   a. **INSERT** the Sync Stick for 1A DG OUT BKR, 1-CS-152-1703 ____

NOTE

- The following local annunciators may momentarily alarm when 1A DG is slow started and then clear:

  (1) SL-20, "SPEED SIGNAL FAIL ENG 1 or 2"

  (2) SL-25, "ENG LOAD UNBALANCED FAILURE"

- The following annunciators will alarm when 1A DG is slow started:

  (1) Local annunciators "GENERATOR UNDRFREQ" and "GENERATOR UNDERVOLTAGE"

  (2) Control Room annunciator "1A DG"

   b. **DEPRESS** 1A DG SLOW START, 1-HS-1708, pushbutton. ____

6.2.2.B.2 **Procedure (Continued)** **INITIALS**

NOTE
Speed will continue to raise to 1200 rpm until speed control handswitch is operated.

c. **WHEN** 1A DG speed exceeds 700 RPM,
THEN ADJUST speed as desired using 1A DG SPEED CONTR, 1-CS-1705. ____

d. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 1C188:

- 1A1 HT RAD FAN SEL SW, 1-HS-10082 ____
- 1A2 HT RAD FAN SEL SW, 1-HS-10102 ____
- 1A1 FO B/U PP SEL SW, 1-HS-10051 ____
- 1A2 FO B/U PP SEL SW, 1-HS-10061 ____

e. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 1C188:

- 1A1 AC PRELUB PP SEL SW, 1-HS-10161 ____
- 1A2 AC PRELUB PP SEL SW, 1-HS-10201 ____
- 1A1 HT PRHT PP SEL SW, 1-HS-10081 ____
- 1A2 HT PRHT PP SEL SW, 1-HS-10101 ____

f. **WHEN** speed control for maintenance or testing is complete,
THEN PERFORM the following:

(1) **ADJUST** 1A DG to approximately 60 Hz using 1A DG SPEED CONTR, 1-CS-1705. ____

NOTE
1A DG remains at the "as-left" speed.

(2) **REMOVE** the Sync Stick. ____

(3) **REMOVE** the temporary alteration for bypassing the low coolant pressure trips. ____

g. IF parallel operation is desired,
THEN GO TO Step 7. ____

6.2.2.B.2 **Procedure (Continued)** **INITIALS**

h. **IF** 1A DG will be stopped,
THEN GO TO Section 6.5.1, 1A DG NORMAL SHUTDOWN FROM CONTROL ROOM. ____

NOTE

- The following local annunciators may momentarily alarm when 1A DG is slow started and then clear:
  a. SL-20, "SPEED SIGNAL FAIL ENG 1 or 2"
  b. SL-25, "ENG LOAD UNBALANCED FAILURE"
- The following annunciators will alarm when 1A DG is slow started:
  a. Local annunciators "GENERATOR UNDRFREQ" and "GENERATOR UNDERVOLTAGE"
  b. Control Room annunciator "1A DG"

3. **DEPRESS** 1A DG SLOW START, 1-HS-1708, pushbutton. ____

4. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 1C188:
   - 1A1 HT RAD FAN SEL SW, 1-HS-10082 ____
   - 1A2 HT RAD FAN SEL SW, 1-HS-10102 ____
   - 1A1 FO B/U PP SEL SW, 1-HS-10051 ____
   - 1A2 FO B/U PP SEL SW, 1-HS-10061 ____

5. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 1C188:
   - 1A1 AC PRELUB PP SEL SW, 1-HS-10161 ____
   - 1A2 AC PRELUB PP SEL SW, 1-HS-10201 ____
   - 1A1 HT PRHT PP SEL SW, 1-HS-10081 ____
   - 1A2 HT PRHT PP SEL SW, 1-HS-10101 ____

6.2.2.B Procedure (Continued) **INITIALS**

6. **IF** the engine driven fuel oil pump piping has been drained for maintenance **OR IF** desired,
THEN VENT the fuel oil piping as follows:

   a. **PLACE** 1A1 FO B/U PP SEL SW, 1-HS-10051 to OFF. ____

   b. **OBSERVE** 1A1 FO FEED PRESS, 1-PI-10052 for indication of normal fuel oil pressure. ____

   c. **PLACE** 1A1 FO B/U PP SEL SW, 1-HS-10051 to AUTO. ____

   d. **PLACE** 1A2 FO B/U PP SEL SW, 1-HS-10061 to OFF. ____

   e. **OBSERVE** 1A2 FO FEED PRESS, 1-PI-10062 for indication of normal fuel oil pressure. ____

   f. **PLACE** 1A2 FO B/U PP SEL SW, 1-HS-10061 to AUTO. ____

7. **IF** paralleling 1A DG,
THEN PERFORM the following:

   - **CHECK** 1A DG is at rated frequency (58.8 to 61.2 Hz) **AND** voltage (3.74KV to 4.58KV).
     - 1A DG FREQUENCY, 1-SI-1701
     - 1A DG VOLTS, 1-EI-1701
   - **CHECK** 1A DG generator phase voltages are balanced (highest to lowest phase voltage difference is less than 400 volts). **[B0248]**
     - 1A DG VOLTS, 1-EI-1701

8. **IF** flags are dropped **AND** the associated 1C188 alarm is clear,
THEN RESET the following relay flags in Panel 1C188 Cabinet 5:
(N/A if flags are not dropped or alarm is not clear.) ____

ALARM:	"GENERATOR UNDERVOLTAGE [27]"
RELAY:	UNDERVOLTAGE PROTECTIVE RELAY, 1ESL 0997-27
ALARM:	"GENERATOR UNDERFREQ [81/U]"
RELAY:	UNDERFREQUENCY PROTECTIVE RELAY, 1SSL 0998-81.U

NOTE
After 30 minutes of unloaded operation (<1.620 MW), 1A DG should be run loaded for at least 1 hour at greater than or equal to 2.700 MW for cleanout.

9. **IF** 1A DG will be paralleled to the 11/17 4KV Bus,
THEN GO TO Section 6.3, PARALLEL 1A DG TO THE 11/17 4KV BUS. ____

6.2.2.B Procedure (Continued) **INITIALS**

10. **IF** 1A DG will be stopped,
THEN GO TO Section 6.5.1, 1A DG NORMAL SHUTDOWN FROM CONTROL ROOM. ____

****** END ******

6.2.3 1A DG FAST/EMERGENCY START FROM LOCAL CONTROL PANEL 1C188 [B0154]

A. Initial Conditions

1. 1A DG is in Standby **PER** Section 6.1, 1A DG NORMAL STANDBY, Subsection A.

2. For testing only, 1A HT Coolant Systems are at **OR** above minimum preheat temperature of 118° F.

3. **IF** a FAST (non-emergency) start is being performed,
THEN the AC prelube pump on each engine is operating for the prelube oil pressure start permissive.

4. Keys for the following switches are available (N/A for Emergency Start):

   - 1A GEN CONTR MODE SEL SW, 1-HS-10322
   - 1A GEN STRT/STOP CONTR SW, 1-HS-10327
   - 1A DG OUT BKR, 152-1703, remote/local switch, 1-HS-152-1703A

B. Procedure **INITIALS**

1. **IF** the 1A DG is being started for testing,
THEN PERFORM 1A DG system checks **PER** Section 6.1, 1A DG NORMAL STANDBY, Subsection B. ____

NOTE

In a casualty situation **ONLY**, the 5 minute limit of no prelube can be extended to 30 minutes. **[B0255]**

2. **IF** an Emergency Start is desired when the 1A AC Prelube Pumps are unavailable **AND** the pumps have been off longer than five minutes,
THEN OPERATE the 1A Pneumatic Prelube Pumps **PER** Section 6.7.5, OPERATE THE 1A PNEUMATIC PRELUBE PUMPS.
[B0255] ____

6.2.3.B Procedure (Continued) **INITIALS**

3. IF Emergency Start is desired,
   THEN PERFORM the following:

   a. **VERIFY** 1A GEN CONTR MODE SEL SW, 1-HS-10322, is in REMOTE/AUTO. ____

   b. **DEPRESS** 1A MANUAL EMER START PB, 1-HS-10334. ____

   c. **CHECK** 1A DG accelerates to approximately 1200 rpm on 1A GENSET SPD IND, 1-SI-10321. ____

   d. **CHECK** 1A DG generator phase voltages are balanced (highest to lowest phase voltage difference is less than 400 volts): **[B0248]**

      - 1A GEN PHASE A VOLT IND, 1-EI-10321
      - 1A GEN PHASE B VOLT IND, 1-EI-10322
      - 1A GEN PHASE C VOLT IND, 1-EI-10323

NOTE

With an emergency start signal present, placing 1-HS-10322 to LOCAL causes the following actions to occur:

- The emergency start signal is cancelled
- All 1A DG trips are enabled

   e. IF manual control of 1A DG from Local Control Panel 1C188 is desired,
      THEN PERFORM the following:

CAUTION

IF either of the following conditions exist, do **NOT** select LOCAL:

- An actual emergency condition exists **AND** the Control Room is habitable

OR

- Non-essential trips are to remain bypassed

      (1) **PLACE** 1A GEN CONTR MODE SEL SW, 1-HS-10322, to LOCAL. ____

      (2) **PLACE** 1A DG OUT BKR, 152-1703, remote/local switch, 1-HS-152-1703A, to LOCAL. ____

6.2.3.B Procedure (Continued) **INITIALS**

4. **IF** a Fast Start is desired,
   THEN PERFORM the following:

   a. **PERFORM** 1A DG system checks **PER** Section 6.1, 1A DG NORMAL STANDBY, Subsection B. ____

   b. **PLACE** 1A DG OUT BKR, 152-1703, remote/local switch, 1-HS-152-1703A, to LOCAL. ____

   c. **PLACE** 1A GEN CONTR MODE SEL SW, 1-HS-10322, to LOCAL. ____

   d. **PLACE** 1A GEN LOCAL SPD SEL SW, 1-HS-10325, to FAST. ____

NOTE

The following 1C188 alarms will be received approximately 3 seconds after starting 1A DG:

- "GENERATOR UNDERVOLTAGE"
- "FIELD FLASHING FAILURE"

CAUTION

If 11/17 4KV Bus is de-energized, 1A DG should be started and 11/17 4KV Bus energized without delay to ensure 1A DG support equipment is operating.

   e. **PLACE** 1A GEN STRT/STOP CONTR SW, 1-HS-10327, to START. ____

   f. **CHECK** 1A DG accelerates to approximately 1200 rpm on 1A GENSET SPD IND, 1-SI-10321. ____

6.2.3.B.4 Procedure (Continued) **INITIALS**

g. **IF** loaded operation is desired,
THEN PERFORM the following:

(1) **PLACE** 1A FIELD FLASH SEL SW, 1-HS-10329, to ON. ____

(2) **CHECK** 1A DG rated frequency (58.8 to 61.2 Hz) **AND** voltage (3.74KV to 4.58KV) are established:

- 1A GEN FREQ IND, 1-SI-10332
- 1A GEN PHASE A VOLT IND, 1-EI-10321

(3) **IF** 11/17 4KV Bus is DE-ENERGIZED,
THEN PERFORM the following to energize auxiliary equipment:

(a) **PLACE** Synchronizing Jack SJ to SYNC. ____

(b) **CHECK** the Synchroscope is **NOT** rotating. ____

(c) **PLACE** 1A DG OUT BKR, 1-HS-152-1703C, to CLOSE. ____

(d) **IF** manual frequency control is required,
THEN PLACE 1A GOVNR SPEED CONTR SW,
1-HS-10330, to RAISE OR LOWER. ____

NOTE
1A DG remains at the "as-left" frequency.

(e) **WHEN** 1A DG is approximately 60 Hz,
THEN PLACE Synchronizing Jack SJ to OFF. ____

(4) **CHECK** 1A DG generator phase voltages are balanced (highest to lowest phase voltage difference is less than 400 volts): **[B0248]**

- 1A GEN PHASE A VOLT IND, 1-EI-10321
- 1A GEN PHASE B VOLT IND, 1-EI-10322
- 1A GEN PHASE C VOLT IND, 1-EI-10323

6.2.3.B Procedure (Continued) **INITIALS**

5. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 1C188:

   - 1A1 HT RAD FAN SEL SW, 1-HS-10082 ____
   - 1A2 HT RAD FAN SEL SW, 1-HS-10102 ____
   - 1A1 FO B/U PP SEL SW, 1-HS-10051 ____
   - 1A2 FO B/U PP SEL SW, 1-HS-10061 ____

6. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 1C188:

   - 1A1 AC PRELUB PP SEL SW, 1-HS-10161 ____
   - 1A2 AC PRELUB PP SEL SW, 1-HS-10201 ____
   - 1A1 HT PRHT PP SEL SW, 1-HS-10081 ____
   - 1A2 HT PRHT PP SEL SW, 1-HS-10101 ____

7. **RESET** any 1C188 Alarm Panel alarms.

8. **IF** flags are dropped **AND** the associated 1C188 alarm is clear, **THEN RESET** the following relay flags in Panel 1C188 Cabinet 5: *(N/A if flags are not dropped or alarm is not clear.)* ____

ALARM:	"GENERATOR UNDERVOLTAGE [27]"
RELAY:	UNDERVOLTAGE PROTECTIVE RELAY, 1ESL 0997-27
ALARM:	"GENERATOR UNDERFREQ [81/U]"
RELAY:	UNDERFREQUENCY PROTECTIVE RELAY, 1SSL 0998-81.U

6.2.3.B Procedure (Continued) **INITIALS**

9. **IF** transfer of 1A DG operation to the Control Room is desired, **THEN PERFORM** the following:

   a. **PLACE** the following switches to REMOTE:

      - 1A GEN CONTR MODE SEL SW, 1-HS-10322 ____
      - 1A DG OUT BKR, 152-1703, remote/local switch, 1-HS-152-1703A ____

   b. **REMOVE** keys from the following switches:

      - 1A GEN CONTR MODE SEL SW, 1-HS-10322 ____
      - 1A GEN STRT/STOP CONTR SW, 1-HS-10327 ____
      - 1A DG OUT BKR, 152-1703, remote/local switch, 1-HS-152-1703A ____

   c. **GO TO** the desired applicable section of this procedure:

      - Section 6.3, PARALLEL 1A DG TO THE 11/17 4KV BUS

      OR

      - Section 6.5.1, 1A DG NORMAL SHUTDOWN FROM CONTROL ROOM

NOTE
After 30 minutes of unloaded operation (<1.620 MW), 1A DG should be run loaded for at least 1 hour at greater than or equal to 2.700 MW for cleanout.

10. **WHEN** 1A DG is to be stopped, **THEN GO TO** Section 6.5.2, 1A DG NORMAL SHUTDOWN FROM LOCAL CONTROL PANEL 1C188. ____

****** END ******

6.2.4 1A DG SLOW START FROM LOCAL CONTROL PANEL 1C188

A. Initial Conditions

1. 1A DG is in Standby **PER** Section 6.1, 1A DG NORMAL STANDBY, Subsection A.
2. 1A HT Coolant Systems should be at **OR** above minimum preheat temperature of 118° F.
3. 1A HT Coolant System temperatures are above the 95° F slow start permissive.
4. 11/17 4KV Bus is powering 1A DG auxiliary equipment.
5. The AC prelube pump on each engine is operating for the prelube oil pressure start permissive. **[B0255]**
6. **IF** manual speed control below 1176 rpm (58.8 Hz) is required due to maintenance or testing,
   THEN a temporary alteration is installed to prevent 1A DG from tripping on low coolant pump pressure two minutes after starting 1A DG.
7. Keys for the following switches are available:
   - 1A GEN CONTR MODE SEL SW, 1-HS-10322
   - 1A GEN STRT/STOP CONTR SW, 1-HS-10327
   - 1A DG OUT BKR, 152-1703, remote/local switch, 1-HS-152-1703A

B. Procedure

INITIALS

1. **PERFORM** 1A DG system checks **PER** Section 6.1, 1A DG NORMAL STANDBY, Subsection B. ____
2. **PLACE** 1A GEN CONTR MODE SEL SW, 1-HS-10322, to LOCAL. ____
3. **PLACE** 1A GEN LOCAL SPD SEL SW, 1-HS-10325, to SLOW. ____
4. **PLACE** 1A DG OUT BKR, 152-1703, remote/local switch, 1-HS-152-1703A, to LOCAL. ____

6.2.4.B Procedure (Continued) **INITIALS**

5. **IF** manual speed control below 1176 RPM (58.8 Hz) is necessary due to maintenance or testing,
THEN PERFORM the following:

   a. **PLACE** Sync Jack SJ to SYNC. ____

NOTE
The following 1C88 alarms will be received approximately 3 seconds after starting 1A DG:

- "GENERATOR UNDERVOLTAGE"
- "FIELD FLASHING FAILURE"

   b. **PLACE** 1A GEN STRT/STOP CONTR SW, 1-HS-10327, to START. ____

   c. **WHEN** 1A DG speed exceeds 700 RPM,
THEN ADJUST speed as desired using 1A GOVNR SPEED CONTR SW, 1-HS-10330. ____

   d. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 1C188:

      - 1A1 HT RAD FAN SEL SW, 1-HS-10082 ____
      - 1A2 HT RAD FAN SEL SW, 1-HS-10102 ____
      - 1A1 FO B/U PP SEL SW, 1-HS-10051 ____
      - 1A2 FO B/U PP SEL SW, 1-HS-10061 ____

   e. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 1C188:

      - 1A1 AC PRELUB PP SEL SW, 1-HS-10161 ____
      - 1A2 AC PRELUB PP SEL SW, 1-HS-10201 ____
      - 1A1 HT PRHT PP SEL SW, 1-HS-10081 ____
      - 1A2 HT PRHT PP SEL SW, 1-HS-10101 ____

6.2.4.B.5 **Procedure (Continued)** **INITIALS**

f. **WHEN** speed control for maintenance or testing is complete, **THEN PERFORM** the following:

(1) **ADJUST** 1A DG to approximately 60 Hz using 1A GOVNR SPEED CONTR SW, 1-HS-10330. ____

NOTE
1A DG remains at the "as-left" speed.

(2) **PLACE** the Sync Jack to OFF. ____

(3) **REMOVE** the temporary alteration for bypassing the low coolant pressure trips. ____

g. **IF** loaded operation is desired, **THEN GO TO** Step 9. ____

h. **IF** 1A DG will be stopped, **THEN GO TO** Section 6.5.2, 1A DG NORMAL SHUTDOWN FROM LOCAL CONTROL PANEL 1C188. ____

NOTE
The following 1C88 alarms will be received approximately 3 seconds after starting 1A DG:

- "GENERATOR UNDERVOLTAGE"
- "FIELD FLASHING FAILURE"

6. **PLACE** 1A GEN STRT/STOP CONTR SW, 1-HS-10327, to START. ____

7. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 1C188:

- 1A1 HT RAD FAN SEL SW, 1-HS-10082 ____
- 1A2 HT RAD FAN SEL SW, 1-HS-10102 ____
- 1A1 FO B/U PP SEL SW, 1-HS-10051 ____
- 1A2 FO B/U PP SEL SW, 1-HS-10061 ____

6.2.4.B Procedure (Continued) **INITIALS**

8. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 1C188:

   - 1A1 AC PRELUB PP SEL SW, 1-HS-10161 ____
   - 1A2 AC PRELUB PP SEL SW, 1-HS-10201 ____
   - 1A1 HT PRHT PP SEL SW, 1-HS-10081 ____
   - 1A2 HT PRHT PP SEL SW, 1-HS-10101 ____

9. **IF** loaded operation is desired,
   THEN PERFORM the following:

   a. **PLACE** 1A FIELD FLASH SEL SW, 1-HS-10329, to ON. ____

   b. **CHECK** 1A DG rated frequency (58.8 to 61.2 Hz) **AND** voltage (3.74KV to 4.58KV) are established:

      - 1A GEN FREQ IND, 1-SI-10332
      - 1A GEN PHASE A VOLT IND, 1-EI-10321

   c. **CHECK** 1A DG generator phase voltages are balanced (highest to lowest phase voltage difference is less than 400 volts). **[B0248]**

      - 1A GEN PHASE A VOLT IND, 1-EI-10321
      - 1A GEN PHASE B VOLT IND, 1-EI-10322
      - 1A GEN PHASE C VOLT IND, 1-EI-10323

10. **RESET** any 1C188 Alarm Panel alarms. ____

11. **IF** flags are dropped **AND** the associated 1C188 alarm is clear,
    THEN RESET the following relay flags in Panel 1C188 Cabinet 5:
    (N/A if flags are not dropped or alarm is not clear.) ____

ALARM:	"GENERATOR UNDERVOLTAGE [27]"
RELAY:	UNDERVOLTAGE PROTECTIVE RELAY, 1ESL 0997-27
ALARM:	"GENERATOR UNDERFREQ [81/U]"
RELAY:	UNDERFREQUENCY PROTECTIVE RELAY, 1SSL 0998-81.U

6.2.4.B Procedure (Continued) **INITIALS**

12. **IF** transfer of 1A DG operation to the Control Room is desired, **THEN PERFORM** the following:

    a. **PLACE** the following switches to REMOTE:

    - 1A GEN CONTR MODE SEL SW, 1-HS-10322 ____
    - 1A DG OUT BKR, 152-1703, remote/local switch, 1-HS-152-1703A ____

    b. **REMOVE** keys from the following switches:

    - 1A GEN CONTR MODE SEL SW, 1-HS-10322 ____
    - 1A GEN STRT/STOP CONTR SW, 1-HS-10327 ____
    - 1A DG OUT BKR, 152-1703, remote/local switch, 1-HS-152-1703A ____

    c. **GO TO** the desired applicable section of this procedure:

    - Section 6.3, PARALLEL 1A DG TO THE 11/17 4KV BUS

    OR

    - Section 6.5.1, 1A DG NORMAL SHUTDOWN FROM CONTROL ROOM

NOTE
After 30 minutes of unloaded operation (<1.620 MW), 1A DG should be run loaded for at least 1 hour at greater than or equal to 2.700 MW for cleanout.

13. **WHEN** 1A DG is to be stopped, **THEN GO TO** Section 6.5.2, 1A DG NORMAL SHUTDOWN FROM LOCAL CONTROL PANEL 1C188. ____

****** END ******

6.2.5 RESTART OF 1A DG WITH AN AUTOMATIC START SIGNAL PRESENT [B0154]

A. Initial Conditions

1. 1A DG has failed to start with an automatic start signal **OR** has tripped following an automatic start signal.

2. The cause of the start failure or trip has been determined **AND** corrected.

B. Procedure

INITIALS

1. **IF** Prelube has been off for greater than 5 minutes,
   THEN PRELUBE the 1A DG **PER** Section 6.7.5, OPERATE THE 1A PNEUMATIC PRELUBE PUMPS. **[B0255]** ____

NOTE

The 1A DG should immediately emergency start upon resetting the Start Failure or Emergency Shutdown.

2. **DEPRESS** the following pushbuttons to clear any shutdown signals:

   - 1A START FAILURE RESET PB, 1-HS-10338
   - 1A GEN EMER S/D RESET PB, 1-HS-10337 ____

NOTE

WHEN 1A DG is running at rated frequency and voltage **AND** 11/17 4KV Bus is dead, breaker 152-1703 will automatically close.

3. **IF** an automatic start signal exists **AND** 11/17 4KV Bus is DE-ENERGIZED,
   THEN CHECK 1A DG energizes 11/17 4KV Bus.

4. **WHEN** offsite power is available,
   THEN GO TO Section 6.4, TRANSFER 11/17 4KV BUS LOADS FROM 1A DG TO OFFSITE POWER. ____

****** END ******

6.3 PARALLEL 1A DG TO THE 11/17 4KV BUS

A. Initial Conditions

1. 1A DG is running satisfactorily **AND** will be paralleled to 11/17 4KV Bus.
2. SIAS **AND** U/V actuation signals on the 11/17 4KV Bus are reset.

B. Procedure

CAUTION
When the DG is paralleled to the bus, the Shutdown Sequencer will start 11 and 12 Post-LOCI Filter fans and stop the Kitchen/Toilet Exhaust fan.

1. **IF** desired, **ALIGN** the Control Room HVAC as follows:
   - **VERIFY** 1C22, 0-RI-5350 "CONTR RM VENT" is clear.
   - **PLACE** the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to OFF
   - **START** the Post-LOCI filter fans by placing the handswitches to START **AND LOG** the starting time in the Charcoal Filter Log
     - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352
     - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353
   - Control Room HVAC Units in the following alignment:
     - **PREFERRED ALIGNMENT** - 12 CR HVAC in operation

     OR

     - 11 CR HVAC in operation with the Control Room chiller Unit secured.
2. **IF** 1A DG received an emergency start signal, **THEN DEPRESS** 1A DG SLOW START, 1-HS-1708, pushbutton, to clear the emergency start signal.

CAUTION
1A DG should **NOT** be paralleled with 11/17 4KV Bus during periods when power is suspect (for example, during a severe storm).

3. **INSERT** the Sync Stick for 1A DG OUT BKR, 152-1703.
4. **MOMENTARILY PLACE** 1A DG SPEED CONTR, 1-CS-1705, to RAISE OR LOWER.
5. **CHECK** the Synchroscope and Sync Lights are operating on 1C18B.

6.3.B Procedure (Continued)

6. **ADJUST** INCOMING VOLTS, 1-EI-4001A, equal to RUNNING VOLTS, 1-EI-4001B, using 1A DG AUTO VOLT CONTR, 1-CS-1704.

7. **ADJUST** 1A DG frequency so the Synchroscope pointer is rotating slowly in the FAST direction using 1A DG SPEED CONTR, 1-CS-1705.

CAUTION
TABLE 1, SHUTDOWN SEQUENCER LOADS, lists equipment that receives an auto start signal from the Shutdown Sequencer when the 1A DG output breaker is closed.

8. **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position,
THEN PLACE 1A DG OUT BKR, 1-CS-152-1703, to CLOSE.

9. **VERIFY** 1A DG picks up approximately 0.70 MW load on 1A DG VAR/WATT, 1-JI-1701B.

10. **CHECK** 1C08 annunciator "SEQUENCER INITIATED" alarms.

11. **CHECK** 1C17 annunciator "RAD MON PANEL 1C22" alarms. (N/A if 0-RI-5350 is bypassed)

NOTE
The Control Room Vent RMS alarm, 0-RI-5350, may **NOT** be lit.

- **BYPASS** 1C22, 0-RI-5350 "CONTR RM VENT"

12. **REMOVE** the Sync Stick **AND RETURN** to Home Base.

CAUTION
Do **NOT** exceed limits of 5.400 MW, 500 KVARs, **AND** 752 amps.

13. **RAISE** MW **AND** KVAR loads concurrently to the desired levels **PER** the following:

    a. **RAISE** MW load by less than **OR** equal to 1.0 MW over a one minute time period using 1A DG SPEED CONTR, 1-CS-1705.

    b. **MAINTAIN** 0 to 500 KVARs using 1A DG AUTO VOLT CONTR, 1-CS-1704 **AND** FIGURE 1, 1A DIESEL GENERATOR ELECTRICAL LIMITS.

    c. **WAIT** approximately five minutes for 1A DG temperatures to stabilize before adding additional MW load. **[B0254]**

    d. **MONITOR** 11/17 4KV Bus voltage between 4.1KV and 4.35KV.

6.3.B Procedure (Continued)

14. **MONITOR** 1A DG while loaded to maintain MW **AND** KVAR loads within prescribed limits.

15. **RECORD** equipment operating data 15 minutes after reaching the desired load **AND** at 60 minute intervals thereafter on the 1A Diesel Generator Logsheet.

16. **WHEN** 1A DG is to be stopped,
THEN GO TO Section 6.5.1, 1A DG NORMAL SHUTDOWN FROM CONTROL ROOM.

****** END ******

6.4 TRANSFER 11/17 4KV BUS LOADS FROM 1A DG TO OFFSITE POWER [B0614]

A. Initial Conditions

1. 1A DG is powering 11/17 4KV Bus **AND** transfer of 11/17 4KV Bus loads to offsite power from the Control Room is desired.
2. The 11/17 4KV Bus Normal **AND** Alternate Bus feeder breakers are OPEN:
   - 11 4KV BUS ALT FDR, 152-1101
   - 11 4KV BUS NORMAL FDR, 152-1115
3. The 11 4KV Bus SIAS **AND** U/V signals are RESET.
4. One of the 11/17 4KV Bus offsite power sources is available:
   - 11 4KV BUS ALT FDR, 152-1101

   OR

   - 11 4KV BUS NORMAL FDR, 152-1115

B. Procedure

1. **CHECK** the selected 11/17 4KV Bus offsite power source is expected to remain available:
   - 11 4KV BUS ALT FDR, 152-1101

   OR

   - 11 4KV BUS NORMAL FDR, 152-1115
2. **VERIFY** DC control power is available by observing the 11/17 4KV Bus Normal **OR** Alternate Feeder breaker position light being illuminated at the control switch.

6.4.B Procedure (Continued)

3. **PLACE** 1A DG in the TRANSFER MODE by performing the following:

   a. **DEPRESS** 1A DG EMERGENCY START, 1-HS-1707, pushbutton.

   b. **INSERT** the Sync Stick for 1A DG OUT BKR, 1-CS-152-1703.

   c. **DEPRESS** 1A DG SLOW START, 1-HS-1708, pushbutton.

   d. **MOMENTARILY PLACE** 1A DG SPEED CONTR, 1-CS-1705, to RAISE OR LOWER.

   e. **MAINTAIN** 1A DG at approximately 60 Hz using 1A DG SPEED CONTR, 1-CS-1705.

   f. **REMOVE** the Sync Stick from 1A DG OUT BKR, 1-CS-152-1703.

   g. **INSERT** the Sync Stick for the 11/17 4KV Bus Normal **OR** Alternate Feeder breaker handswitch:

      - 11 4KV BUS ALT FDR, 1-CS-152-1101

      OR

      - 11 4KV BUS NORMAL FDR, 1-CS-152-1115

   h. **CHECK** the associated Synchroscope **AND** Sync Lights are operating.

> **NOTE**
> Offsite power voltage indication will be on the INCOMING voltmeter.

   i. **ADJUST** RUNNING VOLTS equal to INCOMING VOLTS using 1A DG AUTO VOLT CONTR, 1-CS-1704.

> **NOTE**
> The Synchroscope works in the opposite direction from normal when 1A DG is the RUNNING power source.

   j. **ADJUST** 1A DG frequency so the synchroscope pointer is rotating slowly in the FAST direction using 1A DG SPEED CONTR, 1-CS-1705.

6.4.B.3 Procedure (Continued)

CAUTION
To avoid improper paralleling, do **NOT** start **OR** stop any large loads on the 11/17 4KV Bus.

k. **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position,
THEN CLOSE the 11/17 4KV Bus Normal **OR** Alternate Feeder breaker:

- 11 4KV BUS ALT FDR, 1-CS-152-1101

OR

- 11 4KV BUS NORMAL FDR, 1-CS-152-1115

l. **CHECK** 1A DG load is approximately 2.0 MW.

m. **REMOVE** the Sync Stick **AND RETURN** to Home Base.

4. **MONITOR** 11/17 4KV Bus voltage between 4.1KV and 4.35KV.

5. **IF** continued parallel operation of 1A DG for cleanout is desired,
THEN GO TO Section 6.5.1, 1A DG NORMAL SHUTDOWN FROM CONTROL ROOM, Step B.1, to unload 1A DG and restore non-essential trips.

6. **IF** 1A DG will be stopped,
THEN GO TO Section 6.5.1, 1A DG NORMAL SHUTDOWN FROM CONTROL ROOM.

****** END ******

6.5 SHUTDOWN 1A DG

6.5.1 1A DG NORMAL SHUTDOWN FROM CONTROL ROOM

A. Initial Conditions

1. 1A DG is being operated from the Control Room.

B. Procedure

1. **IF** 1A DG is in parallel operation with the 11/17 4KV Bus,
   THEN PERFORM the following:

   a. **LOWER** MW **AND** KVAR loads concurrently to approximately 0.70 MW **AND** zero KVARs **PER** the following:

      (1) **LOWER** MW load approximately 1.0 MW using 1A DG SPEED CONTR, 1-CS-1705. **[B0254]**

      (2) **MAINTAIN** 0 to 500 KVARs using 1A DG AUTO VOLT CONTR, 1-CS-1704 **AND** FIGURE 1, 1A DIESEL GENERATOR ELECTRICAL LIMITS.

      (3) **MONITOR** 11/17 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**

      (4) WAIT approximately 5 minutes,
      THEN REPEAT Steps 1.a.(1) through 1.a.(4) until 1A DG load is approximately 0.7 MW.

   b. **WHEN** D/G load is approximately 0.7 MW,
   THEN PLACE 1A DG OUT BKR, 1-CS-152-1703, to TRIP.

   c. **IF** 1A DG was unloaded to clear the Transfer Mode **AND** continued parallel operation is desired,
   THEN GO TO Section 6.3, PARALLEL 1A DG TO THE 11/17 4KV BUS.

6.5.1.B Procedure (Continued)

2. **IF** 1A DG output breaker 152-1703 is open,
THEN PERFORM the following:

   a. **VERIFY** 1A DG voltage is 4.16KV (4.16KV to 4.30KV) on 1A DG VOLTS, 1-EI-1701.

   b. **CHECK** 1A DG frequency is approximately 60 Hz on 1A DG FREQUENCY, 1-SI-1701.

   c. **CHECK** the following alarms are clear:

      - "11, 17 BUS DIESEL BKRS CLOSE BLOCKED"
      - "1A DG • POT VOLT • FREQ LO"

   d. **IF** directed by the System Engineer,
THEN MEASURE the 1A DG coastdown time from shutdown signal to shaft rotation stop **AND RECORD** on the 1A Diesel Generator Logsheet.

   e. **WHEN** 1A DG has operated unloaded for at least five minutes,
THEN DEPRESS 1A DG STOP, 1-HS-1709, pushbutton.

   f. **VERIFY** exciter shutdown as indicated by zero volts on 1A DG VOLTS, 1-EI-1701.

   g. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 1C188:

      - 1A1 AC PRELUB PP SEL SW, 1-HS-10161
      - 1A2 AC PRELUB PP SEL SW, 1-HS-10201
      - 1A1 HT PRHT PP SEL SW, 1-HS-10081
      - 1A2 HT PRHT PP SEL SW, 1-HS-10101

   h. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 1C188:

      - 1A1 FO B/U PP SEL SW, 1-HS-10051
      - 1A2 FO B/U PP SEL SW, 1-HS-10061

6.5.1.B.2 **Procedure (Continued)**

i. **DRAIN** the 1A Dirty Fuel Oil Tank to a suitable container through 1A DIRTY FUEL OIL TANK DRAIN VALVE, 1A-DFO-74.

(1) **IF** the 1A Dirty Fuel Oil Tank was drained prior to starting **AND** more than one quart of fuel oil is drained from the 1A Dirty Fuel Oil Tank per hour of run time,
THEN WRITE an Issue Report.

j. **IF** 1A DG has operated one hour **OR** longer,
THEN CHECK the 1A Fuel Oil Day Tank for water as follows: **[B0251]**

(1) **OBTAIN** a suitable container for collecting the effluent.

(2) **CRACK OPEN** 1A FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 1A-DFO-28.

(3) **WHEN** all water has been removed,
THEN SHUT 1A FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 1A-DFO-28.

k. **DISPOSE** of ALL waste oil **PER** CH-1-101, Hazardous Waste Management.

l. **CHECK** any existing alarms.

m. **VERIFY** the 1A1 **AND** 1A2 Radiator Fans stop approximately 15 minutes following 1A DG shutdown by observing the associated green indicating light is illuminated on 1C188:

- 1A1 HT RAD FAN SEL SW, 1-HS-10082
- 1A2 HT RAD FAN SEL SW, 1-HS-10102

n. **VERIFY** 1A Fuel Oil Day Tank level is greater than 22 inches.

o. **NOTIFY** Plant Chemistry that 1A DG has been run and coolant sampling may be performed, if desired.

6.5.1.B.2 Procedure (Continued)

p. **IF** the 1A DG was paralleled to 11 4 KV bus,
THEN ALIGN the Control Room HVAC as follows:

- **IF** 11 CR HVAC was in operation,
THEN RESTORE the Control Room Chiller Unit **PER** OI-22F (N/A if 12 CR HVAC was in operation)

- **UNBYPASS** the Control Room Vent RMS, 0-RI-5350.

- **STOP** the Post-LOCI filter fans by placing the handswitches to STOP **AND LOG** the stopping time in the Charcoal Filter Log

  - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352

  - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353

- **IF** desired,
THEN PLACE the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to ON

****** END ******

6.5.2 1A DG NORMAL SHUTDOWN FROM LOCAL CONTROL PANEL 1C188

A. Initial Conditions

1. Keys for the following switches are available:
   - 1A GEN CONTR MODE SEL SW, 1-HS-10322
   - 1A GEN STRT/STOP CONTR SW, 1-HS-10327
   - 1A DG OUT BKR, 152-1703 remote/local switch, 1-HS-152-1703A

B. Procedure

1. **IF** 1A DG is in parallel operation with the 11/17 4KV Bus, **THEN PERFORM** the following:
   a. **VERIFY** 1A DG OUT BKR, 152-1703, remote/local switch, 1-HS-152-1703A, is in LOCAL.

NOTE

With an emergency start signal present, placing 1-HS-10322 to LOCAL causes the following actions to occur:

- The emergency start signal is cancelled
- All 1A DG trips are enabled

   b. **VERIFY** 1A GEN CONTR MODE SEL SW, 1-HS-10322, is in LOCAL.
   c. **LOWER** MW **AND** KVAR loads concurrently to approximately 0.70 MW **AND** zero KVARs **PER** the following:
      (1) **LOWER** MW load approximately 1.0 MW using 1A GOVNR SPEED CONTR SW, 1-HS-10330. **[B0254]**
      (2) **MAINTAIN** 0 to 500 KVARs using 1A AUTO VOLT REG CONTR SW, 1-HS-10331 **AND** FIGURE 1, 1A DIESEL GENERATOR ELECTRICAL LIMITS.
      (3) **MONITOR** 11/17 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**
      (4) **WAIT** approximately 5 minutes, **THEN REPEAT** Steps 1.c.(1) through 1.c.(4) until 1A DG load is approximately 0.7 MW.
   d. **IF** 1A DG is being stopped, **THEN BEGIN** the 5 minute engine cooldown period prior to 1A DG stop.
   e. **PLACE** 1A DG OUT BKR, 1-HS-1703C, to TRIP.

6.5.2.B Procedure (Continued)

2. **IF** 1A DG output breaker 152-1703 is open,
THEN PERFORM the following:

   a. **VERIFY** 1A GEN CONTR MODE SEL SW, 1-HS-10322, is in LOCAL.

   b. **VERIFY** 1A DG OUT BKR, 152-1703, remote/local switch, 1-HS-152-1703A, is in LOCAL.

   c. **VERIFY** 1A DG voltage is 4.16KV (4.16KV to 4.30KV) on 1A GEN PHASE A VOLT IND, 1-EI-10321.

   d. **CHECK** 1A DG frequency is approximately 60 Hz on 1A GEN FREQ IND, 1-SI-10332.

   e. **VERIFY** from Step 1.d that 1A DG has operated a minimum of 5 minutes at 0.5 MW **OR** less for cooldown.

   f. **IF** directed by the System Engineer,
   THEN MEASURE the 1A DG coastdown time from shutdown signal to shaft rotation stop **AND RECORD** on the 1A Diesel Generator Logsheet.

   g. **PLACE** 1A GEN STRT/STOP CONTR SW, 1-HS-10327, to STOP.

   h. **CHECK** exciter shutdown as indicated by zero volts on 1A GEN PHASE A VOLT IND, 1-EI-10321.

   i. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 1C188:

      - 1A1 AC PRELUB PP SEL SW, 1-HS-10161
      - 1A2 AC PRELUB PP SEL SW, 1-HS-10201
      - 1A1 HT PRHT PP SEL SW, 1-HS-10081
      - 1A2 HT PRHT PP SEL SW, 1-HS-10101

   j. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 1C188:

      - 1A1 FO B/U PP SEL SW, 1-HS-10051
      - 1A2 FO B/U PP SEL SW, 1-HS-10061

   k. **DRAIN** the 1A Dirty Fuel Oil Tank to a suitable container through 1A DIRTY FUEL OIL TANK DRAIN VALVE, 1A-DFO-74.

      (1) **IF** 1A Dirty Fuel Oil Tank was drained prior to starting **AND** more than one quart of oil is drained from the 1A Dirty Fuel Oil Tank per hour of run time,
      THEN WRITE an Issue Report.

6.5.2.B.2 **Procedure (Continued)**

l. **IF** 1A DG has operated one hour **OR** longer,
THEN CHECK the 1A Fuel Oil Day Tank for water as follows: **[B0251]**

(1) **OBTAIN** a suitable container for collecting the fuel oil.

(2) **CRACK OPEN** 1A FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 1A-DFO-28.

(3) **WHEN** all water has been removed,
THEN SHUT 1A FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 1A-DFO-28.

m. **DISPOSE** of ALL waste oil **PER** CH-1-101, Hazardous Waste Management.

n. **CHECK** any existing alarms.

o. **VERIFY** the 1A1 **AND** 1A2 Radiator Fans stop approximately 15 minutes following 1A DG shutdown by observing the associated green indicating light is illuminated on 1C188:

- 1A1 HT RAD FAN SEL SW, 1-HS-10082
- 1A2 HT RAD FAN SEL SW, 1-HS-10102

p. **VERIFY** 1A Fuel Oil Day Tank level is greater than 22 inches.

q. **NOTIFY** Plant Chemistry that 1A DG has been run and coolant sampling may be performed, if desired.

NOTE
The 1C18 annunciator, "11, 17 BUS DIESEL BKRS CLOSE BLOCKED", should clear when equipment is returned to normal.

r. **WHEN** desired,
THEN PLACE 1A Local Control Panel 1C188 switches to the normal position of ATTACHMENT 1F, 1A DG SWITCH POSITION VERIFICATION.

s. **WHEN** desired,
THEN REMOVE keys from the following switches:

- 1A GEN CONTR MODE SEL SW, 1-HS-10322
- 1A GEN STRT/STOP CONTR SW, 1-HS-10327
- 1A DG OUT BKR, 152-1703, remote/local switch, 1-HS-152-1703A

6.5.2.B Procedure (Continued)

3. **IF** the 1A DG was paralleled to 11 4KV bus
THEN ALIGN the Control Room HVAC as follows:

   - **IF** 11 CR HVAC was in operation,
THEN RESTORE the Control Room Chiller Unit **PER** OI-22F (N/A if 12 CR HVAC was in operation)

   - **UNBYPASS** the Control Room Vent RMS, 0-RI-5350.

   - **STOP** the Post-LOCI filter fans by placing the handswitches to STOP **AND LOG** the stopping time in the Charcoal Filter Log

     - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352

     - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353

   - **IF** desired,
THEN PLACE the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to ON

****** END ******

6.5.3 1A DG LOCAL EMERGENCY SHUTDOWN

A. Initial Conditions

1. 1A DG is operating loaded **OR** unloaded **AND** a condition exists that requires an IMMEDIATE shutdown.

B. Procedure

> **NOTE**
> If all 125 VDC Power **OR** Fuses FUP1A/FUP1B are lost, the DG can **NOT** be shutdown by depressing the emergency stop pushbuttons or engine bay shutdown pushbutton. Two operators are needed to shutdown the DG via engine trip levers. (Ref: Alarm Manual 1C188 SL40)

1. **IF** 125 VDC power is available,
   THEN PERFORM the following:

   - **SIMULTANEOUSLY DEPRESS** BOTH local emergency stop pushbuttons:
     - 1A LOCAL EMER STOP PB, 1-HS-10335
     - 1A LOCAL EMER STOP PB, 1-HS-10336

   OR

   - **DEPRESS** 1A DG ENGINE BAY EMERGENCY SHUTDOWN, 1-HS-1711.

2. If all 125 VDC Power **OR** Fuses FUP1A/FUP1B are lost,
   THEN PERFORM the following:

   a. **TRIP** 1A DG OUT BKR 152-1703

   b. **PERFORM** actions **PER** Alarm Manual 1C188, SL40.

3. **VERIFY** 1A DG OUT BKR, 152-1703, is OPEN.

4. **VERIFY** exciter shutdown as indicated by zero volts on 1A GEN PHASE A VOLT IND, 1-EI-10321.

5. **CHECK** 1A DG speed is decreasing to zero.

6. **VERIFY** 11/17 4KV Bus is energized.

6.5.3.B Procedure (Continued)

7. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 1C188:

   - 1A1 AC PRELUB PP SEL SW, 1-HS-10161
   - 1A2 AC PRELUB PP SEL SW, 1-HS-10201
   - 1A1 HT PRHT PP SEL SW, 1-HS-10081
   - 1A2 HT PRHT PP SEL SW, 1-HS-10101

8. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 1C188:

   - 1A1 FO B/U PP SEL SW, 1-HS-10051
   - 1A2 FO B/U PP SEL SW, 1-HS-10061

CAUTION

IF a SIAS **OR** U/V signal exists,
THEN 1A DG will auto start when the shutdown signal is reset.

9. **IF** desired **AND** the emergency shutdown condition has cleared,
   THEN DEPRESS 1A GEN EMER S/D RESET PB, 1-HS-10337.

NOTE

If 1A DG was tripped from full load, steam will form around the cylinder liners and heads. Noise caused by coolant boiling is normal under these conditions.

10. **IF** 1A DG was stopped while hot **AND** the cause of the emergency shutdown will **NOT** affect unloaded operation,
    THEN START 1A DG **AND RUN** unloaded for a minimum of 5 minutes for cooldown **PER** the applicable section:

    - Section 6.2.2, 1A DG SLOW START FROM CONTROL ROOM

    OR

    - Section 6.2.4, 1A DG SLOW START FROM LOCAL CONTROL PANEL 1C188

11. **DRAIN** the 1A Dirty Fuel Oil Tank to a suitable container through 1A DIRTY FUEL OIL TANK DRAIN VALVE, 1A-DFO-74.

    a. **IF** 1A Dirty Fuel Oil Tank was drained prior to starting **AND** more than one quart of fuel oil is drained from the 1A Dirty Fuel Oil Tank per hour of run time,
    THEN WRITE an Issue Report.

6.5.3.B Procedure (Continued)

12. **IF** 1A DG has operated one hour **OR** longer,
THEN CHECK the 1A Fuel Oil Day Tank for water as follows: **[B0251]**

    a. **OBTAIN** a suitable container for collecting the fuel oil.

    b. **CRACK OPEN** 1A FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 1A-DFO-28.

    c. **WHEN** all water has been removed,
    THEN SHUT 1A FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 1A-DFO-28.

13. **VERIFY** 1A Fuel Oil Day Tank level is greater than 22 inches.

14. **DISPOSE** of ALL waste oil **PER** CH-1-101, Hazardous Waste Management.

15. **CHECK** any existing alarms.

16. **VERIFY** the 1A1 **AND** 1A2 Radiator Fans stop approximately 15 minutes following 1A DG shutdown by observing the associated green indicating light is illuminated on 1C188:

    - 1A1 HT RAD FAN SEL SW, 1-HS-10082
    - 1A2 HT RAD FAN SEL SW, 1-HS-10102

17. **NOTIFY** Plant Chemistry that 1A DG has been run and coolant sampling may be performed, if desired.

18. **IF** operation was from Local Control Panel 1C188 **AND** alignment to the Control Room is desired,
THEN PERFORM the following:

NOTE
The 1C18 annunciator, "11, 17 BUS DIESEL BKRS CLOSE BLOCKED", should clear when equipment is returned to normal.

    a. **PLACE** 1A Local Control Panel 1C188 switches to the normal position of ATTACHMENT 1F, 1A DG SWITCH POSITION VERIFICATION.

    b. **REMOVE** keys from the following switches:

    - 1A GEN CONTR MODE SEL SW, 1-HS-10322
    - 1A GEN STRT/STOP CONTR SW, 1-HS-10327
    - 1A DG OUT BKR, 152-1703, remote/local switch, 1-HS-152-1703A

6.5.3.B Procedure (Continued)

19. **IF** the 1A DG was paralleled to 11 4KV bus
THEN ALIGN the Control Room HVAC as follows:

- **IF** 11 CR HVAC was in operation,
THEN RESTORE the Control Room Chiller Unit **PER** OI-22F (N/A if 12 CR HVAC was in operation)

- **UNBYPASS** the Control Room Vent RMS, 0-RI-5350.

- **STOP** the Post-LOCI filter fans by placing the handswitches to STOP **AND LOG** the stopping time in the Charcoal Filter Log

  - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352

  - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353

- **IF** desired,
THEN PLACE the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to ON

****** END ******

6.5.4 RAPID SHUTDOWN OF THE 1A DIESEL

A. Initial Conditions

1. 1A DG is operating in parallel operation with the 11/17 4KV Bus **OR** unloaded **AND** a condition exists that requires a rapid shutdown. 02000

2. The 1A DG is **NOT** in Local. 02000

B. Procedure

NOTE
Steps 1 and 2 may be worked in parallel 02000

1. **IF** 1A DG is running with a SIAS signal present,
   THEN ENSURE actuation modules are reset locally (at the ESFAS cabinets) prior to 1A DG shutdown. 02000

2. **IF** 1A DG is in parallel operation with the 11/17 4KV Bus,
   THEN PERFORM the following: 02000

   a. **LOWER** MW **AND** KVAR loads concurrently to approximately 0.70 MW **AND** zero KVARs **PER** the following:

NOTE
Load may be lowered as rapidly as necessary. 02000

   (1) **LOWER** MW load using 1A DG SPEED CONTR, 1-CS-1705. 02000

   (2) **MAINTAIN** 0 to 500 KVARs using 1A DG AUTO VOLT CONTR, 1-CS-1704 **AND** FIGURE 1, 1A DIESEL GENERATOR ELECTRICAL LIMITS.

   (3) **MONITOR** 11/17 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**

   b. **WHEN** D/G load is approximately 0.7 MW,
   THEN PLACE 1A DG OUT BKR, 1-CS-152-1703, to TRIP.

6.5.4.B Procedure (Continued)

3. **IF** 1A DG output breaker 152-1703 is open,
THEN PERFORM the following: 02000

   a. **VERIFY** 1A DG voltage is 4.16KV (4.16KV to 4.30KV) on 1A DG VOLTS, 1-EI-1701.

   b. **CHECK** 1A DG frequency is approximately 60 Hz on 1A DG FREQUENCY, 1-SI-1701.

   c. **CHECK** the following alarms are clear:

      - "11, 17 BUS DIESEL BKRS CLOSE BLOCKED"
      - "1A DG • POT VOLT • FREQ LO"

   d. **DEPRESS** 1A DG STOP, 1-HS-1709, pushbutton.

   e. **VERIFY** exciter shutdown as indicated by zero volts on 1A DG VOLTS, 1-EI-1701.

   f. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 1C188:

      - 1A1 AC PRELUB PP SEL SW, 1-HS-10161
      - 1A2 AC PRELUB PP SEL SW, 1-HS-10201
      - 1A1 HT PRHT PP SEL SW, 1-HS-10081
      - 1A2 HT PRHT PP SEL SW, 1-HS-10101

   g. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 1C188:

      - 1A1 FO B/U PP SEL SW, 1-HS-10051
      - 1A2 FO B/U PP SEL SW, 1-HS-10061

   h. **DRAIN** the 1A Dirty Fuel Oil Tank to a suitable container through 1A DIRTY FUEL OIL TANK DRAIN VALVE, 1A-DFO-74.

      (1) **IF** the 1A Dirty Fuel Oil Tank was drained prior to starting **AND** more than one quart of fuel oil is drained from the 1A Dirty Fuel Oil Tank per hour of run time,
      THEN WRITE a Condition Report.

6.5.4.B.3 **Procedure (Continued)**

02000

i. **IF** 1A DG has operated one hour **OR** longer,
THEN CHECK the 1A Fuel Oil Day Tank for water as follows: **[B0251]**

(1) **OBTAIN** a suitable container for collecting the effluent.

(2) **CRACK OPEN** 1A FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 1A-DFO-28.

(3) **WHEN** all water has been removed,
THEN SHUT 1A FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 1A-DFO-28.

j. **DISPOSE** of ALL waste oil **PER** CH-1-101, Hazardous Waste Management.

k. **CHECK** any existing alarms.

l. **VERIFY** the 1A1 **AND** 1A2 Radiator Fans stop approximately 15 minutes following 1A DG shutdown by observing the associated green indicating light is illuminated on 1C188:

- 1A1 HT RAD FAN SEL SW, 1-HS-10082
- 1A2 HT RAD FAN SEL SW, 1-HS-10102

m. **VERIFY** 1A Fuel Oil Day Tank level is greater than 22 inches.

n. **NOTIFY** Plant Chemistry that 1A DG has been run and coolant sampling may be performed, if desired.

o. **IF** 1A DG was in parallel operation with 11 4KV Bus,
THEN ENSURE the CPS Generation Dispatcher is notified that the 1A Diesel is no longer paralleled.

6.5.4.B.3 Procedure (Continued)

02000

p. **IF** the 1A DG was paralleled to 11 4 KV bus,
THEN ALIGN the Control Room HVAC as follows:

- **IF** 11 CR HVAC was in operation,
THEN RESTORE the Control Room Chiller Unit **PER** OI-22F (N/A if 12 CR HVAC was in operation)
- **UNBYPASS** the Control Room Vent RMS, 0-RI-5350.
- **STOP** the Post-LOCI filter fans by placing the handswitches to STOP **AND LOG** the stopping time in the Charcoal Filter Log
  - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352
  - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353
- **IF** desired,
THEN PLACE the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to ON

****** END ******

6.6 1A FUEL OIL SYSTEM EQUIPMENT OPERATION

6.6.1 SELECT THE STANDBY 1A FUEL OIL DUPLEX FILTER

A. Initial Conditions

1. 1A DG is operating **OR** shutdown.

B. Procedure

1. **IF** the 1A1 **OR** 1A2 Fuel Oil Duplex Filter differential pressure instrument rises to approximately 3/4 of the scale **OR** if desired,
   THEN PERFORM the following to select the standby Fuel Oil Duplex Filter for service:

NOTE
Alarm "SEL SWS NOT IN AUTO POSITION" will alarm if the switch is placed to ON.

a. **IF** 1A DG is **NOT** running,
   THEN PLACE the selected fuel oil pump to ON:

DG :	HANDSWITCH
1A1 :	1A1 FO B/U PP SEL SW, 1-HS-10051
1A2 :	1A2 FO B/U PP SEL SW, 1-HS-10061

b. **CHECK** the position of the cursor on the selected Fuel Oil Duplex Filter PDIS:

DG :	PDIS
1A1 :	1A1 FO DPLX FILT DIFF PRESS IND/SW, 1-PDIS-10055
1A2 :	1A2 FO DPLX FILT DIFF PRESS IND/SW, 1-PDIS-10065

6.6.1.B.1 Procedure (Continued)

c. **POSITION** the selected Fuel Oil Duplex Filter valve to BLOW-OFF for the filter to be placed in service:

DG :	VALVE
1A1 :	1A1 DUPLEX FILTER 3-WAY VALVE, 1A1-DFO-147/148
1A2 :	1A2 DUPLEX FILTER 3-WAY VALVE, 1A2-DFO-147/148

d. **WAIT** approximately 20 seconds,
THEN POSITION the selected Fuel Oil Duplex Filter valve ALL the way to the stop for the filter to be in service:

DG :	VALVE
1A1 :	1A1 DUPLEX FILTER 3-WAY VALVE, 1A1-DFO-147/148
1A2 :	1A2 DUPLEX FILTER 3-WAY VALVE, 1A2-DFO-147/148

e. **CHECK** the position of the cursor of the selected Fuel Oil Duplex Filter PDIS is less than **OR** equal to the beginning cursor position:

DG :	PDIS
1A1 :	1A1 FO DPLX FILT DIFF PRESS IND/SW, 1-PDIS-10055
1A2 :	1A2 FO DPLX FILT DIFF PRESS IND/SW, 1-PDIS-10065

f. **IF** necessary,
THEN WRITE an Issue Report to have the dirty Fuel Oil Duplex Filter replaced.

6.6.1.B.1 **Procedure (Continued)**

g. **IF** the 1A1 **OR** 1A2 Fuel Oil Backup Pump was manually started, **THEN PERFORM** the following:

(1) **PLACE** the selected fuel oil pump to AUTO:

DG :	HANDSWITCH
1A1 :	1A1 FO B/U PP SEL SW, 1-HS-10051
1A2 :	1A2 FO B/U PP SEL SW, 1-HS-10061

(2) **CHECK** annunciator "SEL SWS NOT IN AUTO POSITION" clears.

****** END ******

6.6.2 SELECTING THE STANDBY 1A FUEL OIL TRANSFER FILTER

A. Initial Conditions

1. 1A DG is operating **OR** shutdown.

B. Procedure

1. **IF** the "FUEL OIL XFER PREFILTR CLOGGED" alarm is received, **OR** if desired,
   THEN PERFORM the following to select 1A Fuel Oil Transfer Filter 11 for service:

   a. **ENSURE LOCKED OPEN** 1A FUEL OIL TRANSFER FILTER 11 OUTLET VALVE, 1A-DFO-19.

   b. **OPEN AND LOCK** 1A FUEL OIL FILTER 11 INLET VALVE, 1A-DFO-16.

   c. **VENT** 1A Fuel Oil Transfer Filter 11 using 1A FUEL OIL TRANSFER FILTER 11 VENT VALVE, 1A-DFO-71.

   d. **SHUT AND LOCK** the following valves:

      - 1A FUEL OIL TRANSFER FILTER 12 INLET VALVE, 1A-DFO-17
      - 1A FUEL OIL TRANSFER FILTER 11 VENT VALVE, 1A-DFO-71

2. **IF** the "FUEL OIL XFER PREFILTR CLOGGED" alarm is received, **OR** if desired,
   THEN PERFORM the following to select 1A Fuel Oil Transfer Filter 12 for service:

   a. **ENSURE LOCKED OPEN** 1A FUEL OIL TRANSFER FILTER 12 OUTLET VALVE, 1A-DFO-20.

   b. **OPEN AND LOCK** 1A FUEL OIL TRANSFER FILTER 12 INLET VALVE, 1A-DFO-17.

   c. **VENT** 1A Fuel Oil Transfer Filter 12 using 1A FUEL OIL TRANSFER FILTER 12 VENT VALVE, 1A-DFO-72.

   d. **SHUT AND LOCK** the following valves:

      - 1A FUEL OIL TRANSFER FILTER 11 INLET VALVE, 1A-DFO-16
      - 1A FUEL OIL TRANSFER FILTER 12 VENT VALVE, 1A-DFO-72

6.6.2.B Procedure (Continued)

3. **IF** desired to check filter D/P,
   THEN PERFORM the following:

   a. **PLACE** the filter to be checked in service **PER** step 1 or 2.

   b. **UNLOCK AND fully OPEN** 1A FUEL OIL TRANSFER PUMPS 11/12 DISCHARGE VALVE, 1A-DFO-68.

NOTE

The time 1-HS-10021 is ON should be minimized to preclude a Fuel Oil Day Tank high level alarm.

   c. **PLACE** 1A-11 FO XFER PP CONTR SW, 1-HS-10021, to ON.

   d. **CHECK** that the "FUEL OIL XFER PREFILTR CLOGGED" alarm is clear.

   e. **PLACE** 1A-11 FO XFER PP CONTR SW, 1-HS-10021, to AUTO.

   f. **CHECK** annunciator "SEL SWS NOT IN AUTO POSITION" is clear.

   g. **LOCK THROTTLED** 1A FUEL OIL TRANSFER PUMPS 11/12 DISCHARGE VALVE, 1A-DFO-68, to 3.25 turns open.

   h. **IF** the "FUEL OIL XFER PREFILTR CLOGGED" alarm was received,
      THEN SHIFT to the standby filter **PER** step 1 or 2, **AND WRITE** an issue report to replace the dirty filter.

****** END ******

6.6.3 VENT THE 1A DG FUEL OIL PUMP PIPING

A. Initial Conditions

1. 1A DG is shutdown.
2. Fuel Oil Pump piping was drained.

B. Procedure

1. **REMOVE** the cap **AND ATTACH** hose to the following valves as required:
   - 1A1 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE LINE DRAIN VALVE, 1A1-DFO-55
   - 1A1 DUPLEX FILTER OUTLET LINE DRAIN VALVE, 1A1-DFO-56
   - 1A2 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE LINE DRAIN VALVE, 1A2-DFO-3
   - 1A2 DUPLEX FILTER OUTLET LINE DRAIN VALVE, 1A2-DFO-9
2. *Using the selected valves,* **VENT** *the selected piping to a suitable container by* draining at least one quart of oil.
   - 1A1 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE LINE DRAIN VALVE, 1A1-DFO-55
   - 1A1 DUPLEX FILTER OUTLET LINE DRAIN VALVE, 1A1-DFO-56
   - 1A2 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE LINE DRAIN VALVE, 1A2-DFO-3
   - 1A2 DUPLEX FILTER OUTLET LINE DRAIN VALVE, 1A2-DFO-9
3. **REMOVE** the hose **AND REPLACE** the cap on the selected valves:
   - 1A1 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE LINE DRAIN VALVE, 1A1-DFO-55
   - 1A1 DUPLEX FILTER OUTLET LINE DRAIN VALVE, 1A1-DFO-56
   - 1A2 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE LINE DRAIN VALVE, 1A2-DFO-3
   - 1A2 DUPLEX FILTER OUTLET LINE DRAIN VALVE, 1A2-DFO-9
4. **START** the selected Fuel Oil Backup Pump:
   - **PLACE** 1A1 FO B/U PP SEL SW, 1-HS-10051 to ON.
   - **PLACE** 1A2 FO B/U PP SEL SW, 1-HS-10061 to ON.

6.6.3.B **Procedure (Continued)**

NOTE
The pressure requirement only checks a sufficient rise in pressure to verify the pump is **NOT** air bound.

5. **VERIFY** the selected fuel oil feed pressure at least 10 PSIG greater than suction pressure:

   - 1A1 FO FEED PP DISCH PRESS, 1-PI-10052
   - 1A1 FO B/U PP SUCT PRESS, 1-PI-10051

   - 1A2 FO FEED PP DISCH PRESS, 1-PI-10062
   - 1A2 FO B/U PP SUCT PRESS, 1-PI-10061

6. **STOP** the selected Fuel Oil Backup Pump:

   - **PLACE** 1A1 FO B/U PP SEL SW, 1-HS-10051 to AUTO.

   - **PLACE** 1A2 FO B/U PP SEL SW, 1-HS-10061 to AUTO.

7. **DISPOSE** of drained oil **PER** CH-1-100, Controlled Materials Management.

****** END ******

6.7 1A DG LUBE OIL SYSTEM EQUIPMENT OPERATION

6.7.1 SELECT THE STANDBY 1A LUBE OIL DUPLEX FILTER

A. Initial Conditions

1. 1A DG is operating **OR** shutdown.

B. Procedure

1. **IF** a 1A1 **OR** 1A2 Lube Oil Duplex Filter High Alarm is received **OR** if desired, **THEN PERFORM** the following to select the standby Lube Oil Duplex Filter for service:

   a. **IF** 1A DG is **NOT** running,
   THEN VERIFY the red indicating light on the associated AC prelube pump is ON:

DG :	HANDSWITCH
1A1 :	1A1 AC PRELUB PP SEL SW, 1-HS-10161
1A2 :	1A2 AC PRELUB PP SEL SW, 1-HS-10201

   b. **CHECK** the position of the cursor for the selected Lube Oil Duplex Filter:

FILTER :	PDIS
1A1 Filters 1/2 :	1A1-1/2 LO FILT DIFF PRESS IND/SW, 1-PDIS-10171
1A1 Filters 3/4 :	1A1-3/4 LO FILT DIFF PRESS IND/SW, 1-PDIS-10170
1A2 Filters 1/2 :	1A2-1/2 LO FILT DIFF PRESS IND/SW, 1-PDIS-10211
1A2 Filters 3/4 :	1A2-3/4 LO FILT DIFF PRESS IND/SW, 1-PDIS-10210

6.7.1.B.1 **Procedure (Continued)**

c. **ROTATE** the selected Lube Oil Duplex Filter cross-tie valve 90° in the counter-clockwise direction to direct lube oil into the standby filter.

FILTER :	VALVE
1A1 Filters 1/2 :	1A1 LUBE OIL CARTRIDGE FILTERS 1 & 2 CROSS-TIE VALVE, 1A1-DLO-73
1A1 Filters 3/4 :	1A1 LUBE OIL CARTRIDGE FILTERS 3 & 4 CROSS-TIE VALVE, 1A1-DLO-74
1A2 Filters 1/2 :	1A2 LUBE OIL CARTRIDGE FILTERS 1 & 2 CROSS-TIE VALVE, 1A2-DLO-73
1A2 Filters 3/4 :	1A2 LUBE OIL CARTRIDGE FILTERS 3 & 4 CROSS-TIE VALVE, 1A2-DLO-74

d. **CHECK** the standby filter housing for leaks.

e. **FILL** the standby filter **PER** the following time limits:

- **IF** the engine is running,
  THEN FILL the standby filter a minimum of five minutes.

OR

- **IF** the engine prelube pump is operating,
  THEN FILL the standby filter a minimum of 20 minutes.

6.7.1.B.1 Procedure (Continued)

f. **WHEN** the filling time has elapsed,
THEN LIFT the locking pin **AND POSITION** the selected valve to the CENTER:

FILTER :	VALVE
1A1 Filters 1/2 :	1A1 LUBE OIL CARTRIDGE FILTERS 1/2 3-WAY VALVE, 1A1-DLO-22/25
1A1 Filters 3/4 :	1A1 LUBE OIL CARTRIDGE FILTERS 3/4 3-WAY VALVE, 1A1-DLO-40/43
1A2 Filters 1/2 :	1A2 LUBE OIL CARTRIDGE FILTERS 1/2 3-WAY VALVE, 1A2-DLO-22/25
1A2 Filters 3/4 :	1A2 LUBE OIL CARTRIDGE FILTERS 3/4 3-WAY VALVE, 1A2-DLO-40/43

g. **WAIT** approximately two seconds,
THEN LIFT the locking pin **AND POSITION** the selected valve to place the desired duplex filter in service.

6.7.1.B.1 **Procedure (Continued)**

h. **ROTATE** the selected Lube Oil Duplex Filter cross-tie valve 90° in the clockwise direction to SHUT the cross-tie valve:

FILTER :	VALVE
1A1 Filters 1/2 :	1A1 LUBE OIL CARTRIDGE FILTERS 1 & 2 CROSS-TIE VALVE, 1A1-DLO-73
1A1 Filters 3/4 :	1A1 LUBE OIL CARTRIDGE FILTERS 3 & 4 CROSS-TIE VALVE, 1A1-DLO-74
1A2 Filters 1/2 :	1A2 LUBE OIL CARTRIDGE FILTERS 1 & 2 CROSS-TIE VALVE, 1A2-DLO-73
1A2 Filters 3/4 :	1A2 LUBE OIL CARTRIDGE FILTERS 3 & 4 CROSS-TIE VALVE, 1A2-DLO-74

6.7.1.B.1 Procedure (Continued)

i. **IF** the engine is running,
THEN CHECK the differential pressure for the duplex filter in service is less than **OR** equal to the beginning differential pressure:

FILTER :	PDIS
1A1 Filters 1/2 :	1A1-1/2 LO FILT DIFF PRESS IND/SW, 1-PDIS-10171
1A1 Filters 3/4 :	1A1-3/4 LO FILT DIFF PRESS IND/SW, 1-PDIS-10170
1A2 Filters 1/2 :	1A2-1/2 LO FILT DIFF PRESS IND/SW, 1-PDIS-10211
1A2 Filters 3/4 :	1A2-3/4 LO FILT DIFF PRESS IND/SW, 1-PDIS-10210

j. **IF** necessary,
THEN WRITE an Issue Report to have the dirty Lube Oil Duplex Filter replaced.

****** END ******

6.7.2 FILL THE 1A AUXILIARY LUBE OIL TANK

A. Initial Conditions

1. 1A DG Lube Oil System valves are in the NORMAL alignment **PER** the following attachments:

   - ATTACHMENT 1C, 1A LUBE OIL SYSTEM VALVE LINEUP
   - ATTACHMENT 2C, 1A LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP

B. Procedure

NOTE
Approved lube oil specification is listed in the Control Room.

1. **DETERMINE** the number of lube oil drums required to fill 1A Lube Oil Auxiliary Tank to the desired level using TABLE 3, 1A AUXILIARY LUBE OIL TANK INDICATED VOLUME.
2. **VERIFY** lube oil type in the drums with the Oil Control Manual.
3. **CHECK** each lube oil drum is sealed with a factory seal **OR** has a custody seal.
4. **IF** the quality of the lube oil is questioned,
   THEN PERFORM the following:
   a. **REJECT** the drum.
   b. **RETURN** the drum to the warehouse.
   c. **INITIATE** an Issue Report for the rejected drum.
5. **WHEN** lube oil is ready to be transferred,
   THEN MOVE the required number of drums to the 1A DG Building lube oil drum station.
6. **PLACE** drip pans under hose connections.

CAUTION
Inspection of hose is to ensure no contaminants or water are added to the Lube Oil system.

7. **INSPECT AND CONNECT** a temporary hose to the 1A Lube Oil Fill Pump hose connection.

6.7.2.B Procedure (Continued)

8. **PERFORM** the following for each lube oil drum:

   a. **INSERT** the free end of the temporary hose into a lube oil drum.

   b. **PLACE** 1A LUBE OIL FILL PUMP, 1-HS-10162, to START **AND TRANSFER** the lube oil.

   c. **WHEN** the lube oil drum is empty,
   THEN PLACE 1A LUBE OIL FILL PUMP, 1-HS-10162, to STOP.

CAUTION
Do **NOT** exceed 34.5 inches of level.

   d. **CHECK** the level of 1A Auxiliary Lube Oil Tank.

9. **WHEN** 1A Auxiliary Lube Oil Tank is at the desired level,
THEN DISCONNECT the temporary hose **AND DRAIN** into the lube oil drum.

10. **STORE** the temporary hose in a leakproof container.

11. **DRAIN** any waste from the drip pans **AND DISPOSE** of **PER** CH-1-101, Hazardous Waste Management.

12. **REMOVE** the lube oil drums from the 1A DG Building in preparation for return to the warehouse.

13. **LOG** the amount of lube oil added **AND** information from the drum custody or factory seals in the Safety Related Consumables Log in the Control Room.

****** END ******

6.7.3 ADD LUBE OIL TO THE 1A DG LUBE OIL SUMPS

A. Initial Conditions

1. 1A DG Lube Oil System valves are aligned **PER** the following attachments:
   - ATTACHMENT 1C, 1A LUBE OIL SYSTEM VALVE LINEUP
   - ATTACHMENT 2C, 1A LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP

B. Procedure

1. **UNLOCK AND OPEN** the selected 1A DG oil sump lube oil inlet valve:

DG :	VALVE
1A1 :	1A LUBE OIL AUX TANK OUTLET TO 1A1 OIL SUMP ISOLATION VALVE, 1A1-DLO-61
1A2 :	1A LUBE OIL AUX TANK OUTLET TO 1A2 OIL SUMP ISOLATION VALVE, 1A2-DLO-61

NOTE
Approximately 10 gallons of lube oil are required to raise 1A DG Engine Lube Oil Sump level 1 inch on the dipstick.

2. **THROTTLE OPEN** the selected 1A DG oil sump fill valve to begin adding oil to the sump:

DG :	VALVE
1A1 :	1A1 DIESEL ENGINE OIL SUMP FILL VALVE, 1A1-DLO-60
1A2 :	1A2 DIESEL ENGINE OIL SUMP FILL VALVE, 1A2-DLO-60

6.7.3.B Procedure (Continued)

3. **WHEN** the desired amount has been added to the selected 1A DG Engine Lube Oil Sump,
   THEN SHUT the selected 1A DG oil sump fill valve:

DG :	VALVE
1A1 :	1A1 DIESEL ENGINE OIL SUMP FILL VALVE, 1A1-DLO-60
1A2 :	1A2 DIESEL ENGINE OIL SUMP FILL VALVE, 1A2-DLO-60

4. **SHUT AND LOCK** the selected 1A DG lube oil sump isolation valve:

DG :	VALVE
1A1 :	1A LUBE OIL AUX TANK OUTLET TO 1A1 OIL SUMP ISOLATION VALVE, 1A1-DLO-61
1A2 :	1A LUBE OIL AUX TANK OUTLET TO 1A2 OIL SUMP ISOLATION VALVE, 1A2-DLO-61

5. **LOG** the amount of lube oil added **AND IDENTIFY** the selected 1A DG engine in the Oil Control Log in the Control Room.

****** END ******

6.7.4 DRAIN AND REFILL THE 1A DG LUBE OIL SYSTEMS

A. Initial Conditions

1. 1A DG is tagged out.
2. The 1A Lube Oil Drain Tank is empty **OR** has adequate capacity to accept approximately 200 gallons per engine (refer to TABLE 5, 1A LUBE OIL DRAIN TANK VOLUME).
3. 1A Lube Oil System valves are aligned **PER** the following attachments:
   - ATTACHMENT 1C, 1A LUBE OIL SYSTEM VALVE LINEUP
   - ATTACHMENT 2C, 1A LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP

B. Procedure

1. **PERFORM** the following to drain the selected 1A DG lube oil system:
   a. **VERIFY** the selected 1A Prelube Pumps are OFF:

DG :	PUMP
1A1 :	1A1 AC and Pneumatic Prelube Pumps
1A2 :	1A2 AC and Pneumatic Prelube Pumps

   b. **VERIFY** 1A LUBE OIL DRAIN TANK INLET FROM 1A DG DRAIN HEADER ISOLATION VALVE, 1A-DLO-1, is OPEN.
   c. **VERIFY** the following valves are SHUT:
      - 1A LUBE OIL DRAIN SYSTEM RETURN TO 1A1 DG ISOLATION VALVE, 1A-DLO-19
      - 1A LUBE OIL DRAIN SYSTEM RETURN TO 1A2 DG ISOLATION VALVE, 1A-DLO-18

6.7.4.B.1 Procedure (Continued)

d. **OPEN** the selected 1A DG lube oil system drain valve to commence draining the lube oil:

DG :	VALVE
1A1 :	1A1 DIESEL ENGINE OIL SUMP DRAIN VALVE, 1A1-DLO-30
1A2 :	1A2 DIESEL ENGINE OIL SUMP DRAIN VALVE, 1A2-DLO-30

e. **WHEN** draining is complete,
THEN LOCK SHUT the selected 1A DG lube oil system drain valve:

DG :	VALVE
1A1 :	1A1 DIESEL ENGINE OIL SUMP DRAIN VALVE, 1A1-DLO-30
1A2 :	1A2 DIESEL ENGINE OIL SUMP DRAIN VALVE, 1A2-DLO-30

6.7.4.B Procedure (Continued)

2. **IF** filling a 1A DG Lube Oil Sump from the 1A Lube Oil Drain Tank is desired, **THEN PERFORM** the following:

   a. **VERIFY** 1A Lube Oil System valves are aligned for the 1A DG engine being filled **PER** the following attachments:

      - ATTACHMENT 1C, 1A LUBE OIL SYSTEM VALVE LINEUP
      - ATTACHMENT 2C, 1A LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP

   b. **VERIFY** 1A LUBE OIL DRAIN TANK TRANSFER PUMP SUCTION VALVE, 1A-DLO-6, is OPEN.

   c. **VERIFY** 1A LUBE OIL DRAIN FILTER OUTLET VALVE, 1A-DLO-16, is OPEN.

   d. **OPEN** 1A LUBE OIL DRAIN TANK RECIRC LINE ISOLATION VALVE, 1A-DLO-30.

   e. **PLACE** 1A LUBE OIL DRAIN TANK TRANSFER PUMP, 1-HS-10001, to **START**.

   f. **OPEN** the selected 1A DG return valve to begin transferring lube oil:

DG :	VALVE
1A1 :	1A LUBE OIL DRAIN SYSTEM RETURN TO 1A1 DG ISOLATION VALVE, 1A-DLO-19
1A2 :	1A LUBE OIL DRAIN SYSTEM RETURN TO 1A2 DG ISOLATION VALVE, 1A-DLO-18

CAUTION
Closing 1A-DLO-30 isolates the recirc path for the 1A Lube Oil Drain Tank Transfer Pump.

   g. **SHUT** 1A LUBE OIL DRAIN TANK RECIRC LINE ISOLATION VALVE, 1A-DLO-30.

6.7.4.B.2 **Procedure (Continued)**

NOTE
Engine oil sump level should **NOT** exceed the "B" mark on the dipstick when the prelube system is shutdown.

h. **MONITOR** the lube oil level at the selected 1A DG dipstick:

DG :	DIPSTICK
1A1 :	1A1 LO LVL IND, 1-LI-10165
1A2 :	1A2 LO LVL IND, 1-LI-10204

CAUTION
The 1A Lube Oil Drain Tank Transfer Pump shall **NOT** be left unattended while operating with the Bypass Switch in BYPASS.

i. **IF** additional lube oil must be transferred below the 1A Lube Oil Drain Tank Transfer Pump stop interlock,
THEN POSITION the Bypass Switch to BYPASS **AND RESTART** the 1A Lube Oil Drain Tank Transfer Pump.

j. **WHEN** the selected 1A DG lube oil sump reaches the desired level,
THEN STOP 1A LUBE OIL DRAIN TANK TRANSFER PUMP, 1-HS-10001.

k. **VERIFY** the Bypass Switch is positioned to NORMAL.

l. **SHUT** the selected 1A DG return valve from 1A Lube Oil Drain Tank:

DG :	VALVE
1A1 :	1A LUBE OIL DRAIN SYSTEM RETURN TO 1A1 DG ISOLATION VALVE, 1A-DLO-19
1A2 :	1A LUBE OIL DRAIN SYSTEM RETURN TO 1A2 DG ISOLATION VALVE, 1A-DLO-18

****** END ******

6.7.5 OPERATE THE 1A PNEUMATIC PRELUBE PUMPS [B0255]

A. Initial Conditions

1. 1A Lube Oil System valves are aligned **PER** the following attachments:
   - ATTACHMENT 1C, 1A LUBE OIL SYSTEM VALVE LINEUP
   - ATTACHMENT 2C, 1A LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP

B. Procedure

1. **IF** Pneumatic Prelube pumps are to be run without an engine start, **THEN** PERFORM the following:
   a. **ENSURE** the 1A DG is **REMOVED** from service **PER** Section 6.11, REMOVE AND RESTORE 1A DG TO/FROM SERVICE.
   b. **SECURE** the AC Prelube pumps by PLACING the following handswithches in OFF:
      - 1A1 AC PRELUBE PP SEL SW, 1-HS-10161
      - 1A2 AC PRELUBE PP SEL SW, 1-HS-10201
2. **OPEN** the following valves:
   - 1A1 PNEUMATIC PRELUBE PUMP SUCTION VALVE, 1A1-DLO-2
   - 1A1 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE, 1A1-DLO-14
   - 1A2 PNEUMATIC PRELUBE PUMP SUCTION VALVE, 1A2-DLO-2
   - 1A2 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE, 1A2-DLO-14
3. **OPEN** the 1A Pneumatic Prelube Pump Air Bottle outlet valve.
4. **START** the 1A Pneumatic Prelube pumps by **PERFORMING** the following:
   a. **ADJUST** 1A PNEUMATIC PRELUBE PUMP AIR REGULATOR, 1-PCV-10180, to a maximum of 110 PSIG on 1A PNEUMATIC PRELUBE PUMP AIR SUPPLY REGULATOR OUTLET PI, 1-PI-10180, to start the Prelube pump turning.
   b. **WHEN** BOTH Prelube pumps have started, **THEN THROTTLE** the 1A PNEUMATIC PRELUBE PUMP AIR REGULATOR, 1-PCV-10180, to obtain approximately 35 PSIG (30-40 PSIG) on 1A PNEUMATIC PRELUBE PUMP AIR SUPPLY REGULATOR OUTLET PI, 1-PI-10180.

6.7.5.B Procedure (Continued)

NOTE
An additional full air bottle will be needed if the 20 minute prelube time is required.

5. **IF** starting 1A DG,
THEN PERFORM the following PRIOR to starting 1A DG:

   - **IF** the following conditions apply,
THEN OPERATE the 1A Pneumatic Prelube Pumps a MINIMUM of 5 minutes:

     - *The prelube pumps ran at least 20 continuous minutes prior to stopping.*

     AND

     - The prelube pumps have been off less than 40 minutes.

   OR

   - **IF** the above conditions are **NOT** met,
THEN OPERATE the 1A Pneumatic Prelube Pumps a MINIMUM of 20 minutes.

NOTE
The 1A Pneumatic Prelube Pumps should be stopped when 1A DG is running.

6. **WHEN** operation of the 1A Pneumatic Prelube Pumps is **NOT** required,
THEN PERFORM the following:

   a. **ADJUST** 1A PNEUMATIC PRELUBE PUMP AIR REGULATOR, 1-PCV-10180, to obtain approximately zero psig on 1A PNEUMATIC PRELUBE PUMP AIR SUPPLY REGULATOR OUTLET PI, 1-PI-10180.

   b. **SHUT** the 1A Pneumatic Prelube Pump Air Bottle outlet valve.

   c. **SHUT** the following valves:

      - 1A2 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE, 1A2-DLO-14
      - 1A2 PNEUMATIC PRELUBE PUMP SUCTION VALVE, 1A2-DLO-2
      - 1A1 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE, 1A1-DLO-14
      - 1A1 PNEUMATIC PRELUBE PUMP SUCTION VALVE, 1A1-DLO-2

6.7.5.B Procedure (Continued)

7. **IF** the Pneumatic Prelube pumps were run without starting the 1A DG, **THEN** PERFORM the following:

   a. **START** the AC prelube pumps by placing the following handswithches in AUTO:

      - 1A1 AC PRELUBE PP SEL SW, 1-HS-10161
      - 1A2 AC PRELUBE PP SEL SW, 1-HS-10201

   b. **VERIFY** AC PRELUBE PUMP FAILURE alarm clear on 1C188.

   c. **IF** desired, **RESTORE** the 1A DG to service **PER** Section 6.11, REMOVE AND RESTORE 1A DG TO/FROM SERVICE.

8. **VERIFY** the 1A Pneumatic Prelube Pump Air Bottle pressure is at least 2000 psig **OR REPLACE** the air bottle.

   - 1A PNEUMATIC PRELUBE PUMP AIR SUPPLY REGULATOR INLET PI, 1-PI-10183

****** END ******

6.7.6 PUMP THE 1A LUBE OIL DRAIN TANK TO A TRUCK

A. Initial Conditions

1. None

B. Procedure

NOTE
Drip pans shall be placed under hose connections to collect any leakage.

1. **CONNECT** the transfer hose from the tanker truck to 1A LUBE OIL DRAIN SYSTEM OUTSIDE TRUCK CONNECTION ISOLATION VALVE, 1A-DLO-15.

2. **OPEN** the truck hose connection valve.

3. **OPEN** 1A LUBE OIL DRAIN SYSTEM OUTSIDE TRUCK CONNECTION ISOLATION VALVE, 1A-DLO-15.

4. **VERIFY** 1A LUBE OIL DRAIN TANK TRANSFER PUMP SUCTION VALVE, 1A-DLO-6, is OPEN.

5. **SHUT** 1A LUBE OIL DRAIN FILTER OUTLET VALVE, 1A-DLO-16.

6. **UNLOCK AND OPEN** 1A LUBE OIL DRAIN TANK TRANSFER PUMP DISCHARGE TO TRUCK CONNECTION ISOLATION VALVE, 1A-DLO-11.

7. **PLACE** 1A LUBE OIL DRAIN TK TRANSFER PUMP, 1-HS-10001, to START to begin transferring 1A Lube Oil Drain Tank contents to the truck.

8. **MONITOR** the transfer process **AND CHECK** for leaks at the hose connections.

CAUTION
The 1A Lube Oil Drain Tank Transfer Pump shall **NOT** be left unattended while operating with the Bypass Switch in BYPASS.

9. **IF** additional lube oil will be transferred below the 1A Lube Oil Drain Tank Transfer Pump low level stop interlock,
THEN POSITION the Bypass Switch to BYPASS.

   a. **IF** necessary,
   THEN RESTART the 1A Lube Oil Drain Tank Transfer Pump.

6.7.6.B Procedure (Continued)

NOTE
If level in the 1A Lube Oil Drain Tank reaches the low level setpoint, the transfer pump will automatically stop unless bypassed.

10. **WHEN** the 1A Lube Oil Drain Tank reaches the desired level, **THEN STOP** the 1A Lube Oil Drain Tank Transfer Pump.

11. **VERIFY** the Bypass Switch is positioned to NORMAL.

12. **LOCK SHUT** 1A LUBE OIL DRAIN TANK TRANSFER PUMP DISCHARGE TO TRUCK CONNECTION ISOLATION VALVE, 1A-DLO-11.

13. **OPEN** 1A LUBE OIL DRAIN FILTER OUTLET VALVE, 1A-DLO-16.

14. **SHUT** 1A LUBE OIL DRAIN SYSTEM OUTSIDE TRUCK CONNECTION ISOLATION VALVE, 1A-DLO-15.

15. **SHUT** the truck hose connection valve.

NOTE
- Ensure any lube oil in the hose is directed to a collection device.
- The CRS **OR** the Shift Manager shall be notified if an oil spill occurs. This also applies to contained spills.

16. **DISCONNECT** the transfer hose from the truck **AND** 1A LUBE OIL DRAIN SYSTEM OUTSIDE TRUCK CONNECTION ISOLATION VALVE, 1A-DLO-15.

17. **DRAIN** the transfer hose **AND STORE** in a suitable receptacle.

18. **DISPOSE** of any waste oil **PER** CH-1-101, Hazardous Waste Management.

****** END ******

6.7.7 RECIRCULATING THE 1A LUBE OIL DRAIN TANK

A. Initial Conditions

1. At least SIX inches indicated level in the 1A Lube Oil Drain Tank to ensure level is above the suction piping of the 1A Lube Oil Drain Tank Transfer Pump.

B. Procedure

1. **CHECK OPEN** 1A LUBE OIL DRAIN TANK TRANSFER PUMP SUCTION VALVE, 1A-DLO-6.

2. **CHECK OPEN** 1A LUBE OIL DRAIN FILTER OUTLET VALVE, 1A-DLO-16.

3. **ENSURE SHUT** the following valves:

   - 1A LUBE OIL DRAIN SYSTEM RETURN TO 1A1 DG ISOLATION VALVE, 1A-DLO-19
   - 1A LUBE OIL DRAIN SYSTEM RETURN TO 1A2 DG ISOLATION VALVE, 1A-DLO-18
   - 1A LUBE OIL DRAIN SYSTEM RETURN TO 0C DG HDR ISOLATION VALVE, 0C-DLO-2
   - 0C1 DIESEL LUBE OIL TO 1A LUBE OIL DRAIN SYSTEM ISOLATION VALVE, 0C1-DLO-73
   - 0C2 DIESEL LUBE OIL TO 1A LUBE OIL DRAIN SYSTEM ISOLATION VALVE, 0C2-DLO-73

4. **OPEN** 1A LUBE OIL DRAIN TANK RECIRC LINE ISOLATION VALVE, 1A-DLO-30.

5. **PLACE** 1A LUBE OIL DRAIN TANK TRANSFER PUMP, 1-HS-10001, to START to begin recirculation.

NOTE

The 1A Lube Oil Drain Pump capacity is 12 GPM. The recirculation time will depend on the volume in the tank. The number of tank volumes to be recirculated will be determined by System Engineer, Maintenance or Chemistry.

6. **RECIRCULATE** the 1A Lube Oil Drain Tank contents as necessary.

7. **CHECK** LO DRAIN TK FILTER D/P GAGE, 1-PDI-10002, indicates less than 20 PSIG.

   a. IF LO DRAIN TK FILTER D/P GAGE, 1-PDI-10002, indicates greater than or equal to 20 PSIG,
   THEN WRITE an issue report to replace the filter.

6.7.7.B Procedure (Continued)

8. **IF** desired,
   THEN REQUEST Plant Chemistry sample the 1A Lube Oil Drain Tank.

9. **WHEN** recirculation is complete,
   THEN STOP 1A LUBE OIL DRAIN TANK TRANSFER PUMP, 1-HS-10001.

10. **SHUT** 1A LUBE OIL DRAIN TANK RECIRC LINE ISOLATION VALVE, 1A-DLO-30.

****** END ******

6.8 1A COOLANT SYSTEM EQUIPMENT OPERATION

6.8.1 MAKEUP TO THE 1A HT/LT COOLANT EXPANSION TANKS

A. Initial Conditions

1. 1A HT/LT Coolant System valves are aligned **PER** the following attachments:
   - ATTACHMENT 1D, 1A HT/LT COOLANT SYSTEM VALVE LINEUP
   - ATTACHMENT 2D, 1A HT/LT COOLANT SYSTEM INSTRUMENT VALVE LINEUP
2. The 1A Coolant Mixing Tank is available.
3. **IF** used,
   THEN the propylene glycol barrel is sealed **OR** locked prior to use.

B. Procedure

NOTE
Sampling of 1A Coolant Mixing Tank is **NOT** required if all of the following conditions are met:
1. Latest Chemistry sample results are posted including Date, Sample percentage and Tank Level.
2. Tank Level is not higher than the posted result.
3. Glycol or DI water makeup to Mixing Tank is **NOT** required.

CAUTION
Mixtures with less than 40% proylene glycol should not be used due to potential freezing of fill piping in unheated areas.

1. **IF** sampling of the 1A Coolant Mixing Tank is required,
   THEN PERFORM the following:
   a. **REQUEST** Plant Chemistry sample the 1A Coolant Mixing Tank contents **AND** the selected 1A HT **OR** LT Cooling Water System.

NOTE
The 1A HT/LT Expansion Tanks hold 2.5 gal/inch (0 - 32 inches = 80 gallons).

   b. **NOTIFY** Plant Chemistry of the amount of makeup required **AND REQUEST** Plant Chemistry recommend amounts of demineralized water **AND** propylene glycol to be mixed for the required concentration.

6.8.1.B.1 **Procedure (Continued)**

NOTE
The 1A Coolant Mixing Tank holds 4.3 gal/inch (0 - 40 inches = 172 gallons. Approximately 29 additional gallons remain below indicated zero).

c. **WHEN** the recommended mixture volumes have been identified, **THEN PERFORM** the following:

(1) **IF** Demineralized Water is required, **THEN PERFORM** the following:

(a) **VERIFY** DEMINERALIZED WATER TO 1A DIESEL GENERATOR BUILDING ISOLATION VALVE, 0-DW-500, is OPEN.

(b) **OPEN** 1A COOLANT MIXING TANK DEMIN WATER INLET VALVE, 0-DW-501, **AND ADD** the required amount of demineralized water to the 1A Coolant Mixing Tank.

(c) **SHUT** 1A COOLANT MIXING TANK DEMIN WATER INLET VALVE, 0-DW-501.

(d) **SHUT** DEMINERALIZED WATER TO 1A DIESEL GENERATOR BUILDING ISOLATION VALVE, 0-DW-500.

6.8.1.B.1.c **Procedure (Continued)**

(2) **IF** Propylene Glycol addition is required,
THEN PERFORM the following:

(a) **CONNECT** a hose to the 1A Glycol Fill Pump hose connection.

(b) **PLACE** a catch pan under the hose connection to receive any spills.

(c) **PLACE** the free end of the hose into the propylene glycol barrel.

(d) **OPEN** 1A COOLANT MIXING TANK GLYCOL FILL LINE INLET VALVE, 1A-DCW-6.

(e) **PLACE** 1A GLYCOL FILL PP, 1-HS-10074, to START.

(f) **WHEN** the required amount has been transferred,
THEN PLACE 1A GLYCOL FILL PP, 1-HS-10074, to STOP.

(g) **SHUT** 1A COOLANT MIXING TANK GLYCOL FILL LINE INLET VALVE, 1A-DCW-6.

(h) **DISCONNECT** the hose from the 1A Glycol Fill Pump hose connection **AND DRAIN** the hose into the glycol barrel.

(i) **REMOVE** the hose from the propylene glycol barrel **AND STORE** in a leakproof container.

(j) **IF NOT** empty,
THEN SHUT AND LOCK the propylene glycol barrel to prevent contamination.

(k) **RECORD** propylene glycol barrel tracking information in the Outside Operators log.

(l) **REMOVE** the drip pans **AND DISPOSE** of any leaked propylene glycol **PER** CH-1-100, Controlled Materials Management.

6.8.1.B Procedure (Continued)

2. **RECIRCULATE** the 1A Coolant Mixing Tank contents as follows:

   a. **ENSURE OPEN** 1A COOLANT MIXING TANK OUTLET VALVE, 1A-DCW-7.

   b. **VERIFY** 1A COOLANT MIXING TANK PUMP DISCHARGE VALVE, 1A-DCW-38, is SHUT.

NOTE

- When recirculating, the 1A Coolant Mixing Tank Pump flowrate is approximately 10 GPM.
- The 1A Coolant Mixing Tank Pump will automatically stop at a level of approximately 13 inches indicated in the tank.

   c. **PLACE** 1A COOLANT MIXING TANK PP, 1-HS-10073, to START, to begin recirculating the 1A Coolant Mixing Tank.

   d. **IF** desired,
   THEN REQUEST Plant Chemistry sample the 1A Coolant Mixing Tank contents **AND VERIFY** the mixture is within the recommended range.

   e. **VERIFY** the following valves are SHUT:

   - 0C1 LT EXPANSION TANK FILL VALVE, 0C-DCW-11
   - 0C1 HT EXPANSION TANK FILL VALVE, 0C-DCW-12
   - 0C2 LT EXPANSION TANK FILL VALVE, 0C-DCW-13
   - 0C2 HT EXPANSION TANK FILL VALVE, 0C-DCW-14
   - 1A1 LT EXPANSION TANK FILL VALVE, 1A-DCW-11
   - 1A1 HT EXPANSION TANK FILL VALVE, 1A-DCW-12
   - 1A2 LT EXPANSION TANK FILL VALVE, 1A-DCW-13
   - 1A2 HT EXPANSION TANK FILL VALVE, 1A-DCW-14

NOTE

Two Operators should perform the filling operation.

3. **WHEN** the 1A Coolant Mixing Tank contents are ready to be transferred, **THEN OPEN** 1A COOLANT MIXING TANK PUMP DISCHARGE VALVE, 1A-DCW-38.

6.8.1.B Procedure (Continued)

4. **THROTTLE OPEN** approximately one turn, the selected expansion tank isolation valve to commence filling:

EXP TK :	VALVE
1A1 HT :	1A1 HT EXPANSION TANK FILL VALVE, 1A-DCW-12
1A1 LT :	1A1 LT EXPANSION TANK FILL VALVE, 1A-DCW-11
1A2 HT :	1A2 HT EXPANSION TANK FILL VALVE, 1A-DCW-14
1A2 LT :	1A2 LT EXPANSION TANK FILL VALVE, 1A-DCW-13

CAUTION

- The HT/LT Expansion Tanks overflow to the 1A Coolant Mixing Tank at approximately 35.5 inches.
- The expansion tanks should **NOT** be filled above 25 inches.

5. **WHEN** the level in the 1A HT/LT Expansion Tank rises to the desired level, **THEN SHUT** the selected expansion tank isolation valve:

EXP TK :	VALVE
1A1 HT :	1A1 HT EXPANSION TANK FILL VALVE, 1A-DCW-12
1A1 LT :	1A1 LT EXPANSION TANK FILL VALVE, 1A-DCW-11
1A2 HT :	1A2 HT EXPANSION TANK FILL VALVE, 1A-DCW-14
1A2 LT :	1A2 LT EXPANSION TANK FILL VALVE, 1A-DCW-13

6. **PLACE** 1A COOLANT MIXING TANK PP, 1-HS-10073, to STOP.

7. **SHUT** 1A COOLANT MIXING TANK PUMP DISCHARGE VALVE, 1A-DCW-38.

6.8.1.B Procedure (Continued)

8. **IF** desired, **REFILL** the 1A Coolant Mixing Tank.

   a. **REQUEST** Plant Chemistry recommend amounts of demineralized water **AND** propylene glycol to be mixed.

NOTE
The 1A Coolant Mixing Tank holds 4.3 gal/inch (0 - 40 inches = 172 gallons. Approximately 29 additional gallons remain below indicated zero).

   b. **WHEN** the recommended mixture volumes have been identified, **THEN PERFORM** the following:

      (1) **IF** Demineralized Water is required, **THEN PERFORM** the following:

         (a) **VERIFY** DEMINERALIZED WATER TO 1A DIESEL GENERATOR BUILDING ISOLATION VALVE, 0-DW-500, is OPEN.

         (b) **OPEN** 1A COOLANT MIXING TANK DEMIN WATER INLET VALVE, 0-DW-501, **AND ADD** the required amount of demineralized water to the 1A Coolant Mixing Tank.

         (c) **SHUT** 1A COOLANT MIXING TANK DEMIN WATER INLET VALVE, 0-DW-501.

         (d) **SHUT** DEMINERALIZED WATER TO 1A DIESEL GENERATOR BUILDING ISOLATION VALVE, 0-DW-500.

6.8.1.B.8.b **Procedure (Continued)**

(2) **IF** Propylene Glycol addition is required,
THEN PERFORM the following:

(a) **CONNECT** a hose to the 1A Glycol Fill Pump hose connection.

(b) **PLACE** a catch pan under the hose connection to receive any spills.

(c) **PLACE** the free end of the hose into the propylene glycol barrel.

(d) **OPEN** 1A COOLANT MIXING TANK GLYCOL FILL LINE INLET VALVE, 1A-DCW-6.

(e) **PLACE** 1A GLYCOL FILL PP, 1-HS-10074, to START.

(f) **WHEN** the required amount has been transferred,
THEN PLACE 1A GLYCOL FILL PP, 1-HS-10074, to STOP.

(g) **SHUT** 1A COOLANT MIXING TANK GLYCOL FILL LINE INLET VALVE, 1A-DCW-6.

(h) **DISCONNECT** the hose from the 1A Glycol Fill Pump hose connection **AND DRAIN** the hose into the glycol barrel.

(i) **REMOVE** the hose from the propylene glycol barrel **AND STORE** in a leakproof container.

(j) **IF NOT** empty,
THEN SHUT AND LOCK the propylene glycol barrel to prevent contamination.

(k) **RECORD** propylene glycol barrel tracking information in the Outside Operators log.

(l) **REMOVE** the drip pans **AND DISPOSE** of any leaked propylene glycol **PER** CH-1-100, Controlled Materials Management.

6.8.1.B.8 **Procedure (Continued)**

c. **RECIRCULATE** the 1A Coolant Mixing Tank contents as follows:

(1) **ENSURE OPEN** 1A COOLANT MIXING TANK OUTLET VALVE, 1A-DCW-7.

(2) **VERIFY** 1A COOLANT MIXING TANK PUMP DISCHARGE VALVE, 1A-DCW-38, is SHUT.

(3) **PLACE** 1A COOLANT MIXING TANK PP, 1-HS-10073, to START, to begin recirculating the 1A Coolant Mixing Tank.

NOTE

- The 1A Coolant Mixing Tank holds 4.3 gal/inch (0 - 40 inches = 172 gallons. Approximately 29 additional gallons remain below indicated zero).
- When recirculating, the 1A Coolant Mixing Tank Pump flowrate is approximately 10 GPM.

(4) **WHEN** the 1A Coolant Mixing Tank has recirculated at least three volumes,
THEN PLACE 1A COOLANT MIXING TANK PP, 1-HS-10073, to STOP.

(5) **IF** desired,
THEN REQUEST Plant Chemistry sample the 1A Coolant Mixing Tank contents **AND VERIFY** the mixture is within the recommended range.

****** END ******

6.8.2 DRAIN THE 1A HT/LT COOLANT SYSTEMS TO THE 1A COOLANT DRAIN TANK

A. Initial Conditions

1. 1A DG is tagged out for maintenance.
2. The associated 1A DG equipment is tagged out:
   - 1A1 Electric Water Preheater **AND** 1A1 Preheat Pump
   - 1A2 Electric Water Preheater **AND** 1A2 Preheat Pump
3. The 1A HT/LT Coolant system valves are aligned **PER** the following attachments:
   - ATTACHMENT 1D, 1A HT/LT COOLANT SYSTEM VALVE LINEUP
   - ATTACHMENT 2D, 1A HT/LT COOLANT SYSTEM INSTRUMENT VALVE LINEUP
4. The expected maintenance requires draining one **OR** more of the 1A HT/LT Coolant Systems.
5. Since the 1A Coolant Drain Tank will **NOT** hold all four HT/LT coolant circuits, the 1A Coolant Drain Tank is empty **OR** has adequate capacity to accept the expected volume to be drained (refer to TABLE 4, 1A COOLANT DRAIN TANK VOLUME).
   - HT loop - ≈700 gal. each
   - LT loop - ≈1000 gal. each
   - Engine Block - ≈150 gal. each
6. A portable pump with hose connections is available if draining lower piping.
7. HT Coolant temperature less than or equal to 110° F as indicated at the Aux desk gage.

6.8.2 DRAIN THE 1A HT/LT COOLANT SYSTEMS TO THE 1A COOLANT DRAIN TANK (Continued)

B. Procedure

1. **PERFORM** the following to drain a selected 1A HT/LT Coolant System:

   a. **CONNECT** one end of a temporary hose to the quick disconnect located on top of the 1A Coolant Drain Tank.

   b. **IF** a portable pump is being used,
   THEN PERFORM the following:

      (1) **CONNECT** the other end of the temporary hose to the portable pump discharge quick disconnect.

      (2) **CONNECT** a second temporary hose (with quick disconnects) to the portable pump suction quick disconnect.

6.8.2.B.1 Procedure (Continued)

NOTE
Depending on the reason for draining the selected 1A HT/LT Coolant System, one **OR** both sides of the AMOT Thermostatic valve may require draining.

c. **CONNECT** the free end of the temporary hose to the selected 1A HT/LT Coolant System drain valve:

CLG SYS :	VALVE
1A1 HT :	1A1 HT RADIATOR FILL AND DRAIN VALVE, 1A1-DCW-1 **OR** 1A1 HT COOLANT DRAIN/SAMPLE VALVE, 1A1-DCW-57
1A1 LT :	1A1 LT RADIATOR FILL AND DRAIN VALVE, 1A1-DCW-14 **OR** 1A1 LT COOLANT DRAIN/SAMPLE VALVE, 1A1-DCW-58
1A2 HT :	1A2 HT RADIATOR FILL AND DRAIN VALVE, 1A2-DCW-1 **OR** 1A2 HT COOLANT DRAIN/SAMPLE VALVE, 1A2-DCW-57
1A2 LT :	1A2 LT RADIATOR FILL AND DRAIN VALVE, 1A2-DCW-14 **OR** 1A2 LT COOLANT DRAIN/SAMPLE VALVE, 1A2-DCW-58
1A1 ENGINE BLOCK :	1A1 ENGINE BLOCK HT COOLANT DRAIN VALVE, 1A1-DCW-30 **AND** 1A1 ENGINE BLOCK HT COOLANT DRAIN VALVE, 1A1-DCW-42
1A2 ENGINE BLOCK :	1A2 ENGINE BLOCK HT COOLANT DRAIN VALVE, 1A2-DCW-30 **AND** 1A2 ENGINE BLOCK HT COOLANT DRAIN VALVE, 1A2-DCW-42

2. **PLACE** drip pans **OR** absorbent material at hose connections to catch any leaked propylene glycol.

6.8.2.B Procedure (Continued)

3. **OPEN** the selected 1A HT/LT Coolant System drain valve:

CLG SYS :	VALVE
1A1 HT :	1A1 HT RADIATOR FILL AND DRAIN VALVE, 1A1-DCW-1 **OR** 1A1 HT COOLANT DRAIN/SAMPLE VALVE, 1A1-DCW-57
1A1 LT :	1A1 LT RADIATOR FILL AND DRAIN VALVE, 1A1-DCW-14 **OR** 1A1 LT COOLANT DRAIN/SAMPLE VALVE, 1A1-DCW-58
1A2 HT :	1A2 HT RADIATOR FILL AND DRAIN VALVE, 1A2-DCW-1 **OR** 1A2 HT COOLANT DRAIN/SAMPLE VALVE, 1A2-DCW-57
1A2 LT :	1A2 LT RADIATOR FILL AND DRAIN VALVE, 1A2-DCW-14 **OR** 1A2 LT COOLANT DRAIN/SAMPLE VALVE, 1A2-DCW-58
1A1 ENGINE BLOCK :	1A1 ENGINE BLOCK HT COOLANT DRAIN VALVE, 1A1-DCW-30 **AND** 1A1 ENGINE BLOCK HT COOLANT DRAIN VALVE, 1A1-DCW-42
1A2 ENGINE BLOCK :	1A2 ENGINE BLOCK HT COOLANT DRAIN VALVE, 1A2-DCW-30 **AND** 1A2 ENGINE BLOCK HT COOLANT DRAIN VALVE, 1A2-DCW-42

4. **IF** a portable pump is being used,
   THEN START the portable pump.

5. **MONITOR** the 1A Coolant Drain Tank level while draining the selected 1A HT **OR** LT Coolant system.

6.8.2.B Procedure (Continued)

6. **WHEN** draining is complete,
THEN PERFORM the following:

   a. **IF** used,
   THEN STOP the portable pump.

   b. **SHUT** the selected 1A HT/LT Coolant System drain valve:

CLG SYS :	VALVE
1A1 HT :	1A1 HT RADIATOR FILL AND DRAIN VALVE, 1A1-DCW-1 **OR** 1A1 HT COOLANT DRAIN/SAMPLE VALVE, 1A1-DCW-57
1A1 LT :	1A1 LT RADIATOR FILL AND DRAIN VALVE, 1A1-DCW-14 **OR** 1A1 LT COOLANT DRAIN/SAMPLE VALVE, 1A1-DCW-58
1A2 HT :	1A2 HT RADIATOR FILL AND DRAIN VALVE, 1A2-DCW-1 **OR** 1A2 HT COOLANT DRAIN/SAMPLE VALVE, 1A2-DCW-57
1A2 LT :	1A2 LT RADIATOR FILL AND DRAIN VALVE, 1A2-DCW-14 **OR** 1A2 LT COOLANT DRAIN/SAMPLE VALVE, 1A2-DCW-58
1A1 ENGINE BLOCK :	1A1 ENGINE BLOCK HT COOLANT DRAIN VALVE, 1A1-DCW-30 **AND** 1A1 ENGINE BLOCK HT COOLANT DRAIN VALVE, 1A1-DCW-42
1A2 ENGINE BLOCK :	1A2 ENGINE BLOCK HT COOLANT DRAIN VALVE, 1A2-DCW-30 **AND** 1A2 ENGINE BLOCK HT COOLANT DRAIN VALVE, 1A2-DCW-42

7. **IF** additional draining is desired,
THEN CONTINUE to drain using Steps 1.c through 6.b.

6.8.2.B Procedure (Continued)

NOTE

IF the following conditions are met,
THEN the hoses installed for draining may remain in place:

- The temporary hose short term installation is approved.
- The coolant will be returned to the same 1A DG coolant system.
- The hoses are marked **AND** routed to prevent tripping hazards.
- The portable pump is removed.

8. **IF** used,
   THEN REMOVE the portable pump by performing the following:

   a. **COLLECT** any propylene glycol from hose connections in drip pans **OR** absorbent material.

   b. **DISCONNECT** the hoses from the pump.

   c. **IF** hoses are to remain in place,
   THEN CONNECT the two hoses together.

   d. **REMOVE** the portable pump **AND STORE** in a leakproof container.

9. **IF** refilling the 1A HT/LT Coolant System from the 1A Coolant Drain Tank is desired,
   THEN GO TO 6.8.3, FILL THE 1A HT/LT COOLANT SYSTEMS FROM THE 1A COOLANT DRAIN TANK.

10. **IF** removal of the hoses is desired,
    THEN PERFORM the following:

    a. **DISCONNECT** the temporary hoses installed for draining.

    b. **DRAIN** the hoses into a bucket **OR** collection device.

    c. **REMOVE** the drip pans and absorbent material **AND DISPOSE** of ALL waste propylene glycol **PER** CH-1-100, Controlled Materials Management.

    d. **STORE** the draining equipment **AND** temporary hoses in a leakproof container.

6.8.2.B Procedure (Continued)

NOTE
The following step can be skipped **IF** no coolant was spilled during the evolution.

11. **CHECK** the 1A DG Building sump for blue dye.

    a. **IF** propylene glycol mixture (blue dye) is evident in the sump, **THEN PERFORM** the following:

    - **PLACE** the 1A DG Building sump pumps to OFF.
    - **NOTIFY** the CRS **OR** Shift Manager.
    - **INITIATE** action to pump the sump to suitable containers for disposal **PER** CH-1-100, Controlled Materials Management.

****** END ******

6.8.3 FILL THE 1A HT/LT COOLANT SYSTEMS FROM THE 1A COOLANT DRAIN TANK

A. Initial Conditions

1. The selected 1A HT/LT Coolant System has been drained **PER** Section 6.8.2, DRAIN THE 1A HT/LT COOLANT SYSTEMS TO THE 1A COOLANT DRAIN TANK.

2. The 1A Coolant Drain Tank is available to provide makeup coolant (refer to TABLE 4, 1A COOLANT DRAIN TANK VOLUME).

B. Procedure

1. **ENSURE OPEN** 1A COOLANT DRAIN TANK OUTLET VALVE, 1A-DCW-20.

NOTE

When in recirculation, the 1A Coolant Drain Tank Pump flowrate is approximately 14 GPM. The recirculation time will depend on the volume in the tank. The number of tank volumes to be recirculated will be determined by the System Engineer, Maintenance or Chemistry.

2. **PLACE** 1A COOLANT DRAIN PP, 1-HS-10071, to ON **AND RECIRCULATE** the 1A Coolant Drain Tank as necessary.

CAUTION

Mixtures with less than 40% proylene glycol should not be used due to potential freezing of fill piping in unheated areas.

3. **IF** desired by the System Engineer,
THEN REQUEST Plant Chemistry sample the 1A Coolant Drain Tank **AND ADD** chemicals as directed by the System Engineer.

4. **WHEN** the 1A Coolant Drain Tank contents are ready to be returned to the selected 1A HT **OR** LT Coolant System,
THEN OBTAIN the necessary temporary hoses (with quick disconnects on each end).

5. **IF** the hoses were left in place,
THEN PERFORM the following:

   a. **DISCONNECT** the hose from the top of the 1A Coolant Drain Tank.

   b. **CONNECT** the hose to the 1A Coolant Drain Filter outlet quick disconnect.

6.8.3.B Procedure (Continued)

6. **IF** hose installation is required,
THEN PERFORM the following:

   a. **CONNECT** one end of a temporary hose (with quick disconnects) to the 1A Coolant Drain Filter outlet quick disconnect.

   b. **CONNECT** the other end of the temporary hose to the selected 1A HT/LT Coolant System drain valve quick disconnect:

CLG SYS :	VALVE
1A1 HT :	1A1 HT RADIATOR FILL AND DRAIN VALVE, 1A1-DCW-1
1A1 LT :	1A1 LT RADIATOR FILL AND DRAIN VALVE, 1A1-DCW-14
1A2 HT :	1A2 HT RADIATOR FILL AND DRAIN VALVE, 1A2-DCW-1
1A2 LT :	1A2 LT RADIATOR FILL AND DRAIN VALVE, 1A2-DCW-14

7. **PLACE** drip pans **OR** absorbent material at hose connections to catch any leaked propylene glycol.

6.8.3.B Procedure (Continued)

8. **OPEN** the selected 1A HT/LT Coolant System drain valve:

CLG SYS :	VALVE
1A1 HT :	1A1 HT RADIATOR FILL AND DRAIN VALVE, 1A1-DCW-1 **OR** 1A1 HT COOLANT DRAIN/SAMPLE VALVE, 1A1-DCW-57
1A1 LT :	1A1 LT RADIATOR FILL AND DRAIN VALVE, 1A1-DCW-14 **OR** 1A1 LT COOLANT DRAIN/SAMPLE VALVE, 1A1-DCW-58
1A2 HT :	1A2 HT RADIATOR FILL AND DRAIN VALVE, 1A2-DCW-1 **OR** 1A2 HT COOLANT DRAIN/SAMPLE VALVE, 1A2-DCW-57
1A2 LT :	1A2 LT RADIATOR FILL AND DRAIN VALVE, 1A2-DCW-14 **OR** 1A2 LT COOLANT DRAIN/SAMPLE VALVE, 1A2-DCW-58

9. **OPEN** 1A COOLANT DRAIN FILTER OUTLET HOSE CONN ISOL VALVE, 1A-DCW-42, to commence filling.

10. **CHECK** COOLANT DRAIN FILTER D/P GAGE, 1-PDI-10075, indicates less than 20 PSIG.

    a. **IF** COOLANT DRAIN FILTER D/P GAGE, 1-PDI-10075, indicates greater than or equal to 20 PSIG,
    THEN WRITE an issue report to replace the filter.

NOTE
The 1A HT/LT Expansion Tanks overflow to the 1A Coolant Mixing Tank.

11. **CONTINUOUSLY MONITOR** the selected 1A DG fill at the engine **AND CHECK** for leaks.

6.8.3.B Procedure (Continued)

NOTE

If desired, the fill may be stopped to check for level indicator stabilization after some expansion tank level rise is observed.

12. **WHEN** the selected 1A HT/LT Expansion Tank level indicator begins to show increasing level,
THEN REDUCE the fill rate to allow the level indicator time to respond to the increasing level.

NOTE

- Coolant will drain back to the 1A Coolant Drain Tank through the recirc line when the 1A Coolant Drain Pump stops.
- The expansion tanks should **NOT** be filled above 25 inches.

13. **VERIFY** the 1A Coolant Drain Pump automatically stops when 1A Coolant Drain Tank level reaches the low level setpoint **OR STOP** the pump when the desired level is reached in the selected 1A HT **OR** LT Expansion Tank:
    - 1A1 HT EXP TK LVL IND, 1-LI-10081
    - 1A1 LT EXP TK LVL IND, 1-LI-10101
    - 1A2 HT EXP TK LVL IND, 1-LI-10121
    - 1A2 LT EXP TK LVL IND, 1-LI-10141
14. **SHUT** 1A COOLANT DRAIN FILTER OUTLET HOSE CONN ISOL VALVE, 1A-DCW-42.

6.8.3.B Procedure (Continued)

15. **SHUT** the selected 1A HT/LT Coolant System drain valve:

CLG SYS :	VALVE
1A1 HT :	1A1 HT RADIATOR FILL AND DRAIN VALVE, 1A1-DCW-1 **OR** 1A1 HT COOLANT DRAIN/SAMPLE VALVE, 1A1-DCW-57
1A1 LT :	1A1 LT RADIATOR FILL AND DRAIN VALVE, 1A1-DCW-14 **OR** 1A1 LT COOLANT DRAIN/SAMPLE VALVE, 1A1-DCW-58
1A2 HT :	1A2 HT RADIATOR FILL AND DRAIN VALVE, 1A2-DCW-1 **OR** 1A2 HT COOLANT DRAIN/SAMPLE VALVE, 1A2-DCW-57
1A2 LT :	1A2 LT RADIATOR FILL AND DRAIN VALVE, 1A2-DCW-14 **OR** 1A2 LT COOLANT DRAIN/SAMPLE VALVE, 1A2-DCW-58

16. **REMOVE** hose from 1A1 HT RADIATOR FILL AND DRAIN VALVE, 1A1-DCW-1.

17. **CONNECT** hose to 1A1 HT COOLANT DRAIN/SAMPLE VALVE, 1A1-DCW-57.

18. **OPEN** 1A1 HT COOLANT DRAIN/SAMPLE VALVE, 1A1-DCW-57.

19. **OPEN** 1A COOLANT DRAIN FILTER OUTLET HOSE CONN ISOL VALVE, 1A-DCW-42.

20. **WHEN** the selected 1A HT/LT Expansion Tank level indicator begins to show rising level,
THEN REDUCE the fill rate to allow the level indicator time to respond to the rising level.

21. **PERFORM** one of the following:

- **VERIFY** the 1A Coolant Drain Pump automatically stops when the 1A Coolant Drain Tank level reaches the low level setpoint.

OR

- **STOP** the 1A Coolant Drain Pump when the desired level is reached in the selected 1A HT **OR** LT Expansion Tank.

6.8.3.B Procedure (Continued)

22. **SHUT** 1A COOLANT DRAIN FILTER OUTLET HOSE CONN ISOL VALVE, 1A-DCW-42.

23. **SHUT** 1A1 HT COOLANT DRAIN/SAMPLE VALVE, 1A1-DCW-57.

24. **REMOVE** the hoses by performing the following:

    a. **DISCONNECT** the temporary hoses installed for draining.

    b. **DRAIN** the hoses into a bucket **OR** collection device.

    c. **REMOVE** the drip pans and absorbent material **AND DISPOSE** of ALL waste propylene glycol **PER** CH-1-100, Controlled Materials Management.

    d. **STORE** the draining equipment **AND** temporary hoses in a leakproof container.

NOTE
The following step can be skipped **IF** no coolant was spilled during the evolution.

25. **CHECK** the 1A DG Building sump for blue dye.

    a. **IF** propylene glycol mixture (blue dye) is evident in the sump, **THEN PERFORM** the following:

    - **PLACE** the 1A DG Building sump pumps to OFF.
    - **NOTIFY** the CRS **OR** Shift Manager.
    - **INITIATE** action to pump the sump to suitable containers for disposal **PER** CH-1-100, Controlled Materials Management.

26. **IF** additional makeup to the 1A HT/LT Expansion Tanks is necessary, **THEN GO TO** Section 6.8.1, MAKEUP TO THE 1A HT/LT COOLANT EXPANSION TANKS.

****** END ******

6.8.4 PUMP THE 1A COOLANT DRAIN TANK TO A TRUCK

A. Initial Conditions

1. 1A Coolant Drain Tank contents have been analyzed by Plant chemistry **AND** offsite disposal is desired.

B. Procedure

1. **CONNECT** the transfer hose from the disposal truck to 1A COOLANT DRAIN SYSTEM TO OUTSIDE TRUCK CONN ISOL VALVE, 1A-DCW-24.
2. **PLACE** a drip pan **OR** absorbent material at the hose connection to catch any leaked propylene glycol.
3. **OPEN** the disposal truck hose connection valve.
4. **UNLOCK AND OPEN** 1A COOLANT DRAIN SYSTEM TO OUTSIDE TRUCK CONN ISOL VALVE, 1A-DCW-24.
5. **ENSURE OPEN** 1A COOLANT DRAIN TANK OUTLET VALVE, 1A-DCW-20.
6. **START** 1A Coolant Drain Pump to start transferring the tank contents to the disposal truck.
7. **MONITOR** the transfer process **AND CHECK** for leaks at the hose connections.
8. **VERIFY** the 1A Coolant Drain Pump stops when level reaches the low level setpoint.
9. **SHUT AND LOCK** 1A COOLANT DRAIN SYSTEM TO OUTSIDE TRUCK CONN ISOL VALVE, 1A-DCW-24.
10. **SHUT** the disposal truck hose connection valve.

NOTE
Ensure any coolant in the hose is collected for disposal.

11. **DISCONNECT** the transfer hose from the disposal truck **AND** 1A COOLANT DRAIN SYSTEM TO OUTSIDE TRUCK CONN ISOL VALVE, 1A-DCW-24.
12. **DRAIN** the transfer hose **AND STORE** in a suitable receptacle.
13. **REMOVE** the drip pan or absorbent material **AND DISPOSE** of ALL waste propylene glycol **PER** CH-1-100, Controlled Materials Management.

****** END ******

6.8.5 RECIRCULATING THE 1A COOLANT MIXING TANK

A. Initial Conditions

1. None.

B. Procedure

1. **CHECK OPEN** 1A COOLANT MIXING TANK OUTLET VALVE, 1A-DCW-7.

2. **CHECK SHUT** 1A COOLANT MIXING TANK PUMP DISCHARGE VALVE, 1A-DCW-38.

NOTE

- When recirculating, the 1A Coolant Mixing Tank Pump flowrate is approximately 10 GPM. The recirculation time will depend on the volume in the tank. The number of tank volumes to be recirculated will be determined by the System Engineer, Maintenance or Chemistry.
- The 1A Coolant Mixing Tank Pump with automatically stop at a level of approximately 13 inches indicated in the tank.

3. **PLACE** 1A COOLANT MIXING TANK PP, 1-HS-10073, to START, to begin recirculating the 1A Coolant Mixing Tank.

4. **IF** desired,
   THEN REQUEST Plant Chemistry sample the 1A Coolant Mixing Tank contents.

5. **WHEN** recirculation is complete,
   THEN PLACE 1A COOLANT MIXING TANK PP, 1-HS-10073, to STOP.

****** END ******

6.8.6 RECIRCULATING THE 1A COOLANT DRAIN TANK

A. Initial Conditions

1. None.

B. Procedure

1. **CHECK OPEN** 1A COOLANT DRAIN TANK OUTLET VALVE, 1A-DCW-20.

NOTE

When in recirculation, the 1A Coolant Drain Tank Pump flowrate is approximately 14 GPM. The recirculation time will depend on the volume in the tank. The number of tank volumes to be recirculated will be determined by the System Engineer, Maintenance or Chemistry.

2. **PLACE** 1A COOLANT DRAIN PP, 1-HS-10071, to START **AND RECIRCULATE** the 1A Coolant Drain Tank as necessary.

3. **IF** desired,
   THEN REQUEST Plant Chemistry sample the 1A Coolant Drain Tank.

4. **IF** desired to add Demineralized Water to the 1A Coolant Drain Tank (reduce glycol concentration),
   THEN PERFORM the following:

   a. **CONNECT** one end of a clean temporary hose to the 1A DG BUILDING 45' DEMINERALIZED WATER HOSE CONNECTION ISOLATION VALVE, 0-DW-503.

   b. **CONNECT** the other end of of the temporary hose to the quick disconnect fitting located on the top of the 1A Coolant Drain tank.

   c. **VERIFY** 1A COOLANT MIXING TANK DEMIN WATER INLET VALVE, 0-DW-501, is SHUT.

   d. **VERIFY** DEMINERALIZED WATER TO 1A DIESEL GENERATOR BUILDING ISOLATION VALVE, 0-DW-500, is OPEN.

   e. **DETERMINE** the final 1A Coolant Drain tank level from Chemistry or Plant Engineering.

   f. **ADD** Demineralized water to 1A Coolant Drain tank by **OPENING** 1A DG BUILDING 45' DEMINERALIZED WATER HOSE CONNECTION ISOLATION VALVE, 0-DW-503.

   g. **WHEN** the desired level is reached in the 1A Coolant Drain Tank,
      THEN SHUT 0-DW-503.

   h. **IF** desired, **REQUEST** Chemistry to sample the 1A Coolant Drain Tank.

6.8.6.B.4 Procedure (Continued)

i. **IF** needed, **REPEAT** steps to add Demineralized water until desired glycol concentration is obtained.

j. **DISCONNECT** temporary hose at 1A DG BUILDING 45' DEMINERALIZED WATER HOSE CONNECTION ISOLATION VALVE, 0-DW-503 **AND INSTALL** the pipe cap.

k. **DISCONNECT** the temporary hose attached to the quick disconnect fitting located on the top of the 1A Coolant Drain tank.

l. **SHUT** DEMINERALIZED WATER TO 1A DIESEL GENERATOR BUILDING ISOLATION VALVE, 0-DW-500.

5. **WHEN** recirculation is complete,
THEN PLACE 1A COOLANT DRAIN PP, 1-HS-10071, to STOP.

****** END ******

6.9 WASH THE 1A DG TURBOCHARGERS (PE 1-24-5-O-2A)

A. Initial Conditions

1. 1A DG turbocharger performance indicates blade fouling,
   OR
   The Responsible System Engineer recommends washing the 1A DG turbocharger,
   OR
   Scheduled PE.

2. 1A DG is running at **OR** above 3.240 MW load.

B. Procedure

CAUTION
The 1A DG turbochargers shall be washed with Demin Water only. Do **NOT** use solvents of any kind.

WARNING
The turbocharger Water Wash Tanks may be pressurized with air.

1. **CAREFULLY REMOVE** the selected turbocharger Water Wash Tank lid **AND FILL** the tank with 1/2 quart of Demin Water.

2. **REPLACE AND HAND TIGHTEN** the selected turbocharger Water Wash Tank lid.

3. **OPEN** the corresponding turbocharger Water Wash Tank outlet valve:

TURBO :	VALVE
1A1 DG :	1A1 INBOARD WATER WASH TANK ISOLATION VALVE, 1A1-SCA-1 OR 1A1 OUTBOARD WATER WASH TANK ISOLATION VALVE, 1A1-SCA-2
1A2 DG :	1A2 INBOARD WATER WASH TANK ISOLATION VALVE, 1A2-SCA-1 OR 1A2 OUTBOARD WATER WASH TANK ISOLATION VALVE, 1A2-SCA-2

4. **DEPRESS AND HOLD** the actuator pushbutton on the tank to commence turbocharger cleaning.

5. **WAIT** approximately 30 seconds,
   THEN RELEASE the pushbutton.

6.9.B Procedure (Continued)

6. **OPERATE** 1A DG loaded for a minimum of three minutes.

7. **SHUT** the corresponding turbocharger Water Wash Tank outlet valve:

TURBO :	VALVE
1A1 DG :	1A1 INBOARD WATER WASH TANK ISOLATION VALVE, 1A1-SCA-1 OR 1A1 OUTBOARD WATER WASH TANK ISOLATION VALVE, 1A1-SCA-2
1A2 DG :	1A2 INBOARD WATER WASH TANK ISOLATION VALVE, 1A2-SCA-1 OR 1A2 OUTBOARD WATER WASH TANK ISOLATION VALVE, 1A2-SCA-2

NOTE
Following the second cleaning, 1A DG shall be operated a MINIMUM of 30 minutes at 3.240 MW **OR** higher load prior to performing additional cleaning cycles.

8. **IF** a second cleaning is desired,
THEN OPERATE 1A DG a minimum of 10 minutes before repeating this section.

WARNING
The turbocharger Water Wash Tank will be pressurized with air.

9. **WHEN** turbocharger cleaning is complete,
THEN PERFORM the following:

   a. **CAREFULLY UNSCREW** the selected Water Wash Tank lid wheel to relieve pressure in the tank.

   b. **HAND TIGHTEN** the tank lid wheel.

****** END ******

6.10 CROSSTIE THE 1A STARTING AIR SYSTEMS

A. Initial Conditions

1. 1A1 **OR** 1A2 Starting Air Compressor is out of service **OR** will be removed from service.

2. 1A DG is required to be operable.

B. Procedure

1. **IF** the 1A1 **AND** 1A2 Starting Air Systems are to be cross-tied, **THEN PERFORM** the following:

   a. **SLOWLY OPEN** 1A1 AND 1A2 STARTING AIR SYSTEMS CROSSTIE VALVE, 1A1-DSA-54.

   b. **PLACE** the selected 1A1 **OR** 1A2 Starting Air Compressor control switch to OFF:

DG :	HANDSWITCH
1A1 :	1A1 SA COMPR, 1-HS-10241
1A2 :	1A2 SA COMPR, 1-HS-10271

   c. **OPEN** the power supply breaker to the selected 1A Starting Air Compressor **AND VERIFY** the other 1A Starting Air Compressor breaker is CLOSED:

DG :	BREAKER
1A1 :	1A1 STARTING AIR COMP, MCC 124, breaker 52-12437
1A2 :	1A2 STARTING AIR COMP, MCC 124, breaker 52-12438

   d. **IF** 1A1 Starting Air Compressor is being removed from service, **THEN SHUT** 1A1 STARTING AIR COMPR SKID OUTLET VALVE, 1A1-DSA-80.

   e. **IF** 1A2 Starting Air Compressor is being removed from service, **THEN SHUT** 1A2 STARTING AIR COMPR SKID OUTLET VALVE, 1A2-DSA-81.

6.10.B.1 Procedure (Continued)

f. **ENSURE** the in-service compressor handswitch, 1-HS-10241 (1-HS-10271) to AUTO and monitor a 5 PSIG rise in pressure.

(1) **IF** compressor does **NOT** start in AUTO,
THEN PLACE handswitch, 1-HS-10241 (1-HS-10271) in ON **AND** monitor for 5 PSIG rise in pressure.

NOTE
Checking the red light lit for the running air compressor ensures the Air Compressor breaker is closed. Ensuring Air Compressor breaker is closed before securing the Compressor ensures that if a breaker is found open after securing the Compressor that the open breaker was due to the known handswitch configuration issue and not a motor malfunction.

(2) **CHECK** the Red running light for the selected Compressor is lit
THEN PLACE handswitch, 1-HS-10241 (1-HS-10271) in AUTO.

NOTE
Taking the Starting Air Compressor handswitch from ON to AUTO may cause the Starting Air Compressor breaker to trip.

(3) **ENSURE CLOSED** the breaker for the inservice compressor:

- 1A1 STARTING AIR COMP, MCC 124, breaker 52-12437

OR

- 1A2 STARTING AIR COMP, MCC 124, breaker 52-12438

(4) **IF** the breaker for the inservice compressor was found TRIPPED
THEN INITIATE a Condition Report for tracking purposes.

g. **CHECK** the in-service Starting Air Compressor maintains the 1A Starting Air Receiver pressures above 507 psig:

- 1A1-11 SA RCVR PRESS IND, 1-PI-10241
- 1A1-12 SA RCVR PRESS IND, 1-PI-10242
- 1A2-11 SA RCVR PRESS IND, 1-PI-10271
- 1A2-12 SA RCVR PRESS IND, 1-PI-10272

6.10.B Procedure (Continued)

2. **WHEN** the 1A1 **AND** 1A2 Starting Air Systems are to be restored to normal lineup,
THEN PERFORM the following:

   a. **IF** 1A1 Starting Air Compressor is being returned to service,
   THEN OPEN 1A1 STARTING AIR COMPR SKID OUTLET VALVE, 1A1-DSA-80.

   b. **IF** 1A2 Starting Air Compressor is being returned to service,
   THEN OPEN 1A2 STARTING AIR COMPR SKID OUTLET VALVE, 1A2-DSA-81.

   c. **CLOSE** the power supply breaker to the selected 1A Starting Air Compressor :

DG :	BREAKER
1A1 :	1A1 STARTING AIR COMP, MCC 124, breaker 52-12437
1A2 :	1A2 STARTING AIR COMP, MCC 124, breaker 52-12438

   d. **SHUT** 1A1 AND 1A2 STARTING AIR SYSTEMS CROSSTIE VALVE, 1A1-DSA-54.

   e. **VERIFY** operation of the 1A1 **OR** 1A2 Starting Air Compressor returned to service by placing the associated control switch to ON:

DG :	HANDSWITCH
1A1 :	1A1 SA COMPR, 1-HS-10241
1A2 :	1A2 SA COMPR, 1-HS-10271

6.10.B.2 Procedure (Continued)

CAUTION
Starting Air Receiver pressures should **NOT** exceed 595 psig.

f. **VERIFY** the associated 1A1 **OR** 1A2 Starting Air Compressor Receiver pressures rise by at least 5 psig.

AIR COMPR :	INDICATOR
1A1 :	1A1-11 SA RCVR PRESS IND, 1-PI-10241 1A1-12 SA RCVR PRESS IND, 1-PI-10242
1A2 :	1A2-11 SA RCVR PRESS IND, 1-PI-10271 1A2-12 SA RCVR PRESS IND, 1-PI-10272

NOTE
Checking the red light lit for the running air compressor ensures the Air Compressor breaker is closed. Ensuring Air Compressor breaker is closed before securing the Compressor ensures that if a breaker is found open after securing the Compressor that the open breaker was due to the known handswitch configuration issue and not a motor malfunction.

g. **CHECK** the Red running light for the selected Air Compressor is lit **THEN PLACE** the selected 1A1 **OR** 1A2 Starting Air Compressor control switch to AUTO:

DG :	HANDSWITCH
1A1 :	1A1 SA COMPR, 1-HS-10241
1A2 :	1A2 SA COMPR, 1-HS-10271

6.10.B.2 Procedure (Continued)

NOTE
Taking the Starting Air Compressor handswitch from ON to AUTO may cause the Starting Air Compressor breaker to trip.

h. **ENSURE CLOSED** the following breakers:

- 1A1 STARTING AIR COMP, MCC 124, breaker 52-12437
- 1A2 STARTING AIR COMP, MCC 124, breaker 52-12438

i. **IF** any breaker was found TRIPPED
THEN INITIATE a Condition Report for tracking purposes.

****** END ******

6.11 REMOVE AND RESTORE 1A DG TO/FROM SERVICE

A. Initial Conditions

1. 1A DG is shutdown **AND** 1A DG OUT BKR, 1-CS-152-1703, is OPEN.

2. Technical Specification 3.8.1 or 3.8.2 has been reviewed to determine Diesel Generator operability requirements.

B. Procedure

NOTE
These actions are required to be performed prior to removing 1A DG from service for elective maintenance greater than 72 hours. For assurance, these actions should be performed every time elective maintenance is performed.

CAUTION
After 1A DG has been removed from service, changes in weather conditions or grid stability should be evaluated for compensatory action.

1. **IF** entering Tech Spec 3.8.1 B for elective maintenance,
THEN PERFORM the following prior to taking the 1A DG out of service:
[B0906]
(N/A if administrative controls are in place to ensure 1A DG returned to service within 72 hours.)

NOTE
Steps 1.a through 1.e may be performed in any order.

a. **VERIFY** the following:

- **NO** elective maintenance will be performed in the switchyard, on the 4 kV Distribution System, or on the 13 KV Distribution System.

6.11.B.1 Procedure (Continued)

NOTE
The Unit-1 AFW system includes 23 AFW pump and its cross-tie.

- **NO** planned maintenance or testing will be performed on the Unit-1 AFW System.
- **NO** maintenance or testing that affects the reliability of Unit-1 B train will be scheduled. If testing or maintenance activities must be performed, a Risk Assessment Evaluation will be performed according to NO-1-117, INTEGRATED RISK MANAGEMENT.
- **NO** elective maintenance will be performed on 0C DG.
- Personnel are aware of the dedication of 0C DG to 11 4KV Bus.
  - Flag-Off 0C DG using green chain barricades.
  - Update OWC Status Board.

NOTE
Patuxent River Naval Air Station is the preferred source for the weather report. However, any government sponsored weather agency may be used.

b. Within 12 hours prior to removing 1A DG from service, **EVALUATE** that **NO** severe weather conditions are forecast for CCNPP or any of the 500 KV transmission lines rights of way.

- Severe Thunderstorm
- Gale/High Wind - greater than 50 mph
- Tornado
- Hurricane
- Blizzard
- Ice Storm

6.11.B.1 Procedure (Continued)

c. Within 12 hours prior to removing 1A DG from service, **REQUEST** the CRS **OR** Shift Manager perform the following notification. **[B0138]**

(1) **CONTACT** the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts.

(2) **ENSURE** grid stress conditions are **NOT** considered "high":

- 5051, 5052 and 5072 circuits are in service.
- PJM is **NOT** in a Warning or implementing an Emergency Action for the following:
  - Primary Reserve - Warning
  - Voltage Reduction - Warning or Action
  - Manual Load Dump - Warning or Action
  - Maximum Emergency Generation - Action
- PJM is **NOT** in Conservative Operations for the following:
  - Thunderstorms
  - Solar Magnetic Disturbances
  - Crisis Response
  - Heavy Load, Low Voltage - Warning or Action
  - Post Contingency Local Load Relief Warning that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard
- **NO** other known condition exists on the PJM or BGE system at this time that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard.

(3) **DETERMINE** that **NO** other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

d. **BRIEF** the operations crews concerning the unit activities, including compensatory measures established and the importance of promptly starting and aligning the 0C DG.

6.11.B.1 Procedure (Continued)

e. **ENSURE** the on-shift operations crew has discussed and reviewed the appropriate normal and emergency operating procedures.

- **PLACE** a note on the Shift Turnover Sheet for oncoming crews to discuss and review the appropriate normal and emergency operating procedures within 24 hours prior to or shortly after assuming the watch for the first time after having scheduled days off.

- **REVIEW** the following procedures as appropriate:

  - AOP-7I, LOSS OF 4KV, 480 VOLT OR 208/120 VOLT INSTRUMENT BUS POWER
  - EOP-0, POST-TRIP IMMEDIATE ACTIONS
  - EOP-2, LOSS OF OFFSITE POWER/LOSS OF FORCED CIRCULATION
  - EOP-7, STATION BLACKOUT
  - AOP-3F, LOSS OF OFFSITE POWER WHILE IN MODES 3, 4, 5 OR 6

6.11.B Procedure (Continued)

2. **REMOVE** the 1A DG from service as follows:

   a. **PERFORM** the following prior to taking the 1A DG out of service:

   - **IF** the 1A DG is operable,
     THEN ENSURE Unit 1 B train is operable **PER** OI-49, Operability Verification, every eight hours while the 1A DG is out of service.

   - **REQUEST** the CRS **OR** Shift Manager perform the following notification. **[B0138]**
     (N/A if Step 1.c performed)

     - **CONTACT** the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts.

     - **DETERMINE** whether other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

     - **IF** the 1A DG will be out of service at the same time reliability of the offsite power supplies is reduced,
       THEN HAVE the Shift Manager determine how to minimize both the time the 1A DG is out of service **AND** the time that offsite power supplies are at reduced reliability.

   - **IF** in Lower Mode Operation,
     THEN ENSURE the requirements of the applicable Minimum Essential Equipment section of NO-1-103, Conduct of Lower Mode Operations, are satisfied.

6.11.B.2 Procedure (Continued)

CAUTION
0C DG Commitments only allow one (1) 0C DG Disconnect to be closed at a time.

b. **IF** the 0C DG is available,
THEN CLOSE the 0C DG 11 4KV Bus Disconnect 189-1106, to prealign the 0C DG to 11 4KV Bus by PERFORMING the following:

(1) **PLACE** the 0C DG 11 4KV BUS FDR handswitch, 1-CS-152-1106 in PTL.

NOTE
Kirk keys 11893, 11901, 11940 and 14259 are required

(2) **LOCK** the 0C DG 11 4KV Bus DISC, 189-1106 in the CLOSE position.

(3) **PLACE** the 0C DG 11 4KV BUS FDR handswitch 1-CS-152-1106 in the NORMAL position.

(4) **PLACE** the following handswitches in PTL with OFF NORMAL COMPONENT tags:

- 0C DG 14 4KV BUS FDR, 1-CS-152-1406
- 0C DG 21 4KV BUS FDR, 2-CS-152-2106
- 0C DG 24 4KV BUS FDR, 2-CS-152-2406

(5) **PLACE** an OFF NORMAL COMPONENT tag on control room indication for DISC 189-1106.

c. **PLACE** the 1A DG OUT BKR, 1-CS-152-1703, in PULL-TO-LOCK.

d. **UNLOCK AND SHUT** the following 1A DG Air Start Header isolation valves: 02000

- 1A1 STARTING AIR RECEIVER 12 OUTLET VALVE, 1A1-DSA-40
- 1A1 STARTING AIR RECEIVER 11 OUTLET VALVE, 1A1-DSA-48
- 1A2 STARTING AIR RECEIVER 12 OUTLET VALVE, 1A2-DSA-40
- 1A2 STARTING AIR RECEIVER 11 OUTLET VALVE, 1A2-DSA-48

6.11.B.2 **Procedure (Continued)**

WARNING
Hearing Protection is required while bleeding down the Air Headers.

e. **OPEN** the following 1A DG Air Start Header filter drain valves:

- 1A1 FILTER 14 DRAIN VALVE, 1A1-DSA-59
- 1A1 FILTER 15 DRAIN VALVE, 1A1-DSA-67
- 1A2 FILTER 14 DRAIN VALVE, 1A2-DSA-59
- 1A2 FILTER 15 DRAIN VALVE, 1A2-DSA-67

3. **WHEN** desired,
THEN RETURN the 1A DG to service as follows:

a. **SHUT** the following 1A DG Air Start Header filter drain valves:

- 1A1 FILTER 14 DRAIN VALVE, 1A1-DSA-59
- 1A1 FILTER 15 DRAIN VALVE, 1A1-DSA-67
- 1A2 FILTER 14 DRAIN VALVE, 1A2-DSA-59
- 1A2 FILTER 15 DRAIN VALVE, 1A2-DSA-67

b. **LOCK OPEN** the following 1A DG Air Start Header isolation valves:

- 1A1 STARTING AIR RECEIVER 12 OUTLET VALVE, 1A1-DSA-40
- 1A1 STARTING AIR RECEIVER 11 OUTLET VALVE, 1A1-DSA-48
- 1A2 STARTING AIR RECEIVER 12 OUTLET VALVE, 1A2-DSA-40
- 1A2 STARTING AIR RECEIVER 11 OUTLET VALVE, 1A2-DSA-48

c. **PLACE** the 1A DG OUT BKR, 1-CS-152-1703, in NORMAL. 02000

6.11.B.3 Procedure (Continued)

d. **IF** required,
THEN PERFORM ONE of the following to return the 1A DG to service:

- **PERFORM** STP 0-8A-1, TEST OF 1A DG AND 11 4KV BUS LOCI SEQUENCER, to declare 1A DG operable.

OR

- **PERFORM** the following sections to restore 1A DG operation:

  (1) Section 6.2.2, 1A DG SLOW START FROM CONTROL ROOM.

  (2) Section 6.3, PARALLEL 1A DG TO THE 11/17 4KV BUS.

  (3) **WHEN** the 1A DG has been loaded for at least one hour, **THEN STOP** the 1A DG **PER** Section 6.5.1, 1A DG NORMAL SHUTDOWN FROM CONTROL ROOM.

e. **IF** 0C DG was prealigned to 11 4KV Bus,
THEN OPEN the 0C DG 11 4KV Bus Disconnect 189-1106, by PERFORMING the following:

(1) **PLACE** the 0C DG 11 4KV BUS FDR handswitch, 1-CS-152-1106 in PTL.

(2) **LOCK** the 0C DG 11 4KV Bus DISC, 189-1106 in the OPEN position.

(3) **PLACE** the 0C DG 11 4KV BUS FDR handswitch 1-CS-152-1106 in the NORMAL position.

(4) **PLACE** the following handswitches in NORMAL **AND REMOVE** the OFF NORMAL COMPONENT tags:

- 0C DG 14 4KV BUS FDR, 1-CS-152-1406
- 0C DG 21 4KV BUS FDR, 2-CS-152-2106
- 0C DG 24 4KV BUS FDR, 2-CS-152-2406

(5) **REMOVE** the OFF NORMAL COMPONENT tag from the control room indication for DISC 189-1106.

f. **REQUEST** the CRS **OR** Shift Manager inform the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts that the 1A DG has been returned to service. **[B0138] [B0906]**

g. **IF** used,
THEN REMOVE 0C DG barricades.

****** END ******

6.12 TESTING THE 1A DG BACKUP VOLTAGE REGULATOR, AVR2 (PE 1-24-2-O-2A)

A. Initial Conditions

1. Tech Specs have been reviewed to determine Diesel Generator operability requirements.

2. Key to 1A AUTO VOLT REG SEL SW, 1-HS-10326, has been obtained.

B. Procedure

NOTE
The 1A DG is inoperable when AVR 2 is selected as the DG Voltage Regulator.

1. **PERFORM** the following prior to declaring the 1A DG out of service:

   - IF the 1A DG is operable,
     THEN ENSURE Unit 1 B train is operable **PER** OI-49, Operability Verification, every eight hours while the 1A DG is out of service.

   - **REQUEST** the CRS **OR** Shift Manager perform the following notification **[B0138]**

     - **CONTACT** the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts.

     - **DETERMINE** whether other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

     - IF the 1A DG will be out of service at the same time reliability of the offsite power supplies is reduced,
       THEN HAVE the Shift Manager determine how to minimize both the time the 1A DG is out of service **AND** the time that offsite power supplies are at reduced reliability.

   - IF in Lower Mode Operation,
     THEN ENSURE the requirements of the applicable Minimum Essential Equipment section of NO-1-103, Conduct of Lower Mode Operations, are satisfied.

NOTE
The 1A Auto Volt Regulator Selector switch, 1-HS-10326, is located inside the left cabinet of 1G25 (AER cabinet).

2. **PLACE** 1A AUTO VOLT REG SEL SW, 1-HS-10326, in the AVR2 ON position.

3. **PERFORM** a slow speed start of the 1A DG **PER** Section 6.2.2, 1A DG SLOW START FROM CONTROL ROOM.

6.12.B Procedure (Continued)

4. **PARALLEL** the 1A DG to 11 4 KV bus **PER** Section 6.3, PARALLEL 1A DG TO THE 11/17 4KV BUS.

5. **WHEN** the 1A DG has been fully loaded for 1 hour,
THEN SHUTDOWN the DG **PER** Section 6.5.1, 1A DG NORMAL SHUTDOWN FROM CONTROL ROOM.

6. **PLACE** AVR1 in service by **PERFORMING** the following:

NOTE
The 1A Auto Volt Regulator Selector switch, 1-HS-10326, is located inside the left cabinet of 1G25 (AER cabinet).

   a. **PLACE** 1A AUTO VOLT REG SEL SW, 1-HS-10326, in the AVR1 ON position.

   b. **ENSURE** the "AVR2 ON" alarm on 1C188 is clear.

7. **IF** desired, **DECLARE** the 1A DG operable.

****** END ******

6.13 OPERATION OF THE 1A DG RADIATOR FANS

A. Initial Conditions

1. None

B. Procedure

1. **START** the desired 1A DG Radiator Fans by placing the associated handswitch to ON:
   - 1A1 HT RAD FAN SEL SW, 1-HS-10082
   - 1A2 HT RAD FAN SEL SW, 1-HS-10102
2. **WHEN** it is desired to secure the Radiator Fan,
   THEN perform the following:

NOTE
Checking Radiator Fan breakers closed before securing fans ensures that if a breaker is found open after securing the Radiator Fan that the open breaker was due to the known handswitch configuration issue and not a motor malfunction.

a. **IF** 1A1 HT RAD FAN SEL SW, 1-HS-10082 was operated
   THEN CHECK CLOSED the following breakers:
   - 1A1 RADIATOR FAN 11, 52-12317
   - 1A1 RADIATOR FAN 12, 52-12318
   - 1A1 RADIATOR FAN 13, 52-12319

b. **IF** 1A2 HT RAD FAN SEL SW, 1-HS-10102 was operated
   THEN CHECK CLOSED the following breakers:
   - 1A2 RADIATOR FAN 11, 52-12320
   - 1A2 RADIATOR FAN 12, 52-12321
   - 1A2 RADIATOR FAN 13, 52-12322

c. **SECURE** the 1A DG Radiator Fans started in step 1 by placing the associated handswitch to AUTOMATIC:
   - 1A1 HT RAD FAN SEL SW, 1-HS-10082
   - 1A2 HT RAD FAN SEL SW, 1-HS-10102

6.13.B Procedure (Continued)

NOTE
Taking the Radiator Fan handswitch from ON to AUTOMATIC may cause the Radiator Fan breakers to trip.

3. **IF** 1A1 HT RAD FAN SEL SW, 1-HS-10082 was operated
THEN ENSURE CLOSED the following breakers:

   - 1A1 RADIATOR FAN 11, 52-12317
   - 1A1 RADIATOR FAN 12, 52-12318
   - 1A1 RADIATOR FAN 13, 52-12319

4. **IF** 1A2 HT RAD FAN SEL SW, 1-HS-10102 was operated
THEN ENSURE CLOSED the following breakers:

   - 1A2 RADIATOR FAN 11, 52-12320
   - 1A2 RADIATOR FAN 12, 52-12321
   - 1A2 RADIATOR FAN 13, 52-12322

5. **IF** any breaker was found TRIPPED
THEN INITIATE a Condition Report for tracking purposes.

****** END ******

6.14 OPERATION OF THE 1A DG STARTING AIR COMPRESSORS

A. Initial Conditions

1. Desired to run the 1A1 **OR** 1A2 Starting Air Compressor

B. Procedure

1. **IF** starting 1A1 Starting Air Compressor,
   THEN PERFORM the following:

   a. **VERIFY** 1A1 Starting Air Compressor handswitch , 1-HS-10241 is in AUTO.

   b. **IF** lowering pressure using 1A1 Starting Air Receiver 11,
   THEN PERFORM the following:

      (1) **REMOVE** pipe cap downstream of 1A1 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE, 1A1-DSA-53.

      (2) **OPEN** 1A1 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE, 1A1-DSA-53.

NOTE
The 1A1 Starting Air Compressor should start at approximately 507 PSIG.

      (3) **THROTTLE OPEN** 1A1 STARTING AIR RECEIVER 11 DRAIN VALVE, 1A1-DSA-52 to lower 1A1 Starting Air Receiver 11 pressure enough to start the 1A1 Starting Air Compressor.

      (4) **ADJUST** throttle position of 1A1 STARTING AIR RECEIVER 11 DRAIN VALVE, 1A1-DSA-52 to maintain pressure on 1-PI-10241 between 507-570 PSIG.

      (5) **WHEN** desired to **SECURE** the 1A1 Starting Air Compressor,
      THEN SHUT 1A1 STARTING AIR RECEIVER 11 DRAIN VALVE, 1A1-DSA-52

      (6) **SHUT** 1A1 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE, 1A1-DSA-53.

      (7) **REINSTALL** pipe cap downstream of 1A1 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE, 1A1-DSA-53.

      (8) **ENSURE** 1A1 Starting Air Compressor SECURES at approximately 580 PSIG.

6.14.B.1 Procedure (Continued)

c. **IF** lowering pressure using 1A1 Starting Air Receiver 12, **THEN PERFORM** the following:

(1) **REMOVE** pipe cap downstream of 1A1 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE, 1A1-DSA-45.

(2) **OPEN** 1A1 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE, 1A1-DSA-45.

NOTE
The 1A1 Starting Air Compressor should start at approximately 507 PSIG.

(3) **THROTTLE OPEN** 1A1 STARTING AIR RECEIVER 12 DRAIN VALVE, 1A1-DSA-44 to lower 1A1 Starting Air Receiver 12 pressure enough to start the 1A1 Starting Air Compressor.

(4) **ADJUST** throttle position of 1A1 STARTING AIR RECEIVER 12 DRAIN VALVE, 1A1-DSA-44 to maintain pressure on 1-PI-10242 between 507-570 PSIG.

(5) **WHEN** desired to **SECURE** the 1A1 Starting Air Compressor, **THEN SHUT** 1A1 STARTING AIR RECEIVER 12 DRAIN VALVE, 1A1-DSA-44.

(6) **SHUT** 1A1 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE, 1A1-DSA-45.

(7) **REINSTALL** pipe cap downstream of 1A1 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE, 1A1-DSA-45.

(8) **ENSURE** 1A1 Starting Air Compressor SECURES at approximately 580 PSIG.

6.14.B Procedure (Continued)

2. IF starting 1A2 Starting Air Compressor,
   THEN PERFORM the following:

   a. **VERIFY** 1A2 Starting Air Compressor handswitch , 1-HS-10271 is in AUTO.

   b. IF lowering pressure using 1A2 Starting Air Receiver 11,
      THEN PERFORM the following:

      (1) **REMOVE** pipe cap downstream of 1A2 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE, 1A2-DSA-53.

      (2) **OPEN** 1A2 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE, 1A2-DSA-53.

NOTE
The 1A2 Starting Air Compressor should start at approximately 507 PSIG.

      (3) **THROTTLE OPEN** 1A2 STARTING AIR RECEIVER 11 DRAIN VALVE, 1A2-DSA-52 to lower 1A2 Starting Air Receiver 11 pressure enough to start the 1A2 Starting Air Compressor.

      (4) **ADJUST** throttle position of 1A2 STARTING AIR RECEIVER 11 DRAIN VALVE, 1A2-DSA-52 to maintain pressure on 1-PI-10271 between 507-570 PSIG.

      (5) **WHEN** desired to **SECURE** the 1A2 Starting Air Compressor,
      THEN SHUT 1A2 STARTING AIR RECEIVER 11 DRAIN VALVE, 1A2-DSA-52

      (6) **SHUT** 1A2 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE, 1A2-DSA-53.

      (7) **REINSTALL** pipe cap downstream of 1A2 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE, 1A2-DSA-53.

      (8) **ENSURE** 1A2 Starting Air Compressor SECURES at approximately 580 PSIG.

6.14.B.2 Procedure (Continued)

c. **IF** lowering pressure using 1A2 Starting Air Receiver 12, **THEN PERFORM** the following:

(1) **REMOVE** pipe cap downstream of 1A2 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE, 1A2-DSA-45.

(2) **OPEN** 1A2 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE, 1A2-DSA-45.

NOTE
The 1A2 Starting Air Compressor should start at approximately 507 PSIG.

(3) **THROTTLE OPEN** 1A2 STARTING AIR RECEIVER 12 DRAIN VALVE, 1A2-DSA-44 to lower 1A2 Starting Air Receiver 12 pressure enough to start the 1A2 Starting Air Compressor.

(4) **ADJUST** throttle position of 1A2 STARTING AIR RECEIVER 12 DRAIN VALVE, 1A2-DSA-44 to maintain pressure on 1-PI-10272 between 507-570 PSIG.

(5) **WHEN** desired to **SECURE** the 1A2 Starting Air Compressor, **THEN SHUT** 1A2 STARTING AIR RECEIVER 12 DRAIN VALVE, 1A2-DSA-44.

(6) **SHUT** 1A2 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE, 1A2-DSA-45.

(7) **REINSTALL** pipe cap downstream of 1A2 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE, 1A2-DSA-45.

(8) **ENSURE** 1A2 Starting Air Compressor SECURES at approximately 580 PSIG.

****** END ******

7.0 POST-PERFORMANCE ACTIVITIES

Upon completion of this procedure, forward the original(s) to the Operations Senior Administrative Assistant for retention **PER** PR-3-100, Records Management.

8.0 BASES

[B0120] Memo from R. A. Buttner of the Design Basis Unit, DBU-92-059, subject: "Plant Operating Voltage Ranges", lists the new 13KV, 4KV, and 480V Bus voltage limits. Previous calculations did not ensure adequate voltage at load terminals.

[B0138] NUMARC 91-06 "Guidelines for Industry Actions to Assess Shutdown Management and NRC Letter 88-17 recommended establishing communications between the SM/CRS and the System Operator-Bulk prior to removing a diesel generator from service.

[B0154] AOP/EOP cross reference per NUREG 1358:

a. EOP-7, STATION BLACKOUT, refers to this OI for restart of the 1A DG with an auto start signal present.

b. AOP-3B, ABNORMAL SHUTDOWN COOLING CONDITIONS, refers to this OI to start the 1A DG per fast/emergency start from local panel.

[B0251] Reg Guide 1.137, Rev 1, October 1979, lists the requirement for sampling the diesel fuel oil day tank for water at least monthly and following any DG operation of one hour or greater.

[B0254] SACM Diesel, Inc. fax 03039502 from Chris Muller, dated February 28, 1995, specifies the recommended monthly test loading method of increasing load by approximately 1000 KW then waiting at least five minutes before adding more load. Unloading at 1.000 MW per minute reduces engine fouling due to operation at lower loads.

[B0255] SACM users manual rev. 2, Requires prelube of the 1A Diesel engine prior to start. ASEU memo dated 6/21/99 allows up to 30 minutes without prelube under casualty conditions. This is limited to ONE start of this type per year **AND** requires engine inspection within FIVE years.

[B0257] SACM users manual rev. 2, The 1A Diesel should be loaded within 1 hour of start. Unloaded operation beyond 1 hour should be minimized. This prevents excessive buildup of soot and oil in the engine cylinders and turbocharger turbine.

[B0263] FCR 89-0079, Startup Problem Report, SPR 95-289M, disposition establishes pneumatic prelube pump air pressure at 35 psig, $\pm$ 5 psig, to allow engine lubrication for greater than or equal to 20 minutes as required by SACM.

8.0 BASES (Continued)

[B0513] Engineering memo PES\990621-200 stating calculation D-M-95-010 indicates the 1A and 0C DGs can operate at 100% load with ONE radiator fan out of service and radiators in a dirty condition if outside air temperature is LESS THAN 59.5° F.

[B0614] SOER 99-01, Recommendation 2.c. Procedure guidance reflects the importance of timely resetting (rearming) of safety system electrical sequencing equipment following the return to grid power.

[B0646] 50.59 SE00438, unloaded Diesel operation is allowed up to 7 days.

[B0698] Engineering memo PES\1129-200 stating requirements for SACM DG Standby temperatures.

9.0 RECORDS

Records generated by this procedure shall be processed **PER** PR-3-100, Records Management.

10.0 ATTACHMENTS

A. TABLE 1, SHUTDOWN SEQUENCER LOADS

B. TABLE 2, 1A FUEL OIL DAY TANK INDICATED VOLUME

C. TABLE 3, 1A AUXILIARY LUBE OIL TANK INDICATED VOLUME

D. TABLE 4, 1A COOLANT DRAIN TANK VOLUME

E. TABLE 5, 1A LUBE OIL DRAIN TANK VOLUME

F. FIGURE 1, 1A DIESEL GENERATOR ELECTRICAL LIMITS

G. ATTACHMENT 1A, 1A STARTING AIR SYSTEM VALVE LINEUP

H. ATTACHMENT 1B, 1A FUEL OIL SYSTEM VALVE LINEUP

I. ATTACHMENT 1C, 1A LUBE OIL SYSTEM VALVE LINEUP

J. ATTACHMENT 1D, 1A HT/LT COOLANT SYSTEM VALVE LINEUP

K. ATTACHMENT 1E, 1A COMBUSTION AIR INTAKE SYSTEM VALVE LINEUP

L. ATTACHMENT 1F, 1A DG SWITCH POSITION VERIFICATION

M. ATTACHMENT 1G, 1A DG LOCAL BREAKER POSITION VERIFICATION

N. ATTACHMENT 1H, 1A DG BUILDING MAINTENANCE AIR SYSTEM

O. ATTACHMENT 2A, 1A AIR START SYSTEM INSTRUMENT VALVE LINEUP

10.0 ATTACHMENTS (Continued)

P. ATTACHMENT 2B, 1A FUEL OIL SYSTEM INSTRUMENT VALVE LINEUP

Q. ATTACHMENT 2C, 1A LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP

R. ATTACHMENT 2D, 1A HT/LT COOLANT SYSTEM INSTRUMENT VALVE LINEUP

S. ATTACHMENT 2E, 1A COMBUSTION AIR INTAKE SYSTEM INSTRUMENT VALVE LINEUP

SHUTDOWN SEQUENCER LOADS

11 4KV BUS SHUTDOWN SEQUENCER LOADS

The following table lists loads that receive a start signal from the 11 4KV Bus Shutdown Sequencer (SDS). The SDS operates if a DG breaker is closed to it.

11 SDS
11 4KV Bus
11 HVAC ESFAS TIMER light illuminates (1C34)

11 CONTR RM FRESH AIR damper, 0-HVAC-5350, shuts

12 CONTR RM FRESH AIR damper, 0-HVAC-5351, shuts

11 Control Room A/C Compr**

11 & 12 Post-LOCI Filter Fans

11 SWGR A/C Compr\#

11 Instr Air Compr\#

11 Salt Water Pump

13 Salt Water Pump*

11 Service Water Pump

13 Service Water Pump*

13 Aux Feedwater Pump\#

Control Room Kitchen/Toilet Exhaust Fan will STOP.

* 13 Saltwater and 13 Service Water Pumps receive a start signal from the SDS only if the associated 11 pump fails to start after receiving an SDS start signal AND they are aligned to 11 4KV Bus.

\# These components receive a start permissive signal from the SDS.

** 11 Control Room HVAC receives a start signal from the SDS only if its associated supply fan is running.

1A FUEL OIL DAY TANK INDICATED VOLUME

INCHES	GALLONS	INCHES	GALLONS
0	0*	21	436
1	10	22	462
2	23	23	488
3	37	24	514
4	52	25	540
5	69	26	565
6	87	27	591
7	106	28	616
8	126	29	641
9	146	30	665
10	168	31	689
11	190	32	713
12	213	33	736
13	236	34	758
14	260	35	780
15	284	36	801
16	309	37	822
17	334	38	841
18	359	39	860
19	385	40	877
20	411	41	893
		42	908

* Approximately 12 gallons of unusable fuel oil remains below indicated level of zero inches.

1A AUXILIARY LUBE OIL TANK INDICATED VOLUME

INCHES	GALLONS	INCHES	GALLONS
0	12*	21	448
1	22*	22	474
2	35*	23	500
3	49	24	526
4	64	25	552
5	81	26	577
6	99	27	603
7	118	28	628
8	138	29	653
9	158	30	677
10	180	31	701
11	202	32	725
12	225	33	748
13	248	34	770
14	272	35	792
15	296	36	813
16	321	37	834
17	346	38	853
18	371	39	872
19	397	40	889
20	423	41	905
		42	920

* Unusable lube oil in tank. (To calculate usable volume, subtract 35 gallons from indicated volume.)

1A COOLANT DRAIN TANK VOLUME

Inches	Gallons	Inches	Gallons	Inches	Gallons
0*	0	25	1041	50	2402
1	22	26	1095	51	2453
2	47	27	1148	52	2503
3	74	28	1203	53	2553
4	104	29	1257	54	2602
5	136	30	1312	55	2650
6	170	31	1367	56	2697
7	205	32	1422	57	2744
8	242	33	1477	58	2789
9	281	34	1533	59	2833
10	321	35	1588	60	2876
11	362	36	1644	61	2918
12	405	37	1699	62	2959
13	449	38	1755	63	2998
14	493	39	1810	64	3036
15	539	40	1865	65	3073
16	586	41	1921	66	3107
17	634	42	1975	67	3140
18	682	43	2030	68	3171
19	732	44	2084	69	3199
20	782	45	2138	70	3226
21	833	46	2192	71	3249
22	884	47	2245	72	3270
23	936	48	2298	73	3286
24	988	49	2350	74	3298

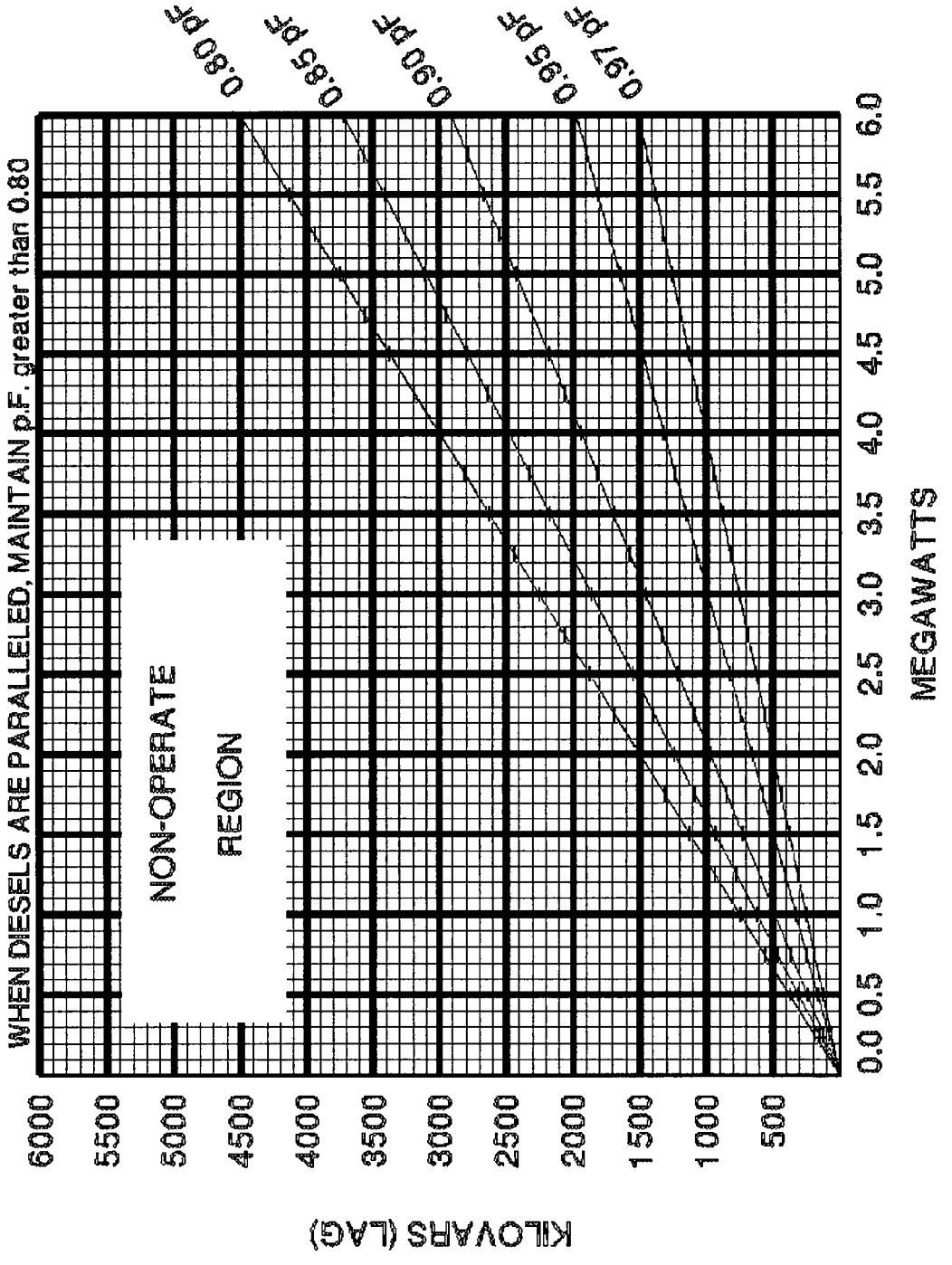
* - Approximately 41 gallons remain in the tank below the pump suction pipe centerline (zero on the above table).

1A LUBE OIL DRAIN TANK VOLUME

Inches	Gallons
0	50
2	63
4	76
6	89
8	102
10	115
12	128
14	141
16	154
18	167
20	180
22	193
24	206
26	219
28	232
30	245
32	258
34	270
36	283
38	296
40	309
42	322
44	335
46	348
48	361
50	374
52	387
54	399

* - Approximately 50 gallons remain in the tank below the sightglass zero. Suction pipe elbow allows removal of lube oil below indication.

1A DIESEL GENERATOR ELECTRICAL LIMITS



ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DSA-2	OPEN	1A1 STARTING AIR COMPRESSOR CONTROL OIL OUTLET VALVE	1A1 STARTING AIR COMPR SKID		
1A1-DSA-3	OPEN	1A1 STARTING AIR COMPRESSOR CONTROL OIL 1-PS-10256 ROOT VALVE	1A1 STARTING AIR COMPR SKID		
1A1-DSA-4	OPEN	1A1 STARTING AIR COMPRESSOR CONTROL OIL 1-PI-10250 ROOT VALVE	1A1 STARTING AIR COMPR SKID		
1A1-DSA-7	OPEN	1A1 INTERCOOLER 11 DISCHARGE 1-PI-10252 ROOT VALVE	1A1 STARTING AIR COMPR SKID		
1A1-DSA-10	OPEN	1A1 WATER SEPARATOR 12 1-PI-10251 ROOT VALVE	1A1 STARTING AIR COMPR SKID		
1A1-DSA-13	OPEN	1A1 WATER SEPARATOR 13 1-PI-10253 ROOT VALVE	1A1 STARTING AIR COMPR SKID		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DSA-14	-----	1A1 STARTING AIR COMPRESSOR DISCHARGE CHECK VALVE	1A1 STARTING AIR COMPR SKID		
1A1-DSA-19	-----	1A1 OIL SEPARATORS 11 AND 12 OUTLET CHECK VALVE	1A1 STARTING AIR COMPR SKID		
1A1-DSA-23	OPEN	1A1 AIR DRYER 11 OUTLET 1-PI-10249 ROOT VALVE	1A1 STARTING AIR COMPR SKID		
1A1-DSA-24	OPEN	1A1 AIR DRYER 12 OUTLET 1-PI-10248 ROOT VALVE	1A1 STARTING AIR COMPR SKID		
1A1-DSA-25	-----	1A1 AIR DRYER 11 REGEN LINE CHECK VALVE	1A1 STARTING AIR COMPR SKID		
1A1-DSA-26	-----	1A1 AIR DRYER 12 REGEN LINE CHECK VALVE	1A1 STARTING AIR COMPR SKID		
1A1-DSA-27	-----	1A1 AIR DRYER 11 OUTLET CHECK VALVE	1A1 STARTING AIR COMPR SKID		
1A1-DSA-28	-----	1A1 AIR DRYER 12 OUTLET CHECK VALVE	1A1 STARTING AIR COMPR SKID		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DSA-31	-----	1A1 AIR DRYER REGEN LINE 1-DSA-10258-PCV OUTLET CHECK VALVE	1A1 STARTING AIR COMPR SKID		
1A1-DSA-32	-----	1A1 AIR DRYER REGEN LINE 1-DSA-10258-PCV OUTLET REGULATING VALVE	1A1 STARTING AIR COMPR SKID		
1A1-DSA-33	OPEN	1A1 AIR DRYER REGEN LINE 1-DSA-10258-PCV OUTLET 1-PI-10247 ROOT VALVE	1A1 STARTING AIR COMPR SKID		
1-DSA-10251-CV	-----	1A1 WATER SEPARATOR 12 AUTOMATIC DRAIN VALVE	1A1 STARTING AIR COMPR SKID		
1-DSA-10252-CV	-----	1A1 INTERCOOLER 11 AUTOMATIC DRAIN VALVE	1A1 STARTING AIR COMPR SKID		
1-DSA-10253-CV	-----	1A1 WATER SEPARATOR 13 AUTOMATIC DRAIN VALVE	1A1 STARTING AIR COMPR SKID		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1-DSA-10258-CV	-----	1A1 AIR DRYER 11 AND 12 INLET 4-WAY CONTROL VALVE	1A1 STARTING AIR COMPR SKID		
1-DSA-10257-PCV	-----	1A1 STARTING AIR COMPRESSOR SKID OUTLET PRESSURE CONTROL VALVE	1A1 STARTING AIR COMPR SKID		
1-DSA-10258-PCV	-----	1A1 AIR DRYER REGEN LINE PRESSURE CONTROL VALVE	1A1 STARTING AIR COMPR SKID		
1-DSA-10245-RV	-----	1A1 OILER 13 RELIEF VALVE	1A1 STARTING AIR COMPR SKID		
1-DSA-10251-RV	-----	1A1 WATER SEPARATOR 12 RELIEF VALVE	1A1 STARTING AIR COMPR SKID		
1-DSA-10252-RV	-----	1A1 INTERCOOLER 11 RELIEF VALVE	1A1 STARTING AIR COMPR SKID		
1-DSA-10253-RV	-----	1A1 WATER SEPARATOR 13 RELIEF VALVE	1A1 STARTING AIR COMPR SKID		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1-DSA-10244-SV	-----	1A1 AIR DRYER REGEN LINE SOLENOID VALVE	1A1 STARTING AIR COMPR SKID		
1-DSA-10245-SV	-----	1A1 AIR DRYER CONTROL AIR TO 1-DSA-10258-CV SOLENOID VALVE	1A1 STARTING AIR COMPR SKID		
1-DSA-10246-SV	-----	1A1 AIR DRYER REGEN CONTROL AIR TO 1-DSA-10258-CV SOLENOID VALVE	1A1 STARTING AIR COMPR SKID		
1-DSA-10247-SV	-----	1A1 AIR DRYER REGEN LINE OUTLET SOLENOID VALVE	1A1 STARTING AIR COMPR SKID		
1-DSA-10248-SV	-----	1A1 OIL SEPARATOR 11 DRAIN SOLENOID VALVE	1A1 STARTING AIR COMPR SKID		
1-DSA-10249-SV	-----	1A1 OIL SEPARATOR 12 DRAIN SOLENOID VALVE	1A1 STARTING AIR COMPR SKID		
1A1-DSA-38	-----	1A1 STARTING AIR RECEIVER 12 INLET CHECK VALVE	1A1 STRTNG AIR RCVR 12 INL LN		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DSA-39	OPEN	1A1 STARTING AIR RECEIVER 12 INLET VALVE	1A1 STRTNG AIR RCVR 12 INL LN		
1A1-DSA-40	LOCKED OPEN	1A1 STARTING AIR RECEIVER 12 OUTLET VALVE	1A1 STRTNG AIR RCVR 12 OUTL LN		
1A1-DSA-42	LOCKED OPEN	1A1 STARTING AIR RECEIVER 12 1-PS-10245/10246 ROOT VALVE	1A1 STARTING AIR RECEIVER 12		
1A1-DSA-43	OPEN	1A1 STARTING AIR RECEIVER 12 1-PI/PT-10242 ROOT VALVE	1A1 STARTING AIR RECEIVER 12		
1A1-DSA-44	SHUT	1A1 STARTING AIR RECEIVER 12 DRAIN VALVE	1A1 STARTING AIR RECEIVER 12		
1A1-DSA-45	SHUT	1A1 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE	1A1 STARTING AIR RECEIVER 12		
1A1-DSA-46	-----	1A1 STARTING AIR RECEIVER 11 INLET CHECK VALVE	1A1 STRTNG AIR RCVR 11 INL LN		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DSA-47	OPEN	1A1 STARTING AIR RECEIVER 11 INLET VALVE	1A1 STRTNG AIR RCVR 11 INL LN		
1A1-DSA-48	LOCKED OPEN	1A1 STARTING AIR RECEIVER 11 OUTLET VALVE	1A1 STRTNG AIR RCVR 11 OUTL LN		
1A1-DSA-50	LOCKED OPEN	1A1 STARTING AIR RECEIVER 11 1-PS-10243/10244 ROOT VALVE	1A1 STARTING AIR RECEIVER 11		
1A1-DSA-51	OPEN	1A1 STARTING AIR RECEIVER 11 1-PI/PT-10241 ROOT VALVE	1A1 STARTING AIR RECEIVER 11		
1A1-DSA-52	SHUT	1A1 STARTING AIR RECEIVER 11 DRAIN VALVE	1A1 STARTING AIR RECEIVER 11		
1A1-DSA-53	SHUT	1A1 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE	1A1 STARTING AIR RECEIVER 11		
1A1-DSA-54	SHUT	1A1 AND 1A2 STARTING AIR SYSTEMS CROSSCONNECT VALVE	66' FAN ROOM BETWN COMPRESSORS		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DSA-55	SHUT	1A1 STARTING AIR RECEIVER 12 OUTLET LINE DRAIN VALVE	35' E END 1A1 PEDESTAL IN OVHD		
1A1-DSA-56	SHUT	1A1 STARTING AIR RECEIVER 12 OUTLET LINE BACKUP DRAIN VALVE	35' E END 1A1 PEDESTAL IN OVHD		
1A1-DSA-57	SHUT	1A1 STARTING AIR RECEIVER 11 OUTLET LINE DRAIN VALVE	35' E END 1A1 PEDESTAL IN OVHD		
1A1-DSA-58	SHUT	1A1 STARTING AIR RECEIVER 11 OUTLET LINE BACKUP DRAIN VALVE	35' E END 1A1 PEDESTAL IN OVHD		
1A1-DSA-59	SHUT	1A1 FILTER 14 DRAIN VALVE	E END 1A1 ENGINE BELOW FILTER		
1A1-DSA-62	-----	1A1 CENTRIFUGAL SENSOR 12 INLET CHECK VALVE	NE CORNER 1A1 ENGINE		
1A1-DSA-63	-----	1A1 INJECTION LIMITER JACK 1-DSA-10243-SV INLET CHECK VALVE	SE CORNER 1A1 ENGINE		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DSA-64	OPEN	1A1 ENGINE START AIR 1-PS-10255 ROOT VALVE	NE CORNER 1A1 ENGINE		
1A1-DSA-65	OPEN	1A1 AIR DISTRIBUTOR 12 1-PT-10258 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DSA-66	-----	1A1 GOVERNOR BOOSTER INLET CHECK VALVE	NE CORNER 1A1 ENGINE		
1A1-DSA-67	SHUT	1A1 FILTER 15 DRAIN VALVE	SE CORNER 1A1 ENGINE		
1A1-DSA-70	-----	1A1 CENTRIFUGAL SENSOR 11 INLET CHECK VALVE	SE CORNER 1A1 ENGINE		
1A1-DSA-71	-----	1A1 INJECTION LIMITER JACK 1-DSA-10243-SV INLET CHECK VALVE	SE CORNER 1A1 ENGINE		
1A1-DSA-72	OPEN	1A1 ENGINE START AIR 1-PS-10254 ROOT VALVE	SE CORNER 1A1 ENGINE		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DSA-73	OPEN	1A1 AIR DISTRIBUTOR 11 1-PT-10257 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DSA-74	-----	1A1 GOVERNOR BOOSTER INLET CHECK VALVE	NE CORNER 1A1 ENGINE		
1A1-DSA-76	THROTTLED	1A1 GOVERNOR BOOSTER AIR LINE VENT VALVE	NE CORNER 1A1 ENGINE		
1A1-DSA-80	OPEN	1A1 AIR COMPRESSOR SKID OUTLET VALVE	66' FAN ROOM BY COMPRESSOR		
1A1-DSA-81	SHUT	1A1 TO 1A2 FUEL RACK STOPPING JACK 12 CROSSCONNECT LINE DRAIN VALVE	35' S SIDE 1A DG PEDESTAL		
1A1-DSA-82	SHUT	1A1 TO 1A2 FUEL RACK STOPPING JACK 12 CROSSCONNECT LINE BACKUP DRAIN VALVE	35' S SIDE 1A DG PEDESTAL		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DSA-84	SHUT	1A1 DIESEL GENERATOR STARTING AIR RECEIVERS INLET VENT VALVE	1A1 STARTING AIR RECEIVERS		
1-DSA-10243-RV	-----	1A1 STARTING AIR RECEIVER 11 RELIEF VALVE	1A1 STARTING AIR RECEIVER 11		
1-DSA-10246-RV	-----	1A1 STARTING AIR RECEIVER 12 RELIEF VALVE	1A1 STARTING AIR RECEIVER 12		
1-DSA-10241-SV	-----	1A1 AIR DISTRIBUTOR 11 INLET SOLENOID VALVE	SE CORNER 1A1 ENGINE		
1-DSA-10242-SV	-----	1A1 AIR DISTRIBUTOR 12 INLET SOLENOID VALVE	NE CORNER 1A1 ENGINE		
1-DSA-10243-SV	-----	1A1 INJECTION LIMITER JACK INLET SOLENOID VALVE	SE CORNER 1A1 ENGINE		
1A2-DSA-2	OPEN	1A2 STARTING AIR COMPRESSOR CONTROL OIL OUTLET VALVE	1A2 STARTING AIR COMPR SKID		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DSA-3	OPEN	1A2 STARTING AIR COMPRESSOR CONTROL OIL 1-PS-10286 ROOT VALVE	1A2 STARTING AIR COMPR SKID		
1A2-DSA-4	OPEN	1A2 STARTING AIR COMPRESSOR CONTROL OIL 1-PI-10280 ROOT VALVE	1A2 STARTING AIR COMPR SKID		
1A2-DSA-7	OPEN	1A2 INTERCOOLER 11 DISCHARGE 1-PI-10282 ROOT VALVE	1A2 STARTING AIR COMPR SKID		
1A2-DSA-10	OPEN	1A2 WATER SEPARATOR 12 1-PI-10281 ROOT VALVE	1A2 STARTING AIR COMPR SKID		
1A2-DSA-13	OPEN	1A2 WATER SEPARATOR 13 1-PI-10283 ROOT VALVE	1A2 STARTING AIR COMPR SKID		
1A2-DSA-14	-----	1A2 STARTING AIR COMPRESSOR DISCHARGE CHECK VALVE	1A2 STARTING AIR COMPR SKID		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DSA-19	-----	1A2 OIL SEPARATORS 11 AND 12 OUTLET CHECK VALVE	1A2 STARTING AIR COMPR SKID		
1A2-DSA-23	OPEN	1A2 AIR DRYER 11 OUTLET 1-PI-10279 ROOT VALVE	1A2 STARTING AIR COMPR SKID		
1A2-DSA-24	OPEN	1A2 AIR DRYER 12 OUTLET 1-PI-10278 ROOT VALVE	1A2 STARTING AIR COMPR SKID		
1A2-DSA-25	-----	1A2 AIR DRYER 11 REGEN LINE CHECK VALVE	1A2 STARTING AIR COMPR SKID		
1A2-DSA-26	-----	1A2 AIR DRYER 12 REGEN LINE CHECK VALVE	1A2 STARTING AIR COMPR SKID		
1A2-DSA-27	-----	1A2 AIR DRYER 11 OUTLET CHECK VALVE	1A2 STARTING AIR COMPR SKID		
1A2-DSA-28	-----	1A2 AIR DRYER 12 OUTLET CHECK VALVE	1A2 STARTING AIR COMPR SKID		
1A2-DSA-31	-----	1A2 AIR DRYER REGEN LINE 1-DSA-10288-PCV OUTLET CHECK VALVE	1A2 STARTING AIR COMPR SKID		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DSA-32	-----	1A2 AIR DRYER REGEN LINE 1-DSA-10288-PCV OUTLET REGULATING VALVE	1A2 STARTING AIR COMPR SKID		
1A2-DSA-33	OPEN	1A2 AIR DRYER REGEN LINE 1-DSA-10288-PCV OUTLET 1-PI-10277 ROOT VALVE	1A2 STARTING AIR COMPR SKID		
1-DSA-10281-CV	-----	1A2 WATER SEPARATOR 12 AUTOMATIC DRAIN VALVE	1A2 STARTING AIR COMPR SKID		
1-DSA-10282-CV	-----	1A2 INTERCOOLER 11 AUTOMATIC DRAIN VALVE	1A2 STARTING AIR COMPR SKID		
1-DSA-10283-CV	-----	1A2 WATER SEPARATOR 13 AUTOMATIC DRAIN VALVE	1A2 STARTING AIR COMPR SKID		
1-DSA-10288-CV	-----	1A2 AIR DRYER 11 AND 12 INLET 4-WAY CONTROL VALVE	1A2 STARTING AIR COMPR SKID		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1-DSA-10287-PCV	-----	1A2 STARTING AIR COMPRESSOR SKID OUTLET PRESSURE CONTROL VALVE	1A2 STARTING AIR COMPR SKID		
1-DSA-10288-PCV	-----	1A2 AIR DRYER REGEN LINE PRESSURE CONTROL VALVE	1A2 STARTING AIR COMPR SKID		
1-DSA-10275-RV	-----	1A2 OILER 13 RELIEF VALVE	1A2 STARTING AIR COMPR SKID		
1-DSA-10281-RV	-----	1A2 WATER SEPARATOR 12 RELIEF VALVE	1A2 STARTING AIR COMPR SKID		
1-DSA-10282-RV	-----	1A2 INTERCOOLER 11 RELIEF VALVE	1A2 STARTING AIR COMPR SKID		
1-DSA-10283-RV	-----	1A2 WATER SEPARATOR 13 RELIEF VALVE	1A2 STARTING AIR COMPR SKID		
1-DSA-10274-SV	-----	1A2 AIR DRYER REGEN LINE SOLENOID VALVE	1A2 STARTING AIR COMPR SKID		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1-DSA-10275-SV	-----	1A2 AIR DRYER REGEN LINE OUTLET SOLENOID VALVE	1A2 STARTING AIR COMPR SKID		
1-DSA-10276-SV	-----	1A2 AIR DRYER REGEN CONTROL AIR TO 1-DSA-10288-CV SOLENOID VALVE	1A2 STARTING AIR COMPR SKID		
1-DSA-10277-SV	-----	1A2 AIR DRYER CONTROL AIR TO 1-DSA-10288-CV SOLENOID VALVE	1A2 STARTING AIR COMPR SKID		
1-DSA-10278-SV	-----	1A2 OIL SEPARATOR 11 DRAIN SOLENOID VALVE	1A2 STARTING AIR COMPR SKID		
1-DSA-10279-SV	-----	1A2 OIL SEPARATOR 12 DRAIN SOLENOID VALVE	1A2 STARTING AIR COMPR SKID		
1A2-DSA-38	-----	1A2 STARTING AIR RECEIVER 12 INLET CHECK VALVE	1A2 STRTNG AIR RCVR 12 INL LN		
1A2-DSA-39	OPEN	1A2 STARTING AIR RECEIVER 12 INLET VALVE	1A2 STRTNG AIR RCVR 12 INL LN		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DSA-40	LOCKED OPEN	1A2 STARTING AIR RECEIVER 12 OUTLET VALVE	1A2 STRTNG AIR RCVR 12 OUTL LN		
1A2-DSA-42	LOCKED OPEN	1A2 STARTING AIR RECEIVER 12 1-PS-10275/10276 ROOT VALVE	1A2 STARTING AIR RECEIVER 12		
1A2-DSA-43	OPEN	1A2 STARTING AIR RECEIVER 12 1-PI/PT-10272 ROOT VALVE	1A2 STARTING AIR RECEIVER 12		
1A2-DSA-44	SHUT	1A2 STARTING AIR RECEIVER 12 DRAIN VALVE	1A2 STARTING AIR RECEIVER 12		
1A2-DSA-45	SHUT	1A2 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE	1A2 STARTING AIR RECEIVER 12		
1A2-DSA-46	-----	1A2 STARTING AIR RECEIVER 11 INLET CHECK VALVE	1A2 STRTNG AIR RCVR 11 INL LN		
1A2-DSA-47	OPEN	1A2 STARTING AIR RECEIVER 11 INLET VALVE	1A2 STRTNG AIR RCVR 11 INL LN		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DSA-48	LOCKED OPEN	1A2 STARTING AIR RECEIVER 11 OUTLET VALVE	1A2 STRTNG AIR RCVR 11 OUTL LN		
1A2-DSA-50	LOCKED OPEN	1A2 STARTING AIR RECEIVER 11 1-PS-10273/10274 ROOT VALVE	1A2 STARTING AIR RECEIVER 11		
1A2-DSA-51	OPEN	1A2 STARTING AIR RECEIVER 11 1-PI/PT-10271 ROOT VALVE	1A2 STARTING AIR RECEIVER 11		
1A2-DSA-52	SHUT	1A2 STARTING AIR RECEIVER 11 DRAIN VALVE	1A2 STARTING AIR RECEIVER 11		
1A2-DSA-53	SHUT	1A2 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE	1A2 STARTING AIR RECEIVER 11		
1A2-DSA-55	SHUT	1A2 STARTING AIR RECEIVER 12 OUTLET LINE DRAIN VALVE	35' 1A BLDG W END 1A2 PEDESTAL		
1A2-DSA-56	SHUT	1A2 STARTING AIR RECEIVER 12 OUTLET LINE BACKUP DRAIN VALVE	35' 1A BLDG W END 1A2 PEDESTAL		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DSA-57	SHUT	1A2 STARTING AIR RECEIVER 11 OUTLET LINE DRAIN VALVE	35' 1A BLDG W END 1A2 PEDESTAL		
1A2-DSA-58	SHUT	1A2 STARTING AIR RECEIVER 11 OUTLET LINE BACKUP DRAIN VALVE	35' 1A BLDG W END 1A2 PEDESTAL		
1A2-DSA-59	SHUT	1A2 FILTER 14 DRAIN VALVE	NW CORNER 1A2 ENGINE		
1A2-DSA-60	SHUT	1A2 STARTING AIR RECEIVER 11 OUTLET LINE BACKUP VENT VALVE	BY COOLANT DRAIN TANK IN OVHD		
1A2-DSA-61	SHUT	1A2 STARTING AIR RECEIVER 11 OUTLET LINE DRAIN VALVE	BY COOLANT DRAIN TANK IN OVHD		
1A2-DSA-62	-----	1A2 CENTRIFUGAL SENSOR 12 INLET CHECK VALVE	NW CORNER 1A2 ENGINE		
1A2-DSA-63	-----	1A2 INJECTION LIMITER JACK 1-DSA-10273-SV INLET CHECK VALVE	NW CORNER 1A2 ENGINE		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DSA-64	OPEN	1A2 ENGINE START AIR 1-PS-10285 ROOT VALVE	NW CORNER 1A2 ENGINE		
1A2-DSA-65	OPEN	1A2 AIR DISTRIBUTOR 12 1-PT-10288 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DSA-66	-----	1A2 GOVERNOR BOOSTER INLET CHECK VALVE	SW CORNER 1A2 ENGINE		
1A2-DSA-67	SHUT	1A2 FILTER 15 DRAIN VALVE	SW CORNER 1A2 ENGINE		
1A2-DSA-68	SHUT	1A2 STARTING AIR RECEIVER 11 OUTLET LINE VENT VALVE	BY COOLANT DRAIN TANK IN OVHD		
1A2-DSA-70	-----	1A2 CENTRIFUGAL SENSOR 11 INLET CHECK VALVE	SW CORNER 1A2 ENGINE		
1A2-DSA-71	-----	1A2 INJECTION LIMITER JACK 1-DSA-10273-SV INLET CHECK VALVE	NW CORNER 1A2 ENGINE		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DSA-72	OPEN	1A2 ENGINE START AIR 1-PS-10284 ROOT VALVE	SW CORNER 1A2 ENGINE		
1A2-DSA-73	OPEN	1A2 AIR DISTRIBUTOR 11 1-PT-10287 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DSA-74	-----	1A2 GOVERNOR BOOSTER INLET CHECK VALVE	SW CORNER 1A2 ENGINE		
1A2-DSA-76	THROTTLED	1A2 GOVERNOR BOOSTER AIR LINE VENT VALVE	SW CORNER 1A2 ENGINE		
1A2-DSA-80	SHUT	1A2 TO 1A1 FUEL RACK STOPPING JACK 11 CROSSCONNECT LINE DRAIN VALVE	35' S SIDE 1A PEDESTAL		
1A2-DSA-81	OPEN	1A2 STARTING AIR COMPRESSOR SKID OUTLET VALVE	66' FAN ROOM BY COMPRESSOR		
1A2-DSA-82	SHUT	1A2 STARTING AIR RECEIVER 11 OUTLET LINE BACKUP DRAIN VALVE	35' BEHIND COOLANT DRAIN TANK		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DSA-83	SHUT	1A2 TO 1A1 FUEL RACK STOPPING JACK 11 CROSSCONNECT LINE BACKUP DRAIN VALVE	35' S SIDE 1A PEDESTAL		
1A2-DSA-84	SHUT	1A2 DIESEL GENERATOR STARTING AIR RECEIVERS INLET VENT VALVE	1A2 STARTING AIR RECEIVERS		
1-DSA-10273-RV	-----	1A2 STARTING AIR RECEIVER 11 RELIEF VALVE	1A2 STARTING AIR RECEIVER 11		
1-DSA-10276-RV	-----	1A2 STARTING AIR RECEIVER 12 RELIEF VALVE	1A2 STARTING AIR RECEIVER 12		
1-DSA-10271-SV	-----	1A2 AIR DISTRIBUTOR 11 INLET SOLENOID VALVE	SW SIDE 1A2 ENGINE		
1-DSA-10272-SV	-----	1A2 AIR DISTRIBUTOR 12 INLET SOLENOID VALVE	NW SIDE 1A2 ENGINE		

ATTACHMENT 1A
1A STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1-DSA-10273-SV	-----	1A2 INJECTION LIMITER JACK INLET SOLENOID VALVE	NW SIDE 1A2 ENGINE		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DFO-1	LOCKED OPEN	1A FUEL OIL TRANSFER PUMP 11 SUCTION VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-2	OPEN	1A FUEL OIL TRANSFER PUMP 11 SUCTION 1-PI-10021 ROOT VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-4	OPEN	1A FUEL OIL TRANSFER PUMP 11 DISCHARGE 1-PI-10022 ROOT VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-5	-----	1A FUEL OIL TRANSFER PUMP 11 DISCHARGE CHECK VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-6	LOCKED OPEN	1A FUEL OIL TRANSFER PUMP 11 DISCHARGE VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-7	LOCKED OPEN	1A FUEL OIL TRANSFER PUMP 12 SUCTION VALVE	1A FOST RM LOWER LEVEL		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DFO-8	OPEN	1A FUEL OIL TRANSFER PUMP 12 SUCTION 1-PI-10023 ROOT VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-10	OPEN	1A FUEL OIL TRANSFER PUMP 12 DISCHARGE 1-PI-10024 ROOT VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-11	-----	1A FUEL OIL TRANSFER PUMP 12 DISCHARGE CHECK VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-12	LOCKED OPEN	1A FUEL OIL TRANSFER PUMP 12 DISCHARGE VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-15	OPEN	1A FUEL OIL TRANSFER FILTERS 1-PDIS-10029 HP ROOT VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-16	LOCKED OPEN	1A FUEL OIL TRANSFER FILTER 11 INLET VALVE	1A FOST RM LOWER LEVEL		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DFO-17	LOCKED SHUT	1A FUEL OIL TRANSFER FILTER 12 INLET VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-18	OPEN	1A FUEL OIL TRANSFER FILTERS 1-PDIS-10029 LP ROOT VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-19	LOCKED OPEN	1A FUEL OIL TRANSFER FILTER 11 OUTLET VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-20	LOCKED OPEN	1A FUEL OIL TRANSFER FILTER 12 OUTLET VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-21	LOCKED SHUT	1A FUEL OIL TRANSFER FILTER 11 DRAIN VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-22	LOCKED SHUT	1A FUEL OIL TRANSFER FILTER 12 DRAIN VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-23	SHUT	1A FUEL OIL DAY TANK 1-LS-10021/10022 VENT VALVE	1A FOST RM UPPER LEVEL		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DFO-24	LOCKED SHUT	1A FUEL OIL DAY TANK 1-LS-10021 DRAIN VALVE	1A FOST RM UPPER LEVEL		
1A-DFO-25	LOCKED SHUT	1A FUEL OIL DAY TANK 1-LS-10022 DRAIN VALVE	1A FOST RM UPPER LEVEL		
1A-DFO-26	LOCKED OPEN	1A FUEL OIL DAY TANK 1-LS-10021/10022 UPPER ROOT VALVE	1A FOST RM UPPER LEVEL		
1A-DFO-27	LOCKED OPEN	1A FUEL OIL DAY TANK 1-LS-10021/10022 AND 1-LI/LT-10023 LOWER ROOT VALVE	1A FOST RM UPPER LEVEL		
1A-DFO-28	LOCKED SHUT	1A FUEL OIL DAY TANK DRAIN/SAMPLE VALVE	1A FOST RM UPPER LEVEL		
1A-DFO-29	LOCKED SHUT	1A FUEL OIL DAY TANK TO 1A FOST DRAIN VALVE	1A FOST RM UPPER LEVEL		
1A-DFO-58	SHUT	1A DIRTY FUEL OIL TANK 1-LG-10051 VENT VALVE	35' S SIDE 1A PEDESTAL		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DFO-65	OPEN	1A DIRTY FUEL OIL TANK 1-LG-10051 UPPER ROOT VALVE	35' S SIDE 1A PEDESTAL		
1A-DFO-68	LOCKED THROTTLED	1A FUEL OIL TRANSFER PUMPS 11/12 DISCHARGE VALVE	1A FOST RM LOWER LEVEL		3.25 TURNS OPEN
1A-DFO-71	LOCKED SHUT	1A FUEL OIL TRANSFER FILTER 11 VENT VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-72	LOCKED SHUT	1A FUEL OIL TRANSFER FILTER 12 VENT VALVE	1A FOST RM LOWER LEVEL		
1A-DFO-74	SHUT	1A DIRTY FUEL OIL TANK DRAIN VALVE	35' S SIDE 1A PEDESTAL		
1A-DFO-75	OPEN	1A DIRTY FUEL OIL TANK 1-LG-10051 LOWER ROOT VALVE	35' S SIDE 1A PEDESTAL		
1A-DFO-76	SHUT	1A DIRTY FUEL OIL TANK 1-LG-10051 DRAIN VALVE	35' S SIDE 1A PEDESTAL		
1A-DFO-79	LOCKED SHUT	1A FUEL OIL DAY TANK SAMPLE VALVE	1A FOST RM UPPER LEVEL		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DFO-80	OPEN	1A FUEL OIL DAY TANK 1-LI/LT-10023 ROOT VALVE	1A FOST RM UPPER LEVEL		
1A-DFO-168	SHUT	1A FUEL OIL DAY TANK SUPPLY HEADER DRAIN VALVE	35' BELOW 1A2 AUX DESK		
1A-DFO-175	OPEN	1A DIRTY FUEL OIL TANK 1-LG-10051 LOWER ISOLATION VALVE	35' S SIDE 1A PEDESTAL		
1A-DFO-176	OPEN	1A DIRTY FUEL OIL TANK 1-LG-10051 UPPER ISOLATION VALVE	35' S SIDE 1A PEDESTAL		
1A1-DFO-55	SHUT	1A1 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE LINE DRAIN VALVE	35' N SIDE 1A1 PEDESTAL IN OVHD		
1A1-DFO-56	SHUT	1A1 DUPLEX FILTER OUTLET LINE DRAIN VALVE	35' N SIDE 1A1 PEDESTAL IN OVHD		
1A1-DFO-82	LOCKED OPEN	1A1 ENGINE DRIVEN FUEL OIL PUMP SUCTION VALVE	35' E END 1A1 PEDESTAL IN OVHD		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DFO-83	SHUT	1A1 ENGINE DRIVEN FUEL OIL PUMP SUCTION LINE DRAIN VALVE	35' E END 1A1 PEDESTAL IN OVHD		
1A1-DFO-84	SHUT	1A1 FUEL OIL EXCESS FLOW RETURN LINE DRAIN VALVE	35' E END 1A1 PEDESTAL IN OVHD		
1A1-DFO-85	SHUT	1A1 FUEL OIL PUMPS DISCHARGE RETURN LINE DRAIN VALVE	35' N SIDE 1A1 PEDESTAL IN OVHD		
1A1-DFO-101	OPEN	1A1 MOTOR DRIVEN FUEL OIL PUMP SUCTION VALVE	1A1 AUX DESK		
1A1-DFO-102	-----	1A1 MOTOR DRIVEN FUEL OIL PUMP DISCHARGE CHECK VALVE	1A1 AUX DESK		
1A1-DFO-103	-----	1A1 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE CHECK VALVE	1A1 AUX DESK		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DFO-106	OPEN	1A1 ENGINE DRIVEN FUEL OIL PUMP SUCTION 1-PI/PT-10054 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DFO-107	OPEN	1A1 ENGINE FUEL OIL MANIFOLD 1-PS-10056 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DFO-108	OPEN	1A1 MOTOR DRIVEN FUEL OIL PUMP SUCTION 1-PI/PT-10051 ROOT VALVE	1A1 AUX DESK		
1A1-DFO-109	OPEN	1A1 DUPLEX FILTER INLET 1-PI/PT-10052 ROOT VALVE	1A1 AUX DESK		
1A1-DFO-110	OPEN	1A1 DUPLEX FILTER OUTLET 1-PI/PT-10053 ROOT VALVE	1A1 AUX DESK		
1A1-DFO-120	OPEN	1A1 DUPLEX FILTER 1-PDIS-10055 HP ROOT VALVE	1A1 AUX DESK		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DFO-121	OPEN	1A1 DUPLEX FILTER 1-PDIS-10055 LP ROOT VALVE	1A1 AUX DESK		
1A1-DFO-125	OPEN	1A1 MOTOR DRIVEN FUEL OIL PUMP DISCHARGE VALVE	1A1 AUX DESK		
1A1-DFO-131	OPEN	1A1 ENGINE FUEL INJECTOR 1 ISOLATION VALVE	45' N SIDE 1A1 ENGINE		
1A1-DFO-132	OPEN	1A1 ENGINE FUEL INJECTOR 2 ISOLATION VALVE	45' N SIDE 1A1 ENGINE		
1A1-DFO-133	OPEN	1A1 ENGINE FUEL INJECTOR 3 ISOLATION VALVE	45' N SIDE 1A1 ENGINE		
1A1-DFO-134	OPEN	1A1 ENGINE FUEL INJECTOR 4 ISOLATION VALVE	45' N SIDE 1A1 ENGINE		
1A1-DFO-135	OPEN	1A1 ENGINE FUEL INJECTOR 5 ISOLATION VALVE	45' N SIDE 1A1 ENGINE		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DFO-136	OPEN	1A1 ENGINE FUEL INJECTOR 6 ISOLATION VALVE	45' N SIDE 1A1 ENGINE		
1A1-DFO-137	OPEN	1A1 ENGINE FUEL INJECTOR 7 ISOLATION VALVE	45' N SIDE 1A1 ENGINE		
1A1-DFO-138	OPEN	1A1 ENGINE FUEL INJECTOR 8 ISOLATION VALVE	45' N SIDE 1A1 ENGINE		
1A1-DFO-139	OPEN	1A1 ENGINE FUEL INJECTOR 9 ISOLATION VALVE	45' S SIDE 1A1 ENGINE		
1A1-DFO-140	OPEN	1A1 ENGINE FUEL INJECTOR 10 ISOLATION VALVE	45' S SIDE 1A1 ENGINE		
1A1-DFO-141	OPEN	1A1 ENGINE FUEL INJECTOR 11 ISOLATION VALVE	45' S SIDE 1A1 ENGINE		
1A1-DFO-142	OPEN	1A1 ENGINE FUEL INJECTOR 12 ISOLATION VALVE	45' S SIDE 1A1 ENGINE		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DFO-143	OPEN	1A1 ENGINE FUEL INJECTOR 13 ISOLATION VALVE	45' S SIDE 1A1 ENGINE		
1A1-DFO-144	OPEN	1A1 ENGINE FUEL INJECTOR 14 ISOLATION VALVE	45' S SIDE 1A1 ENGINE		
1A1-DFO-145	OPEN	1A1 ENGINE FUEL INJECTOR 15 ISOLATION VALVE	45' S SIDE 1A1 ENGINE		
1A1-DFO-146	OPEN	1A1 ENGINE FUEL INJECTOR 16 ISOLATION VALVE	45' S SIDE 1A1 ENGINE		
1A1-DFO-147/148	NOT IN MID POSITION	1A1 DUPLEX FILTER 3-WAY VALVE	1A1 AUX DESK		
1A1-DFO-165	SHUT	1A1 FUEL OIL EXCESS FLOW RETURN LINE VENT VALVE	66' 1A TANK RM ABOVE FO DAY TK		
1A1-DFO-166	SHUT	1A1 FUEL OIL PUMPS DISCHARGE RETURN LINE VENT VALVE	66' 1A TANK RM ABOVE FO DAY TK		
1A1-DFO-167	SHUT	1A1 FUEL OIL EXCESS FLOW RETURN LINE DRAIN VALVE	35' N SIDE 1A1 PEDESTAL IN OVHD		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DFO-169	SHUT	1A1 ENGINE DRIVEN FUEL OIL PUMP SUCTION LINE VENT VALVE	35' E END 1A1 PEDESTAL IN OVHD		
1A1-DFO-170	SHUT	1A1 ENGINE DRIVEN FUEL OIL PUMP SUCTION LINE DRAIN VALVE	35' E END 1A1 PEDESTAL IN OVHD		
1A1-DFO-171	SHUT	1A1 FUEL OIL EXCESS FLOW RETURN LINE VENT VALVE	35' E END 1A1 PEDESTAL IN OVHD		
1-DFO-10051-RV	-----	1A1 MOTOR DRIVEN FUEL OIL PUMP INTERNAL RELIEF VALVE	1A1 AUX DESK		INTERNAL TO PUMP
1-DFO-10054-RV	-----	1A1 MOTOR DRIVEN FUEL OIL PUMP DISCHARGE LINE RELIEF VALVE	1A1 AUX DESK		
1-DFO-10055-RV	-----	1A1 FUEL OIL FEED RAMP EXCESS FLOW RELIEF VALVE	45' NW CORNER 1A1 ENGINE		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DFO-3	SHUT	1A2 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE LINE DRAIN VALVE	35' NW CRNR 1A2 PEDESTAL IN OVHD		
1A2-DFO-9	SHUT	1A2 DUPLEX FILTER OUTLET LINE DRAIN VALVE	35' NW CRNR 1A2 PEDESTAL IN OVHD		
1A2-DFO-82	LOCKED OPEN	1A2 ENGINE DRIVEN FUEL OIL PUMP SUCTION VALVE	35' W END 1A2 PEDESTAL IN OVHD		
1A2-DFO-84	SHUT	1A2 FUEL OIL EXCESS FLOW RETURN LINE DRAIN VALVE	35' W END 1A2 PEDESTAL IN OVHD		
1A2-DFO-85	SHUT	1A2 FUEL OIL PUMPS DISCHARGE RETURN LINE DRAIN VALVE	35' N SIDE 1A2 PEDESTAL IN OVHD		
1A2-DFO-101	OPEN	1A2 MOTOR DRIVEN FUEL OIL PUMP SUCTION VALVE	1A2 AUX DESK		
1A2-DFO-102	-----	1A2 MOTOR DRIVEN FUEL OIL PUMP DISCHARGE CHECK VALVE	1A2 AUX DESK		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DFO-103	-----	1A2 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE CHECK VALVE	1A2 AUX DESK		
1A2-DFO-106	OPEN	1A2 ENGINE DRIVEN FUEL OIL PUMP SUCTION 1-PI/PT-10064 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DFO-107	OPEN	1A2 ENGINE FUEL OIL MANIFOLD 1-PS-10066 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DFO-108	OPEN	1A2 MOTOR DRIVEN FUEL OIL PUMP SUCTION 1-PI/PT-10061 ROOT VALVE	1A2 AUX DESK		
1A2-DFO-109	OPEN	1A2 DUPLEX FILTER INLET 1-PI/PT-10062 ROOT VALVE	1A2 AUX DESK		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DFO-110	OPEN	1A2 DUPLEX FILTER OUTLET 1-PI/PT-10063 ROOT VALVE	1A2 AUX DESK		
1A2-DFO-120	OPEN	1A2 DUPLEX FILTER 1-PDIS-10065 HP ROOT VALVE	1A2 AUX DESK		
1A2-DFO-121	OPEN	1A2 DUPLEX FILTER 1-PDIS-10065 LP ROOT VALVE	1A2 AUX DESK		
1A2-DFO-125	OPEN	1A2 MOTOR DRIVEN FUEL OIL PUMP DISCHARGE VALVE	1A2 AUX DESK		
1A2-DFO-131	OPEN	1A2 ENGINE FUEL INJECTOR 1 ISOLATION VALVE	45' S SIDE 1A2 ENGINE		
1A2-DFO-132	OPEN	1A2 ENGINE FUEL INJECTOR 2 ISOLATION VALVE	45' S SIDE 1A2 ENGINE		
1A2-DFO-133	OPEN	1A2 ENGINE FUEL INJECTOR 3 ISOLATION VALVE	45' S SIDE 1A2 ENGINE		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DFO-134	OPEN	1A2 ENGINE FUEL INJECTOR 4 ISOLATION VALVE	45' S SIDE 1A2 ENGINE		
1A2-DFO-135	OPEN	1A2 ENGINE FUEL INJECTOR 5 ISOLATION VALVE	45' S SIDE 1A2 ENGINE		
1A2-DFO-136	OPEN	1A2 ENGINE FUEL INJECTOR 6 ISOLATION VALVE	45' S SIDE 1A2 ENGINE		
1A2-DFO-137	OPEN	1A2 ENGINE FUEL INJECTOR 7 ISOLATION VALVE	45' S SIDE 1A2 ENGINE		
1A2-DFO-138	OPEN	1A2 ENGINE FUEL INJECTOR 8 ISOLATION VALVE	45' S SIDE 1A2 ENGINE		
1A2-DFO-139	OPEN	1A2 ENGINE FUEL INJECTOR 9 ISOLATION VALVE	45' N SIDE 1A2 ENGINE		
1A2-DFO-140	OPEN	1A2 ENGINE FUEL INJECTOR 10 ISOLATION VALVE	45' N SIDE 1A2 ENGINE		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DFO-141	OPEN	1A2 ENGINE FUEL INJECTOR 11 ISOLATION VALVE	45' N SIDE 1A2 ENGINE		
1A2-DFO-142	OPEN	1A2 ENGINE FUEL INJECTOR 12 ISOLATION VALVE	45' N SIDE 1A2 ENGINE		
1A2-DFO-143	OPEN	1A2 ENGINE FUEL INJECTOR 13 ISOLATION VALVE	45' N SIDE 1A2 ENGINE		
1A2-DFO-144	OPEN	1A2 ENGINE FUEL INJECTOR 14 ISOLATION VALVE	45' N SIDE 1A2 ENGINE		
1A2-DFO-145	OPEN	1A2 ENGINE FUEL INJECTOR 15 ISOLATION VALVE	45' N SIDE 1A2 ENGINE		
1A2-DFO-146	OPEN	1A2 ENGINE FUEL INJECTOR 16 ISOLATION VALVE	45' N SIDE 1A2 ENGINE		
1A2-DFO-147/148	NOT IN MID POSITION	1A2 DUPLEX FILTER 3-WAY VALVE	1A2 AUX DESK		
1A2-DFO-165	SHUT	1A2 FUEL OIL EXCESS FLOW RETURN LINE VENT VALVE	66' 1A TANK RM ABOVE FO DAY TK		

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DFO-166	SHUT	1A2 FUEL OIL PUMPS DISCHARGE RETURN LINE VENT VALVE	66' 1A TANK RM ABOVE FO DAY TANK		
1A2-DFO-167	SHUT	1A2 FUEL OIL EXCESS FLOW RETURN LINE DRAIN VALVE	35' BEHIND COOLANT DRN TK IN OVHD		
1A2-DFO-169	SHUT	1A2 ENGINE DRIVEN FUEL OIL PUMP SUCTION LINE VENT VALVE	35' W END 1A2 PEDESTAL IN OVHD		
1A2-DFO-170	SHUT	1A2 ENGINE DRIVEN FUEL OIL PUMP SUCTION LINE DRAIN VALVE	35' W END 1A2 PEDESTAL IN OVHD		
1A2-DFO-171	SHUT	1A2 FUEL OIL EXCESS FLOW RETURN LINE VENT VALVE	35' W END 1A2 PEDESTAL IN OVHD		
1-DFO-10061-RV	-----	1A2 MOTOR DRIVEN FUEL OIL PUMP INTERNAL RELIEF VALVE	1A2 AUX DESK		INTERNAL TO PUMP

ATTACHMENT 1B
1A FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1-DFO-10064-RV	-----	1A2 MOTOR DRIVEN FUEL OIL PUMP DISCHARGE LINE RELIEF VALVE	1A2 AUX DESK		
1-DFO-10065-RV	-----	1A2 FUEL OIL FEED RAMP EXCESS FLOW RELIEF VALVE	45' SE CORNER 1A2 ENGINE		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DLO-1	OPEN	1A LUBE OIL DRAIN TANK INLET FROM 1A DG DRAIN HEADER ISOLATION VALVE	35' ABOVE 1A LO DRAIN TANK		
1A-DLO-2	OPEN	1A LUBE OIL DRAIN TANK 1-LG/LS-10001 UPPER ISOLATION VALVE	35' ON 1A LO DRAIN TANK LVL COLUMN		
1A-DLO-3	OPEN	1A LUBE OIL DRAIN TANK 1-LG/LS-10001 LOWER ISOLATION VALVE	35' ON 1A LO DRAIN TANK LVL COLUMN		
1A-DLO-4	SHUT	1A LUBE OIL DRAIN TANK 1-LG/LS-10001 VENT VALVE	35' ON 1A LO DRAIN TANK LVL COLUMN		
1A-DLO-5	SHUT	1A LUBE OIL DRAIN TANK 1-LG/LS-10001 DRAIN VALVE	35' ON 1A LO DRAIN TANK LVL COLUMN		
1A-DLO-6	OPEN	1A LUBE OIL DRAIN TANK TRANSFER PUMP SUCTION VALVE	35' W OF 1A LO DRAIN TANK		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DLO-8	SHUT	1A LUBE OIL DRAIN TANK TRANSFER PUMP SUCTION LINE DRAIN VALVE	35' W OF 1A LO DRAIN TANK		
1A-DLO-9	OPEN	1A LUBE OIL DRAIN TANK TRANSFER PUMP DISCH 1-PI-10001 ROOT VALVE	35' W OF 1A LO DRAIN TANK		
1A-DLO-10	-----	1A LUBE OIL DRAIN TANK TRANSFER PUMP DISCHARGE CHECK VALVE	35' W OF 1A LO DRAIN TANK		
1A-DLO-11	LOCKED SHUT	1A LUBE OIL DRAIN TANK TRANSFER PP DISCH TO TRUCK CONN ISOLATION VALVE	35' W OF 1A LO DRAIN TANK		
1A-DLO-12	OPEN	1A LUBE OIL DRAIN FILTER 1-PDI-10002 HP ROOT VALVE	35' W OF 1A LO DRAIN TANK		
1A-DLO-13	OPEN	1A LUBE OIL DRAIN FILTER 1-PDI-10002 LP ROOT VALVE	35' W OF 1A LO DRAIN TANK		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DLO-14	SHUT	1A LUBE OIL DRAIN FILTER DRAIN VALVE	35' BELOW 1A LO DRAIN FILTER		
1A-DLO-15	SHUT	1A LUBE OIL DRAIN SYSTEM OUTSIDE TRUCK CONN ISOLATION VALVE	45' ON W OUTSIDE WALL 1A BLDG		
1A-DLO-16	OPEN	1A LUBE OIL DRAIN FILTER OUTLET VALVE	35' W OF 1A LO DRAIN TANK		
1A-DLO-17	SHUT	1A LUBE OIL DRAIN FILTER OUTLET HEADER VENT VALVE	35' ABOVE FILTER IN OVHD		
1A-DLO-18	SHUT	1A LUBE OIL DRAIN SYSTEM RETURN TO 1A2 DG ISOLATION VALVE	35' SW CORNER 1A PEDESTAL OVHD		
1A-DLO-19	SHUT	1A LUBE OIL DRAIN SYSTEM RETURN TO 1A1 DG ISOLATION VALVE	35' SW CORNER 1A PEDESTAL OVHD		
1A-DLO-20	-----	1A LUBE OIL FILL PUMP DISCHARGE CHECK VALVE	45' N WALL DG ROOM BY FILL PP		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DLO-21	OPEN	1A LUBE OIL AUX TANK 1-LS-10166 UPPER ISOLATION VALVE	66' TANK ROOM ON LO AUX TANK		
1A-DLO-22	OPEN	1A LUBE OIL AUX TANK 1-LS-10166 LOWER ISOLATION VALVE	66' TANK ROOM ON LO AUX TANK		
1A-DLO-23	SHUT	1A LUBE OIL AUX TANK 1-LS-10166 VENT VALVE	66' TANK ROOM ON LO AUX TANK		
1A-DLO-24	SHUT	1A LUBE OIL AUX TANK 1-LS-10166 DRAIN/SAMPLE VALVE	66' TANK ROOM ON LO AUX TANK		
1A-DLO-25	SHUT	1A LUBE OIL AUX TANK DRAIN VALVE	66' TANK ROOM ON LO AUX TANK		
1A-DLO-26	SHUT	1A LUBE OIL DRAIN FILTER VENT VALVE	35' ON 1A LO DRAIN FILTER		
1A-DLO-27	SHUT	1A LUBE OIL DRAIN FILTER DRAIN VALVE	35' ON 1A LO DRAIN FILTER		
1A-DLO-28	SHUT	1A LUBE OIL FILL PUMP DISCHARGE LINE DRAIN VALVE	45' N WALL DG ROOM BY FILL PP		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DLO-30	SHUT	1A LUBE OIL DRAIN TANK RECIRC LINE ISOLATION VALVE	35' ABOVE 1A LO DRAIN TANK		
1A-DLO-31	-----	1A LUBE OIL DRAIN TANK RECIRC LINE CHECK VALVE	35' ABOVE 1A LO DRAIN TANK		
1A-DLO-32	OPEN	1A LUBE OIL DRAIN TANK RECIRC/INLET FROM OC DG ISOLATION VALVE	35' ABOVE 1A LO DRAIN TANK		
1A-DLO-33	SHUT	1A LUBE OIL DRAIN TANK DRAIN VALVE	35' BELOW 1A LO DRAIN TANK		
1A-DLO-34	OPEN	1A LUBE OIL AUX TANK 1-LI/LT-10164 ISOLATION VALVE	66' TANK RM ON 1A LO AUX TANK		
1A-DLO-35	SHUT	1A LUBE OIL DRAIN FILTER OUTLET HEADER DRAIN/SAMPLE VALVE	35' ABOVE LO DRAIN FILTER		
1-DLO-10180-PCV	-----	1A PNEUMATIC PRELUBE PUMP AIR BOTTLE PRESSURE CONTROL VALVE	35' N 1A2 PEDESTAL		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DLO-1	OPEN	1A1 AC PRELUBE PUMP SUCTION VALVE	1A1 AUX DESK		
1A1-DLO-2	SHUT	1A1 PNEUMATIC PRELUBE PUMP SUCTION VALVE	1A1 AUX DESK		
1A1-DLO-3	OPEN	1A1 AC PRELUBE PUMP DISCHARGE 1-PS-10161 ROOT VALVE	1A1 AUX DESK		
1A1-DLO-4	-----	1A1 AC PRELUBE PUMP DISCHARGE CHECK VALVE	1A1 AUX DESK		
1A1-DLO-5	OPEN	1A1 AC PRELUBE PUMP DISCHARGE VALVE	1A1 AUX DESK		
1A1-DLO-6	LOCKED OPEN TO ENGINE	1A1 PRELUBE PUMPS DISCHARGE LINE 3-WAY VALVE	1A1 AUX DESK		
1A1-DLO-7	-----	1A1 PNEUMATIC PRELUBE PUMP DISCHARGE CHECK VALVE	1A1 AUX DESK		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DLO-8	OPEN	1A1 DIESEL LUBE OIL PREHEATER OUTLET VALVE	1A1 AUX DESK		
1A1-DLO-10	-----	1A1 DIESEL LUBE OIL PREHEATER OUTLET CHECK VALVE	45' SE END 1A1 ENGINE		
1A1-DLO-11	OPEN	1A1 PNEUMATIC PRELUBE PUMP DISCHARGE 1-PI-10169 ROOT VALVE	1A1 AUX DESK		
1A1-DLO-12	-----	1A1 ENGINE DRIVEN LUBE OIL PUMP DISCHARGE HEADER CHECK VALVE	45' E END 1A1 ENGINE		
1A1-DLO-13	OPEN	1A1 ENGINE DRIVEN LUBE OIL PUMP DISCHARGE HDR 1-PI/PT-10167 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DLO-14	SHUT	1A1 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE	1A1 AUX DESK		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DLO-15	OPEN	1A1 DIESEL LUBE OIL CENTRIFUGAL FILTER 1 INLET VALVE	45' N SIDE 1A1 ENGINE		
1A1-DLO-16	LOCKED SHUT	1A1 NORTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE	45' NE CORNER 1A1 ENGINE		
1A1-DLO-17	LOCKED SHUT	1A1 SOUTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE	45' SE CORNER 1A1 ENGINE		
1A1-DLO-19	OPEN	1A1 LUBE OIL CARTRIDGE FILTERS 1/2 INLET 1-PI/PT-10166 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DLO-21	OPEN	1A1 LUBE OIL CARTRIDGE FILTERS 1/2 1-PDIS-10171 HP ROOT VALVE	45' N SIDE 1A1 ENGINE		
1A1-DLO-22/25	NOT IN MID POSITION	1A1 LUBE OIL CARTRIDGE FILTERS 1/2 3-WAY VALVE	45' N SIDE 1A1 ENGINE		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DLO-23	SHUT	1A1 LUBE OIL CARTRIDGE FILTER 1 DRAIN VALVE	45' N SIDE 1A1 ENGINE		
1A1-DLO-24	SHUT	1A1 LUBE OIL CARTRIDGE FILTER 2 DRAIN VALVE	45' N SIDE 1A1 ENGINE		
1A1-DLO-26	OPEN	1A1 LUBE OIL CARTRIDGE FILTERS 1/2 1-PDIS-10171 LP ROOT VALVE	45' N SIDE 1A1 ENGINE		
1A1-DLO-28	OPEN	1A1 LUBE OIL CARTRIDGE FILTERS 1/2 OUTLET 1-PI/PT-10165 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DLO-29	-----	1A1 DIESEL ENGINE PRELUBE REGULATING BALL CHECK VALVE	45' NW CORNER 1A1 ENGINE		
1A1-DLO-30	LOCKED SHUT	1A1 DIESEL ENGINE OIL SUMP DRAIN VALVE	45' E END 1A1 ENGINE		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DLO-32	-----	1A1 ENGINE DRIVEN LUBE OIL PUMP DISCHARGE HEADER CHECK VALVE	45' E END 1A1 ENGINE		
1A1-DLO-33	OPEN	1A1 ENGINE DRIVEN LUBE OIL PUMP DISCHARGE 1-PI/PT-10164 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DLO-35	OPEN	1A1 DIESEL LUBE OIL CENTRIFUGAL FILTER 2 INLET VALVE	45' S SIDE 1A1 ENGINE		
1A1-DLO-37	OPEN	1A1 LUBE OIL CARTRIDGE FILTERS 3/4 INLET 1-PI/PT-10163 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DLO-39	OPEN	1A1 LUBE OIL CARTRIDGE FILTERS 3/4 1-PDIS-10170 HP ROOT VALVE	45' S SIDE 1A1 ENGINE		
1A1-DLO-40/43	NOT IN MID POSITION	1A1 LUBE OIL CARTRIDGE FILTERS 3/4 3-WAY VALVE	45' S SIDE 1A1 ENGINE		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DLO-41	SHUT	1A1 LUBE OIL CARTRIDGE FILTER 3 DRAIN VALVE	45' S SIDE 1A1 ENGINE		
1A1-DLO-42	SHUT	1A1 LUBE OIL CARTRIDGE FILTER 4 DRAIN VALVE	45' S SIDE 1A1 ENGINE		
1A1-DLO-44	OPEN	1A1 LUBE OIL CARTRIDGE FILTERS 3/4 1-PDIS-10170 LP ROOT VALVE	45' S SIDE 1A1 ENGINE		
1A1-DLO-46	OPEN	1A1 LUBE OIL CARTRIDGE FILTERS 3/4 OUTLET 1-PI/PT-10162 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DLO-47	-----	1A1 DIESEL ENGINE PRELUBE REGULATING BALL CHECK VALVE	45' SW SIDE 1A1 ENGINE		
1A1-DLO-48	OPEN	1A1 DIESEL ENGINE OIL SUMP 1-PI-10168 ROOT VALVE	45' N SIDE 1A1 ENGINE		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DLO-49	LOCKED OPEN	1A1 DIESEL ENGINE INTERNAL CIRCUIT 1-PS-10175 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DLO-50	LOCKED OPEN	1A1 DIESEL ENGINE INTERNAL CIRCUIT 1-PS-10174 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DLO-51	LOCKED OPEN	1A1 DIESEL ENGINE INTERNAL CIRCUIT 1-PS-10178 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DLO-52	LOCKED OPEN	1A1 DIESEL ENGINE INTERNAL CIRCUIT 1-PS-10177 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DLO-53	LOCKED OPEN	1A1 DIESEL ENGINE INTERNAL CIRCUIT 1-PS-10176 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DLO-54	LOCKED OPEN	1A1 DIESEL ENGINE OIL SUMP 1-LG-10161/1-LS-10 167 ROOT VALVE	45' SE CORNER 1A1 ENGINE		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DLO-55	SHUT	1A1 DIESEL ENGINE OIL SUMP 1-LG-10161/1-LS-10 167 DRAIN VALVE	45' SE CORNER 1A1 ENGINE		
1A1-DLO-60	SHUT	1A1 DIESEL ENGINE OIL SUMP FILL VALVE	45' S SIDE 1A1 ENGINE		
1A1-DLO-61	LOCKED SHUT	1A LUBE OIL AUX TANK OUTLET TO 1A1 OIL SUMP ISOLATION VALVE	45' S SIDE 1A1 ENGINE		
1A1-DLO-62	LOCKED OPEN	1A1 DIESEL ENGINE INTERNAL CIRCUIT 1-PS-10179 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DLO-63	LOCKED OPEN	1A1 DIESEL ENGINE OIL SUMP 1-PS-10172 ROOT VALVE	45' N SIDE 1A1 ENGINE		
1A1-DLO-70	SHUT	1A1 PNEUMATIC PRELUBE PUMP DISCHARGE LINE DRAIN VALVE	35' N SIDE 1A1 PEDESTAL IN OVHD		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DLO-71	SHUT	1A1 PRELUBE PUMPS SUCTION LINE DRAIN VALVE	35' N SIDE 1A1 PEDESTAL IN OVHD		
1A1-DLO-72	SHUT	1A1 DIESEL LUBE OIL PREHEATER OUTLET LINE DRAIN/SAMPLE VALVE	35' N SIDE 1A1 PEDESTAL IN OVHD		
1A1-DLO-73	SHUT	1A1 LUBE OIL CARTRIDGE FILTERS 1/2 CROSS-TIE VALVE	45' N SIDE 1A1 ENGINE		
1A1-DLO-74	SHUT	1A1 LUBE OIL CARTRIDGE FILTERS 3/4 CROSS-TIE VALVE	45' S SIDE 1A1 ENGINE		
1-DLO-10163-BV	-----	1A1 CRANKCASE PRESSURE BREATHER VALVE	45' S SIDE 1A1 ENGINE		
1-DLO-10184-BV	-----	1A1 CRANKCASE PRESSURE BREATHER VALVE	45' S SIDE 1A1 ENGINE		
1-DLO-10161-RV	-----	1A1 AC PRELUBE PUMP INTERNAL RELIEF VALVE	1A1 AUX DESK		INTERNAL TO PUMP

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1-DLO-10162-RV	-----	1A1 ENGINE DRIVEN LUBE OIL PUMP 2 INTERNAL RELIEF VALVE	45' E END 1A1 ENGINE		INTERNAL TO PUMP
1-DLO-10164-RV	-----	1A1 SIDE B CRANKCASE OVERPRESSURE RELIEF VALVE	45' S SIDE 1A1 ENGINE		
1-DLO-10168-RV	-----	1A1 DLO CARTRIDGE FILTERS 1/2 INLET LINE RELIEF VALVE	45' N SIDE 1A1 ENGINE		
1-DLO-10174-RV	-----	1A1 SIDE A CRANKCASE OVERPRESSURE RELIEF VALVE	45' N SIDE 1A1 ENGINE		
1-DLO-10180-RV	-----	1A1 PRELUBE PUMP DISCHARGE LINE RELIEF VALVE	1A1 AUX DESK		
1-DLO-10182-RV	-----	1A1 ENGINE DRIVEN LUBE OIL PUMP 1 INTERNAL RELIEF VALVE	45' E END 1A1 ENGINE		INTERNAL TO PUMP

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1-DLO-10185-RV	-----	1A1 DLO CARTRIDGE FILTERS 3/4 INLET LINE RELIEF VALVE	45' S SIDE 1A1 ENGINE		
1-DLO-10171-TCV	-----	1A1 LUBE OIL SIDE A TEMPERATURE CONTROL VALVE	45' N SIDE 1A1 ENGINE		
1-DLO-10172-TCV	-----	1A1 LUBE OIL SIDE B TEMPERATURE CONTROL VALVE	45' S SIDE 1A1 ENGINE		
1A2-DLO-1	OPEN	1A2 AC PRELUBE PUMP SUCTION VALVE	1A2 AUX DESK		
1A2-DLO-2	SHUT	1A2 PNEUMATIC PRELUBE PUMP SUCTION VALVE	1A2 AUX DESK		
1A2-DLO-3	OPEN	1A2 AC PRELUBE PUMP DISCHARGE 1-PS-10201 ROOT VALVE	1A2 AUX DESK		
1A2-DLO-4	-----	1A2 AC PRELUBE PUMP DISCHARGE CHECK VALVE	1A2 AUX DESK		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DLO-5	OPEN	1A2 AC PRELUBE PUMP DISCHARGE VALVE	1A2 AUX DESK		
1A2-DLO-6	LOCKED OPEN TO ENGINE	1A2 PRELUBE PUMPS DISCHARGE LINE 3-WAY VALVE	1A2 AUX DESK		
1A2-DLO-7	-----	1A2 PNEUMATIC PRELUBE PUMP DISCHARGE CHECK VALVE	1A2 AUX DESK		
1A2-DLO-8	OPEN	1A2 DIESEL LUBE OIL PREHEATER OUTLET VALVE	1A2 AUX DESK		
1A2-DLO-10	-----	1A2 DIESEL LUBE OIL PREHEATER OUTLET CHECK VALVE	45' NW END 1A2 ENGINE		
1A2-DLO-11	OPEN	1A2 PNEUMATIC PRELUBE PUMP DISCHARGE 1-PI-10209 ROOT VALVE	1A2 AUX DESK		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DLO-12	-----	1A2 ENGINE DRIVEN LUBE OIL PUMP DISCHARGE HEADER CHECK VALVE	45' W END 1A2 ENGINE		
1A2-DLO-13	OPEN	1A2 ENGINE DRIVEN LUBE OIL PUMP DISCHARGE HDR 1-PI/PT-10207 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DLO-14	SHUT	1A2 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE	1A2 AUX DESK		
1A2-DLO-15	OPEN	1A2 DIESEL LUBE OIL CENTRIFUGAL FILTER 1 INLET VALVE	45' S SIDE 1A2 ENGINE		
1A2-DLO-16	LOCKED SHUT	1A2 NORTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE	45' NW CORNER 1A2 ENGINE		
1A2-DLO-17	LOCKED SHUT	1A2 SOUTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE	45' SW CORNER 1A2 ENGINE		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DLO-19	OPEN	1A2 LUBE OIL CARTRIDGE FILTERS 1/2 INLET 1-PI/PT-10206 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DLO-21	OPEN	1A2 LUBE OIL CARTRIDGE FILTERS 1/2 1-PDIS-10211 HP ROOT VALVE	45' S SIDE 1A2 ENGINE		
1A2-DLO-22/25	NOT IN MID POSITION	1A2 LUBE OIL CARTRIDGE FILTERS 1/2 3-WAY VALVE	45' S SIDE 1A2 ENGINE		
1A2-DLO-23	SHUT	1A2 LUBE OIL CARTRIDGE FILTER 1 DRAIN VALVE	45' S SIDE 1A2 ENGINE		
1A2-DLO-24	SHUT	1A2 LUBE OIL CARTRIDGE FILTER 2 DRAIN VALVE	45' S SIDE 1A2 ENGINE		
1A2-DLO-26	OPEN	1A2 LUBE OIL CARTRIDGE FILTERS 1/2 1-PDIS-10211 LP ROOT VALVE	45' S SIDE 1A2 ENGINE		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DLO-28	OPEN	1A2 LUBE OIL CARTRIDGE FILTERS 1/2 OUTLET 1-PI/PT-10205 ROOT VALVE.	1A2 PT MANIFOLD		
1A2-DLO-29	-----	1A2 DIESEL ENGINE PRELUBE REGULATING BALL CHECK VALVE	45' S SIDE 1A2 ENGINE		
1A2-DLO-30	LOCKED SHUT	1A2 DIESEL ENGINE OIL SUMP DRAIN VALVE	45' W END 1A2 ENGINE		
1A2-DLO-31	SHUT	1A LUBE OIL AUX TANK OUTLET LINE DRAIN VALVE	35' S SIDE 1A2 ENGINE		
1A2-DLO-32	-----	1A2 ENGINE DRIVEN LUBE OIL PUMP DISCHARGE HEADER CHECK VALVE	45' W END 1A2 ENGINE		
1A2-DLO-33	OPEN	1A2 ENGINE DRIVEN LUBE OIL PUMP DISCHARGE 1-PI/PT-10204 ROOT VALVE	1A2 PT MANIFOLD		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DLO-35	OPEN	1A2 DIESEL LUBE OIL CENTRIFUGAL FILTER 2 INLET VALVE	45' N SIDE 1A2 ENGINE		
1A2-DLO-37	OPEN	1A2 LUBE OIL CARTRIDGE FILTERS 3/4 INLET 1-PI/PT-10203 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DLO-39	OPEN	1A2 LUBE OIL CARTRIDGE FILTERS 3/4 1-PDIS-10210 HP ROOT VALVE	45' N SIDE 1A2 ENGINE		
1A2-DLO-40/43	NOT IN MID POSITION	1A2 LUBE OIL CARTRIDGE FILTERS 3/4 3-WAY VALVE	45' N SIDE 1A2 ENGINE		
1A2-DLO-41	SHUT	1A2 LUBE OIL CARTRIDGE FILTER 3 DRAIN VALVE	45' N SIDE 1A2 ENGINE		
1A2-DLO-42	SHUT	1A2 LUBE OIL CARTRIDGE FILTER 4 DRAIN VALVE	45' N SIDE 1A2 ENGINE		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DLO-44	OPEN	1A2 LUBE OIL CARTRIDGE FILTERS 3/4 1-PDIS-10210 LP ROOT VALVE	45' N SIDE 1A2 ENGINE		
1A2-DLO-46	OPEN	1A2 LUBE OIL CARTRIDGE FILTERS 3/4 OUTLET 1-PI/PT-10202 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DLO-47	-----	1A2 DIESEL ENGINE PRELUBE REGULATING BALL CHECK VALVE	45' N SIDE 1A2 ENGINE		
1A2-DLO-48	OPEN	1A2 DIESEL ENGINE OIL SUMP 1-PI-10208 ROOT VALVE	45' N SIDE 1A2 ENGINE		
1A2-DLO-49	LOCKED OPEN	1A2 DIESEL ENGINE INTERNAL CIRCUIT 1-PS-10215 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DLO-50	LOCKED OPEN	1A2 DIESEL ENGINE INTERNAL CIRCUIT 1-PS-10214 ROOT VALVE	1A2 PT MANIFOLD		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DLO-51	LOCKED OPEN	1A2 DIESEL ENGINE INTERNAL CIRCUIT 1-PS-10216 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DLO-52	LOCKED OPEN	1A2 DIESEL ENGINE INTERNAL CIRCUIT 1-PS-10217 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DLO-53	LOCKED OPEN	1A2 DIESEL ENGINE INTERNAL CIRCUIT 1-PS-10218 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DLO-54	LOCKED OPEN	1A2 DIESEL ENGINE OIL SUMP 1-LG-10201/1-LS-10 205 ROOT VALVE	45' SW CORNER 1A2 ENGINE		
1A2-DLO-55	SHUT	1A2 DIESEL ENGINE OIL SUMP 1-LG-10201/1-LS-10 205 DRAIN VALVE	45' SW CORNER 1A2 ENGINE		
1A2-DLO-60	SHUT	1A2 DIESEL ENGINE OIL SUMP FILL VALVE	45' S SIDE 1A2 ENGINE		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DLO-61	LOCKED SHUT	1A LUBE OIL AUX TANK OUTLET TO 1A2 OIL SUMP ISOLATION VALVE	45' S SIDE 1A2 ENGINE		
1A2-DLO-62	LOCKED OPEN	1A2 DIESEL ENGINE INTERNAL CIRCUIT 1-PS-10219 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DLO-63	LOCKED OPEN	1A2 DIESEL ENGINE OIL SUMP 1-PS-10213 ROOT VALVE	45' N SIDE 1A2 ENGINE		
1A2-DLO-70	SHUT	1A2 PNEUMATIC PRELUBE PUMP DISCHARGE LINE DRAIN VALVE	35' N SIDE 1A2 PEDESTAL IN OVHD		
1A2-DLO-71	SHUT	1A2 PRELUBE PUMPS SUCTION LINE DRAIN VALVE	35' N SIDE 1A2 PEDESTAL IN OVHD		
1A2-DLO-72	SHUT	1A2 DIESEL LUBE OIL PREHEATER OUTLET LINE DRAIN/SAMPLE VALVE	35' N SIDE 1A2 PEDESTAL IN OVHD		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DLO-73	SHUT	1A2 LUBE OIL CARTRIDGE FILTERS 1/2 CROSS-TIE VALVE	45' S SIDE 1A2 ENGINE		
1A2-DLO-74	SHUT	1A2 LUBE OIL CARTRIDGE FILTERS 3/4 CROSS-TIE VALVE	45' N SIDE 1A2 ENGINE		
1-DLO-10204-BV	-----	1A2 CRANKCASE PRESSURE BREATHER VALVE	45' S SIDE 1A2 ENGINE		
1-DLO-10222-BV	-----	1A2 CRANKCASE PRESSURE BREATHER VALVE	45' S SIDE 1A2 ENGINE		
1-DLO-10201-RV	-----	1A2 AC PRELUBE PUMP INTERNAL RELIEF VALVE	1A2 AUX DESK		INTERNAL TO PUMP
1-DLO-10202-RV	-----	1A2 ENGINE DRIVEN LUBE OIL PUMP 1 INTERNAL RELIEF VALVE	45' W END 1A2 ENGINE		INTERNAL TO PUMP
1-DLO-10203-RV	-----	1A2 PRELUBE PUMP DISCHARGE LINE RELIEF VALVE	1A2 AUX DESK		

ATTACHMENT 1C
1A LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1-DLO-10206-RV	-----	1A2 DLO CARTRIDGE FILTERS 3/4 INLET LINE RELIEF VALVE	45' N SIDE 1A2 ENGINE		
1-DLO-10208-RV	-----	1A2 DLO CARTRIDGE FILTERS 1/2 INLET LINE RELIEF VALVE	45' S SIDE 1A2 ENGINE		
1-DLO-10215-RV	-----	1A2 SIDE B CRANKCASE OVERPRESSURE RELIEF VALVE	45' N SIDE 1A2 ENGINE		
1-DLO-10219-RV	-----	1A2 SIDE A CRANKCASE OVERPRESSURE RELIEF VALVE	45' S SIDE 1A2 ENGINE		
1-DLO-10223-RV	-----	1A2 ENGINE DRIVEN LUBE OIL PUMP 2 INTERNAL RELIEF VALVE	45' W END 1A2 ENGINE		INTERNAL TO PUMP
1-DLO-10211-TCV	-----	1A2 LUBE OIL SIDE A TEMPERATURE CONTROL VALVE	45' S SIDE 1A2 ENGINE		
1-DLO-10212-TCV	-----	1A2 LUBE OIL SIDE B TEMPERATURE CONTROL VALVE	45' N SIDE 1A2 ENGINE		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DCW-1	SHUT	1A COOLANT MIXING TANK 1-LG/LS-10072 VENT VALVE	66' 1A BLDG ON MIXING TK		
1A-DCW-2	OPEN	1A COOLANT MIXING TANK 1-LG/LS-10072 UPPER ROOT VALVE	66' 1A BLDG ON MIXING TK		
1A-DCW-3	OPEN	1A COOLANT MIXING TANK 1-LG/LS-10072 LOWER ROOT VALVE	66' 1A BLDG ON MIXING TK		
1A-DCW-4	SHUT	1A COOLANT MIXING TANK 1-LG/LS-10072 DRAIN/SAMPLE VALVE	66' 1A BLDG ON MIXING TK		
1A-DCW-5	SHUT	1A COOLANT MIXING TANK DRAIN VALVE	66' 1A BLDG BELOW MIXING TK		
1A-DCW-6	SHUT	1A COOLANT MIXING TANK GLYCOL FILL LINE INLET VALVE	66' 1A BLDG AT MIXING TK		
1A-DCW-7	OPEN	1A COOLANT MIXING TANK OUTLET VALVE	66' 1A BLDG AT MIXING TK		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DCW-9	OPEN	1A COOLANT MIXING TANK PUMP DISCHARGE 1-PI-10073 ROOT VALVE	66' ON MIXING TK PP DISCH LINE		
1A-DCW-10	-----	1A COOLANT MIXING TANK DISCHARGE CHECK VALVE	66' ON MIXING TK PP DISCH LINE		
1A-DCW-11	SHUT	1A1 LT EXPANSION TANK FILL VALVE	80' 1A BLDG ON EXP TK PLATFORM		
1A-DCW-12	SHUT	1A1 HT EXPANSION TANK FILL VALVE	80' 1A BLDG ON EXP TK PLATFORM		
1A-DCW-13	SHUT	1A2 LT EXPANSION TANK FILL VALVE	80' 1A BLDG ON EXP TK PLATFORM		
1A-DCW-14	SHUT	1A2 HT EXPANSION TANK FILL VALVE	80' 1A BLDG ON EXP TK PLATFORM		
1A-DCW-15	SHUT	1A COOLANT DRAIN TANK 1-LG/LS-10071 DRAIN VALVE	35' 1A BLDG W END CLNT DRAIN TK		
1A-DCW-16	SHUT	1A COOLANT DRAIN TANK 1-LG/LS-10071 VENT VALVE	35' 1A BLDG W END CLNT DRAIN TK		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DCW-17	OPEN	1A COOLANT DRAIN TANK 1-LG/LS-10071 UPPER ROOT VALVE	35' 1A BLDG W END CLNT DRAIN TK		
1A-DCW-18	OPEN	1A COOLANT DRAIN TANK 1-LG/LS-10071 LOWER ROOT VALVE	35' 1A BLDG W END CLNT DRAIN TK		
1A-DCW-19	SHUT	1A COOLANT DRAIN TANK DRAIN VALVE	35' 1A BLDG E OF CLNT DRAIN TK		
1A-DCW-20	OPEN	1A COOLANT DRAIN TANK OUTLET VALVE	35' 1A BLDG E OF CLNT DRAIN TK		
1A-DCW-21	SHUT	1A COOLANT DRAIN FILTER DRAIN VALVE	35' 1A BLDG ON CLNT DRAIN FILT		
1A-DCW-22	OPEN	1A COOLANT DRAIN PUMP 1-PI-10071 ROOT VALVE	35' 1A BLDG ABOVE CLNT DRN TK PP		
1A-DCW-23	-----	1A COOLANT DRAIN PUMP DISCHARGE CHECK VALVE	35' 1A BLDG ABOVE CLNT DRN TK PP		
1A-DCW-24	LOCKED SHUT	1A COOLANT DRAIN TANK OUTSIDE TRUCK CONN ISOLATION VALVE	45' 1A BLDG OUTSIDE W DOOR		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DCW-25	SHUT	1A COOLANT DRAIN FILTER VENT VALVE	35' 1A BLDG ABOVE CLNT DRN FILT		
1A-DCW-26	SHUT	1A COOLANT DRAIN FILTER DRAIN VALVE	35' 1A BLDG BELOW CLNT DRN FILT		
1A-DCW-30	-----	1A GLYCOL FILL PUMP DISCHARGE CHECK VALVE	45' 1A BLDG AT GLYCOL FILL PP		
1A-DCW-34	SHUT	1A COOLANT MIXING TANK PUMP DISCHARGE LINE DRAIN VALVE	66' 1A BLDG ABOVE MIXING TK PP		
1A-DCW-35	SHUT	1A COOLANT DRAIN PUMP DISCHARGE LINE DRAIN/SAMPLE VALVE	35' 1A BLDG ABOVE CLNT DRN PP		
1A-DCW-36	SHUT	1A GLYCOL FILL PUMP DISCHARGE LINE DRAIN VALVE	45' 1A BLDG AT GLYCOL FILL PP		
1A-DCW-37	OPEN	1A COOLANT DRAIN FILTER INLET VALVE	35' 1A BLDG ABOVE CLNT DRN FILT		
1A-DCW-38	SHUT	1A COOLANT MIXING TANK PUMP DISCHARGE VALVE	66' 1A BLDG ABOVE MIXING TK PP		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DCW-39	SHUT	1A GLYCOL FILL PUMP DISCHARGE LINE VENT VALVE	66' 1A BLDG ABOVE MIXING TANK		
1A-DCW-40	OPEN	1A COOLANT DRAIN FILTER 1-PDI-10075 UPPER ROOT VALVE	35' 1A BLDG ON FILTER		
1A-DCW-41	OPEN	1A COOLANT DRAIN FILTER 1-PDI-10075 LOWER ROOT VALVE	35' 1A BLDG ON FILTER		
1A-DCW-42	SHUT	1A COOLANT DRAIN FILTER OUTLET HOSE CONN ISOL VALVE	35' 1A BLDG BY FILTER		
1A1-DCW-1	SHUT	1A1 HT RADIATOR FILL AND DRAIN VALVE	35' 1A BLDG NE END 1A1 PEDESTAL		
1A1-DCW-2	SHUT	1A1 HT RADIATOR INLET VENT VALVE	80' 1A BLDG N 1A1 RADIATOR OVHD		
1A1-DCW-3	SHUT	1A1 HT RADIATOR OUTLET VENT VALVE	80' 1A BLDG N 1A1 RADIATOR OVHD		
1A1-DCW-4	OPEN	1A1 HT RADIATOR CONTINUOUS VENT VALVE	80' 1A BLDG N WALL BELW EXP TKS		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DCW-5	SHUT	1A1 HT PREHEAT PUMP SUCTION DRAIN VALVE	35' 1A BLDG NE END 1A1 PED OVHD		
1A1-DCW-6	SHUT	1A1 LUBE OIL PREHEATER HT COOLANT OUTLET DRAIN VALVE	35' 1A BLDG NE END 1A1 PED OVHD		
1A1-DCW-7	LOCKED OPEN	1A1 HT EXPANSION TANK 1-LS-10082 UPPER ROOT VALVE	80' 1A BLDG 1A1 EXP TK PLATFORM		
1A1-DCW-8	SHUT	1A1 HT EXPANSION TANK 1-LS-10082 VENT VALVE	80' 1A BLDG 1A1 EXP TK PLATFORM		
1A1-DCW-9	SHUT	1A1 HT EXPANSION TANK 1-LS-10082 DRAIN VALVE	80' 1A BLDG 1A1 EXP TK PLATFORM		
1A1-DCW-10	LOCKED OPEN	1A1 HT EXPANSION TANK 1-LS-10082 / 1-LI/LT-10081 LOWER ROOT VALVE	80' 1A BLDG 1A1 EXP TK PLATFORM		
1A1-DCW-11	LOCKED OPEN	1A1 HT EXPANSION TANK OUTLET VALVE	80' 1A BLDG N WALL BELW EXP TKS		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DCW-14	SHUT	1A1 LT RADIATOR FILL AND DRAIN VALVE	35' 1A BLDG E END 1A1 PEDESTAL		
1A1-DCW-15	SHUT	1A1 LT RADIATOR INLET VENT VALVE	80' 1A BLDG N END 1A1 RADIATOR		
1A1-DCW-16	SHUT	1A1 LT RADIATOR OUTLET VENT VALVE	80' 1A BLDG N END 1A1 RADIATOR		
1A1-DCW-19	OPEN	1A1 LT RADIATOR CONTINUOUS VENT VALVE	80' 1A BLDG N WALL BELW EXP TKS		
1A1-DCW-20	LOCKED OPEN	1A1 LT EXPANSION TANK 1-LS-10122 UPPER ROOT VALVE	80' 1A BLDG 1A1 EXP TK PLATFORM		
1A1-DCW-21	SHUT	1A1 LT EXPANSION TANK 1-LS-10122 VENT VALVE	80' 1A BLDG 1A1 EXP TK PLATFORM		
1A1-DCW-22	SHUT	1A1 LT EXPANSION TANK 1-LS-10122 DRAIN VALVE	80' 1A BLDG 1A1 EXP TK PLATFORM		
1A1-DCW-23	LOCKED OPEN	1A1 LT EXPANSION TANK 1-LS-10122 / 1-LI/LT-10121 LOWER ROOT VALVE	80' 1A BLDG 1A1 EXP TK PLATFORM		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DCW-24	LOCKED OPEN	1A1 LT EXPANSION TANK OUTLET VALVE	80' 1A BLDG N WALL BELW EXP TKS		
1A1-DCW-25	SHUT	1A1 LT RADIATOR INLET LINE DRAIN VALVE	80' 1A BLDG N END 1A1 RADIATOR		
1A1-DCW-26	SHUT	1A1 LT RADIATOR OUTLET LINE DRAIN VALVE	80' 1A BLDG ON RAD OUTL PIPING		
1A1-DCW-27	SHUT	1A1 ENGINE HT COOLANT OUTLET LINE DRAIN VALVE	35' 1A BLDG E END 1A1 PEDESTAL		
1A1-DCW-28	SHUT	1A1 HT RADIATOR OUTLET LINE DRAIN VALVE	35' 1A BLDG S SIDE 1A1 PEDESTAL		
1A1-DCW-29	SHUT	1A1 LT RADIATOR INLET LINE VENT VALVE	35' 1A BLDG N SIDE 1A1 PED OVHD		
1A1-DCW-30	SHUT	1A1 ENGINE BLOCK HT COOLANT DRAIN VALVE	45' S SIDE 1A1 ENGINE		
1A1-DCW-31	LOCKED OPEN	1A1 GOVERNOR OIL COOLER HT COOLANT INLET VALVE	45' E END 1A1 ENGINE BY GOVNR		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DCW-32	LOCKED OPEN	1A1 ENGINE DRIVEN HT COOLING WATER PUMP DISCH 1-PS-10083 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DCW-34	OPEN	1A1 ENGINE DRIVEN HT COOLING WATER PUMP SUCT 1-PI/PT-10081 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DCW-35	OPEN	1A1 ENGINE DRIVEN HT COOLING WATER PUMP DISCH 1-PI/PT-10082 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DCW-36	OPEN	1A1 LUBE OIL PREHEATER HT COOLANT OUTLET VALVE	1A1 AUX DESK		
1A1-DCW-37	-----	1A1 LUBE OIL PREHEATER HT COOLANT OUTLET CHECK VALVE	1A1 AUX DESK		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DCW-38	OPEN	1A1 ELECTRIC WATER PREHEATER TO EXPANSION TANK ISOLATION VALVE	1A1 AUX DESK		
1A1-DCW-39	OPEN	1A1 HT PREHEAT PUMP SUCTION VALVE	1A1 AUX DESK		
1A1-DCW-41	LOCKED OPEN	1A1 GOVERNOR OIL COOLER HT COOLANT OUTLET VALVE	45' E END 1A1 ENGINE BY GOVNR		
1A1-DCW-42	SHUT	1A1 ENGINE BLOCK HT COOLANT DRAIN VALVE	45' N SIDE 1A1 ENGINE		
1A1-DCW-43	OPEN	1A1 ENGINE DRIVEN LT COOLING WATER PUMP SUCT 1-PI/PT-10121 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DCW-44	OPEN	1A1 ENGINE DRIVEN LT COOLING WATER PUMP DISCH 1-PI/PT-10122 ROOT VALVE	1A1 PT MANIFOLD		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DCW-45	LOCKED OPEN	1A1 ENGINE DRIVEN LT COOLING WATER PUMP DISCH 1-PS-10123 ROOT VALVE	1A1 PT MANIFOLD		
1A1-DCW-46	SHUT	1A1 SOUTH LUBE OIL COOLER LT COOLANT DRAIN VALVE	45' S SIDE 1A1 ENG BELW LO CLR		
1A1-DCW-47	SHUT	1A1 NORTH LUBE OIL COOLER LT COOLANT DRAIN VALVE	45' N SIDE 1A1 ENG BELW LO CLR		
1A1-DCW-48	SHUT	1A1 ENGINE DRIVEN LT COOLING WATER PUMP SUCTION LINE DRAIN VALVE	35' 1A BLDG N SIDE 1A1 PEDESTAL		
1A1-DCW-49	SHUT	1A1 LT RADIATOR INLET LINE DRAIN VALVE	35' 1A BLDG N SIDE 1A1 PEDESTAL		
1A1-DCW-50	SHUT	1A1 ENGINE DRIVEN LT COOLING WATER PUMP SUCTION LINE VENT VALVE	35' 1A BLDG N SIDE 1A1 PEDESTAL		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DCW-51	OPEN	1A1 HT EXPANSION TANK 1-LI/LT-10081 ROOT VALVE	80' 1A BLDG 1A1 EXP TK PLATFORM		
1A1-DCW-52	OPEN	1A1 LT EXPANSION TANK 1-LI/LT-10121 ROOT VALVE	80' 1A BLDG 1A1 EXP TK PLATFORM		
1A1-DCW-53	SHUT	1A1 ENGINE HT COOLANT OUTLET LINE VENT VALVE	35' 1A BLDG N SIDE 1A1 PED OVHD		
1A1-DCW-55	SHUT	1A1 HT RADIATOR INLET DRAIN VALVE	80' ON 1A1 RADIATOR N END		
1A1-DCW-56	SHUT	1A1 LT RADIATOR DRAIN VALVE	80' ON 1A1 RADIATOR N END		
1A1-DCW-57	SHUT	1A1 HT COOLANT DRAIN/SAMPLE VALVE	35' W END 1A1 PEDESTAL		
1A1-DCW-58	SHUT	1A1 LT COOLANT DRAIN/SAMPLE VALVE	35' E END 1A1 PEDESTAL		
1-DCW-10091-TCV	-----	1A1 ENGINE HT COOLANT TEMPERATURE CONTROL VALVE	35' 1A BLDG N SIDE 1A1 PEDESTAL		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1-DCW-10132-TCV	-----	1A1 ENGINE LT COOLANT TEMPERATURE CONTROL VALVE	35' 1A BLDG E END 1A1 PEDESTAL		
1A2-DCW-1	SHUT	1A2 HT RADIATOR FILL AND DRAIN VALVE	35' S SIDE 1A PED BY LO DRN TK		
1A2-DCW-2	SHUT	1A2 HT RADIATOR INLET VENT VALVE	80' 1A BLDG ON RADIATOR INLET		
1A2-DCW-3	SHUT	1A2 HT RADIATOR OUTLET VENT VALVE	80' 1A BLDG ON RADIATOR OUTLET		
1A2-DCW-4	OPEN	1A2 HT RADIATOR CONTINUOUS VENT VALVE	80' 1A BLDG S WALL BELW EXP TKS		
1A2-DCW-5	SHUT	1A2 HT PREHEAT PUMP SUCTION DRAIN VALVE	35' 1A BLDG BY CLNT DRN TK OVHD		
1A2-DCW-6	SHUT	1A2 LUBE OIL PREHEATER HT COOLANT OUTLET DRAIN VALVE	35' 1A BLDG BY CLNT DRN TK OVHD		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DCW-7	LOCKED OPEN	1A2 HT EXPANSION TANK 1-LS-10102 UPPER ROOT VALVE	80' 1A BLDG 1A2 EXP TK PLATFORM		
1A2-DCW-8	SHUT	1A2 HT EXPANSION TANK 1-LS-10102 VENT VALVE	80' 1A BLDG 1A2 EXP TK PLATFORM		
1A2-DCW-9	SHUT	1A2 HT EXPANSION TANK 1-LS-10102 DRAIN VALVE	80' 1A BLDG 1A2 EXP TK PLATFORM		
1A2-DCW-10	LOCKED OPEN	1A2 HT EXPANSION TANK 1-LS-10102 / 1-LI/LT-10101 LOWER ROOT VALVE	80' 1A BLDG 1A2 EXP TK PLATFORM		
1A2-DCW-11	LOCKED OPEN	1A2 HT EXPANSION TANK OUTLET VALVE	80' 1A BLDG BELOW EXP TKS		
1A2-DCW-14	SHUT	1A2 LT RADIATOR FILL AND DRAIN VALVE	35' 1A BLDG W END 1A2 PEDESTAL		
1A2-DCW-15	SHUT	1A2 LT RADIATOR INLET VENT VALVE	80' 1A BLDG S END 1A2 RADIATOR		
1A2-DCW-16	SHUT	1A2 LT RADIATOR OUTLET VENT VALVE	80' 1A BLDG ON 1A2 RAD OUTLET		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DCW-19	OPEN	1A2 LT RADIATOR CONTINUOUS VENT VALVE	80' 1A BLDG S END 1A2 RADIATOR		
1A2-DCW-20	LOCKED OPEN	1A2 LT EXPANSION TANK 1-LS-10142 UPPER ROOT VALVE	80' 1A BLDG 1A2 EXP TK PLATFORM		
1A2-DCW-21	SHUT	1A2 LT EXPANSION TANK 1-LS-10142 VENT VALVE	80' 1A BLDG 1A2 EXP TK PLATFORM		
1A2-DCW-22	SHUT	1A2 LT EXPANSION TANK 1-LS-10142 DRAIN VALVE	80' 1A BLDG 1A2 EXP TK PLATFORM		
1A2-DCW-23	LOCKED OPEN	1A2 LT EXPANSION TANK 1-LS-10142 / 1-LI/LT-10141 LOWER ROOT VALVE	80' 1A BLDG 1A2 EXP TK PLATFORM		
1A2-DCW-24	LOCKED OPEN	1A2 LT EXPANSION TANK OUTLET VALVE	80' 1A BLDG S WALL BELW EXP TKS		
1A2-DCW-25	SHUT	1A2 LT RADIATOR INLET LINE DRAIN VALVE	80' 1A BLDG S END 1A2 RADIATOR		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DCW-26	SHUT	1A2 LT RADIATOR OUTLET LINE DRAIN VALVE	80' 1A BLDG ON RADIATOR OUTLET		
1A2-DCW-28	SHUT	1A2 HT RADIATOR OUTLET LINE DRAIN VALVE	35' 1A BLG ABOVE 1A2 LT CLT TCV		
1A2-DCW-29	SHUT	1A2 LT RADIATOR INLET LINE VENT VALVE	35' 1A BLDG ABOVE LO DRN TK PP		
1A2-DCW-30	SHUT	1A2 ENGINE BLOCK HT COOLANT DRAIN VALVE	45' 1A BLDG S SIDE 1A2 ENGINE		
1A2-DCW-31	LOCKED OPEN	1A2 GOVERNOR OIL COOLER HT COOLANT INLET VALVE	45' W END 1A2 ENGINE BY GOVNR		
1A2-DCW-32	LOCKED OPEN	1A2 ENGINE DRIVEN HT COOLING WATER PUMP DISCH 1-PS-10103 ROOT VALVE	1A2 PT MANIFOLD		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DCW-34	OPEN	1A2 ENGINE DRIVEN HT COOLING WATER PUMP SUCT 1-PI/PT-10101 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DCW-35	OPEN	1A2 ENGINE DRIVEN HT COOLING WATER PUMP DISCH 1-PI/PT-10102 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DCW-36	OPEN	1A2 LUBE OIL PREHEATER HT COOLANT OUTLET VALVE	1A2 AUX DESK		
1A2-DCW-37	-----	1A2 LUBE OIL PREHEATER HT COOLANT OUTLET CHECK VALVE	1A2 AUX DESK		
1A2-DCW-38	OPEN	1A2 ELECTRIC WATER PREHEATER TO EXPANSION TANK ISOLATION VALVE	1A2 AUX DESK		
1A2-DCW-39	OPEN	1A2 HT PREHEAT PUMP SUCTION VALVE	1A2 AUX DESK		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DCW-41	LOCKED OPEN	1A2 GOVERNOR OIL COOLER HT COOLANT OUTLET VALVE	45' W END 1A2 ENG ABOVE GOVNR		
1A2-DCW-42	SHUT	1A2 ENGINE BLOCK HT COOLANT DRAIN VALVE	45' 1A BLDG W END 1A2 ENGINE		
1A2-DCW-43	OPEN	1A2 ENGINE DRIVEN LT COOLING WATER PUMP SUCT 1-PI/PT-10141 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DCW-44	OPEN	1A2 ENGINE DRIVEN LT COOLING WATER PUMP DISCH 1-PI/PT-10142 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DCW-45	LOCKED OPEN	1A2 ENGINE DRIVEN LT COOLING WATER PUMP DISCH 1-PS-10143 ROOT VALVE	1A2 PT MANIFOLD		
1A2-DCW-46	SHUT	1A2 SOUTH LUBE OIL COOLER LT COOLANT DRAIN VALVE	45' S SIDE 1A2 ENG BELW LO COOLER		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DCW-47	SHUT	1A2 NORTH LUBE OIL COOLER LT COOLANT DRAIN VALVE	45' N SIDE 1A2 ENG BELW LO CLR		
1A2-DCW-48	SHUT	1A2 ENGINE DRIVEN LT COOLING WATER PUMP SUCTION LINE DRAIN VALVE	35' 1A BLDG BY LO DRN TK		
1A2-DCW-49	SHUT	1A2 LT RADIATOR INLET LINE DRAIN VALVE	35' 1A BLDG BY LO DRN TK		
1A2-DCW-50	SHUT	1A2 ENGINE DRIVEN LT COOLING WATER PUMP SUCTION LINE VENT VALVE	35' 1A BLDG ABOVE LO DRN TK PP		
1A2-DCW-51	OPEN	1A2 HT EXPANSION TANK 1-LI/LT-10101 ROOT VALVE	80' 1A BLDG 1A2 EXP TK PLATFORM		
1A2-DCW-52	OPEN	1A2 LT EXPANSION TANK 1-LI/LT-10141 ROOT VALVE	80' 1A BLDG 1A2 EXP TK PLATFORM		
1A2-DCW-55	SHUT	1A2 HT RADIATOR INLET DRAIN VALVE	80' ON S END 1A2 RADIATOR		

ATTACHMENT 1D
1A HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DCW-56	SHUT	1A2 LT RADIATOR DRAIN VALVE	80' ON S END 1A2 RADIATOR		
1A2-DCW-57	SHUT	1A2 HT COOLANT DRAIN/SAMPLE VALVE	35' S SIDE 1A PED BY LO DRN TK		
1A2-DCW-58	SHUT	1A2 LT COOLANT DRAIN/SAMPLE VALVE	35' W END 1A2 PEDESTAL		
1-DCW-10111-TCV	-----	1A2 ENGINE HT COOLANT TEMPERATURE CONTROL VALVE	35' 1A BLDG S SIDE 1A2 PEDESTAL		
1-DCW-10152-TCV	-----	1A2 ENGINE LT COOLANT TEMPERATURE CONTROL VALVE	35' 1A BLDG W END 1A2 PEDESTAL		

ATTACHMENT 1E
1A COMBUSTION AIR INTAKE SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-SCA-1	SHUT	1A1 INBOARD WATER WASH TANK ISOLATION VALVE	45' S SIDE 1A1 ENGINE		
1A1-SCA-2	SHUT	1A1 OUTBOARD WATER WASH TANK ISOLATION VALVE	45' S SIDE 1A1 ENGINE		
1A1-SCA-3	OPEN	1A1 INBOARD TURBOCHARGER DISCHARGE 1-PT-10604 ROOT VALVE	1A1 PT MANIFOLD		
1A1-SCA-4	OPEN	1A1 NORTH INTAKE HEADER 1-PI/PT-10601 ROOT VALVE	1A1 PT MANIFOLD		
1A1-SCA-5	OPEN	1A1 SOUTH INTAKE HEADER 1-PI/PT-10602 ROOT VALVE	1A1 PT MANIFOLD		
1A1-SCA-6	OPEN	1A1 OUTBOARD TURBOCHARGER DISCHARGE 1-PT-10603 ROOT VALVE	1A1 PT MANIFOLD		

ATTACHMENT 1E
1A COMBUSTION AIR INTAKE SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-SCA-7	OPEN	1A1 AIR INTAKE FILTER 1-PDIS-10605 ROOT VALVE	80' ON INTAKE FILTER PLATFORM		
1A2-SCA-1	SHUT	1A2 INBOARD WATER WASH TANK ISOLATION VALVE	45' S SIDE 1A2 ENGINE		
1A2-SCA-2	SHUT	1A2 OUTBOARD WATER WASH TANK ISOLATION VALVE	45' S SIDE 1A2 ENGINE		
1A2-SCA-3	OPEN	1A2 INBOARD TURBOCHARGER DISCHARGE 1-PT-10654 ROOT VALVE	1A2 PT MANIFOLD		
1A2-SCA-4	OPEN	1A2 NORTH INTAKE HEADER 1-PI/PT-10652 ROOT VALVE	1A2 PT MANIFOLD		
1A2-SCA-5	OPEN	1A2 SOUTH INTAKE HEADER 1-PI/PT-10651 ROOT VALVE	1A2 PT MANIFOLD		

ATTACHMENT 1E
1A COMBUSTION AIR INTAKE SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-SCA-6	OPEN	1A2 OUTBOARD TURBOCHARGER DISCHARGE 1-PT-10653 ROOT VALVE	1A2 PT MANIFOLD		
1A2-SCA-7	OPEN	1A2 AIR INTAKE FILTER 1-PDIS-10655 ROOT VALVE	80' ON INTAKE FILTER PLATFORM		

ATTACHMENT 1F
1A DG SWITCH POSITION VERIFICATION

SWITCH NUMBER	NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1-HS-10330	AUTOMATIC	1A GOVNR SPEED CONTR SW	1A DG LOCAL CONTROL PANEL 1C188-1		
1-HS-10322	REMOTE/AUTO	1A GEN CONTR MODE SEL SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10323	ENGINE 1+2	1A GEN ENG SEL SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10324	ELECTRIC	1A GEN GOVNR MODE SEL SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10325	SLOW	1A GEN LOCAL SPD SEL SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10021	AUTOMATIC	1A-11 FO XFER PP CONTR SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10023	AUTOMATIC	1A-12 FO XFER PP CONTR SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10327	NORMAL	1A GEN STRT/STOP CONTR SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10329	OFF	1A FLD/FLASH SEL SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10331	AUTOMATIC	1A AUTO VOLT REG CONTR SW	1A DG LOCAL CONTROL PANEL 1C188-2		

ATTACHMENT 1F
1A DG SWITCH POSITION VERIFICATION

SWITCH NUMBER	NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1-HS-10332	SUB SYST 1+2	1A AIR SUB SYS START SEL SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10025	PUMP 11 OR PUMP 12	1A-FO XFER PP SEL SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10161	AUTOMATIC	1A1 AC PRELUB PP SEL SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10201	AUTOMATIC	1A2 AC PRELUB PP SEL SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10051	AUTOMATIC	1A1 FO B/U PP SEL SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10061	AUTOMATIC	1A2 FO B/U PP SEL SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10082	AUTOMATIC	1A1 HT RAD FAN SEL SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10102	AUTOMATIC	1A2 HT RAD FAN SEL SW	1A DG LOCAL CONTROL PANEL 1C188-2		
1-HS-10081	AUTOMATIC	1A1 HT PHEAT PP SEL SW	1A DG LOCAL CONTROL PANEL 1C188-3		
1-HS-10101	AUTOMATIC	1A2 HT PHEAT PP SEL SW	1A DG LOCAL CONTROL PANEL 1C188-3		

ATTACHMENT 1F
1A DG SWITCH POSITION VERIFICATION

SWITCH NUMBER	NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1-HS-10241	AUTOMATIC	1A1 SA COMPR SEL SW	1A DG LOCAL CONTROL PANEL 1C188-3		
1-HS-10271	AUTOMATIC	1A2 SA COMPR SEL SW	1A DG LOCAL CONTROL PANEL 1C188-3		
1-HS-152-1703C	NORMAL	1A DG OUT BKR	1A DG LOCAL CONTROL PANEL 1C188-4		
-----	OFF	SYNCHRONIZING JACK SJ	1A DG LOCAL CONTROL PANEL 1C188 PANEL 4		
SW 43/LR	REMOTE	1A DG LOCAL/REMOTE SWITCH	1A DG LOCAL CONTROL PANEL 1C188-4 - REAR		
1-HS-10326	AVR1 ON	1A AUTO VOLT REG SEL SW	1A DG EXCITATION PANEL 1G25		
1-HS-10328	AUTOMATIC	1A VOLT REG MODE SEL SW	1A DG EXCITATION PANEL 1G25		

ATTACHMENT 1G
1A DG LOCAL BREAKER POSITION VERIFICATION

BREAKER NUMBER	NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1	ON	CONTROL STATION (1NP2301)	120V AC PANEL 1P23		
2	ON	CONTROL PANEL (1C192)	120V AC PANEL 1P23		
3	ON	CONTROL PANEL (1C192)	120V AC PANEL 1P23		
1	ON	CONTROL PANEL (1C188D-1)	120 V AC PANEL 1P24		
2	ON	MCC 124 SPACE HTRS.	120 V AC PANEL 1P24		
3	ON	4KV SWGR SPACE HTRS.	120 V AC PANEL 1P24		
4	ON	1A SUMP PUMPS 11 & 12	120 V AC PANEL 1P24		
5	ON	ANNUN. FLOW SW. (1FS10563)	120 V AC PANEL 1P24		
6	ON	RTU PANEL (1C196)	120 V AC PANEL 1P24		
7	ON	1A OIL SEP. RM FAN F-11 (1C193)	120 V AC PANEL 1P24		
8	ON	480V LC SPACE HTRS.	120 V AC PANEL 1P24		

ATTACHMENT 1G
1A DG LOCAL BREAKER POSITION VERIFICATION

BREAKER NUMBER	NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
9	ON	MCC 123 SPACE HTRS.	120 V AC PANEL 1P24		
10	ON	MCC 123 SPACE HTRS.	120 V AC PANEL 1P24		
11	ON	MCC 124 SPACE HTRS.	120 V AC PANEL 1P24		
12	ON	CONTROL PANEL (1C193)	120 V AC PANEL 1P24		
13	ON	CONTROL PANEL (1C193)	120 V AC PANEL 1P24		
15	ON	CONTROL PANEL (1C193)	120 V AC PANEL 1P24		
16	ON	CONTROL PANEL (1C192)	120 V AC PANEL 1P24		
17	ON	DAMPER (1MO10502)	120 V AC PANEL 1P24		
18	ON	AC UNIT (1AHU-1)	120 V AC PANEL 1P24		
20	ON	AIR HANDLING UNIT (1AHU-2)	120 V AC PANEL 1P24		

ATTACHMENT 1H
1A DG BUILDING MAINTENANCE AIR SYSTEM

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
0-DMA-1	SHUT	1A DG BLDG MAINTENANCE AIR OUTSIDE TEMP COMPRESSOR ISOLATION VALVE	45' 1A BLDG E SIDE INSIDE VEST		
0-DMA-2	SHUT	1A DG BLDG MAINTENANCE AIR 45' ELEVATION SUPPLY VALVE	45' 1A BLDG BY GLYCOL FILL PP		
0-DMA-3	SHUT	1A DG BLDG MAINTENANCE AIR 66' ELEVATION SUPPLY VALVE	66' 1A BLDG E WALL MECH SHOP		
0-DMA-4	SHUT	1A DG BLDG MAINTENANCE AIR 80' ELEVATION SUPPLY VALVE	80' 1A BLDG E WALL N SILENCERS		

ATTACHMENT 2A
1A AIR START SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-DSA-1241	OPEN	1A1-11 STARTING AIR RECEIVER 1-PI/PT-10241 ISOLATION VALVE	45' 1A1 STARTING AIR RCVR 11		
1A1-DSA-1242	OPEN	1A1-12 STARTING AIR RECEIVER 1-PI/PT-10242 ISOLATION VALVE	45' 1A1 STARTING AIR RCVR 12		
1A1-DSA-1243	SHUT	1A1-11 STARTING AIR RECEIVER 1-PI/PT-10241 TEST VALVE	45' 1A1 STARTING AIR RCVR 11		
1A1-DSA-1244	SHUT	1A1-12 STARTING AIR RECEIVER 1-PI/PT-10242 TEST VALVE	45' 1A1 STARTING AIR RCVR 12		
1A1-DSA-1245	SHUT	1A1-11 STARTING AIR RECEIVER 1-PS-10243/10244 TEST VALVE	45' 1A1 STARTING AIR RCVR 11		
1A1-DSA-1246	SHUT	1A1-12 STARTING AIR RECEIVER 1-PS-10245/10246 TEST VALVE	45' 1A1 STARTING AIR RCVR 12		

ATTACHMENT 2A
1A AIR START SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DSA-1241	OPEN	1A2-11 STARTING AIR RECEIVER 1-PI/PT-10271 ISOLATION VALVE	45' 1A2 STARTING AIR RCVR 11		
1A2-DSA-1242	OPEN	1A2-12 STARTING AIR RECEIVER 1-PI/PT-10272 ISOLATION VALVE	45' 1A2 STARTING AIR RCVR 12		
1A2-DSA-1243	SHUT	1A2-11 STARTING AIR RECEIVER 1-PI/PT-10271 TEST VALVE	45' 1A2 STARTING AIR RCVR 11		
1A2-DSA-1244	SHUT	1A2-12 STARTING AIR RECEIVER 1-PI/PT-10272 TEST VALVE	45' 1A2 STARTING AIR RCVR 12		
1A2-DSA-1245	SHUT	1A2-11 STARTING AIR RECEIVER 1-PS-10273/10274 TEST VALVE	45' 1A2 STARTING AIR RCVR 11		
1A2-DSA-1246	SHUT	1A2-12 STARTING AIR RECEIVER 1-PS-10275/10276 TEST VALVE	45' 1A2 STARTING AIR RCVR 12		

ATTACHMENT 2B
1A FUEL OIL SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DFO-1028	SHUT	1A FUEL OIL DAY TANK 1-LI/LT-10023 TEST VALVE	66' 1A TANK RM BY DAY TK		
1A-DFO-1029	SHUT	1A FUEL OIL TRANSFER PP 11 SUCTION 1-PI-10021 TEST VALVE	45' 1A TANK RM BY TRANSFER PPS		
1A-DFO-1030	SHUT	1A FUEL OIL TRANSFER PP 11 DISCHARGE 1-PI-10022 TEST VALVE	45' 1A TANK RM BY TRANSFER PPS		
1A-DFO-1031	SHUT	1A FUEL OIL TRANSFER PP 12 SUCTION 1-PI-10023 TEST VALVE	45' 1A TANK RM BY TRANSFER PPS		
1A-DFO-1032	SHUT	1A FUEL OIL TRANSFER PUMP 12 DISCHARGE 1-PI-10024 TEST VALVE	45' 1A TANK RM BY TRANSFER PPS		
1A-DFO-1162	OPEN	1A FUEL OIL TRANSFER FILTERS 1-PDIS-10029 HIGH BLOCK VALVE	45' 1A TANK RM BY TRANSFER PPS		

ATTACHMENT 2B
1A FUEL OIL SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DFO-1163	OPEN	1A FUEL OIL TRANSFER FILTERS 1-PDIS-10029 LOW BLOCK VALVE	45' 1A TANK RM BY TRANSFER PPS		
1A-DFO-1164	SHUT	1A FUEL OIL TRANSFER FILTERS 1-PDIS-10029 EQUALIZER VALVE	45' 1A TANK RM BY TRANSFER PPS		
1A-DFO-1165	SHUT	1A FUEL OIL TRANSFER FILTERS 1-PDIS-10029 HIGH TEST VALVE	45' 1A TANK RM BY TRANSFER PPS		
1A-DFO-1166	SHUT	1A FUEL OIL TRANSFER FILTERS 1-PDIS-10029 LOW TEST VALVE	45' 1A TANK RM BY TRANSFER PPS		

ATTACHMENT 2C
1A LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DLO-1002	SHUT	1A LUBE OIL AUXILIARY TANK 1-LI/LT-10164 TEST VALVE	66' 1A TANK RM BY LO AUX TK		
1A-DLO-1004	SHUT	1A LUBE OIL DRAIN TANK TRANSFER PP DISCHARGE 1-PI-10001 TEST VALVE	35' SW CORNER BY LO DRAIN TK		
1A-DLO-1161	OPEN	1A LUBE OIL DRAIN FILTER 1-PDI-10002 HIGH BLOCK VALVE	35' SW CORNER BY LO DRAIN TK		
1A-DLO-1162	OPEN	1A LUBE OIL DRAIN FILTER 1-PDI-10002 LOW BLOCK VALVE	35' SW CORNER BY LO DRAIN TK		
1A-DLO-1163	SHUT	1A LUBE OIL DRAIN FILTER 1-PDI-10002 HIGH EQUALIZER VALVE	35' SW CORNER BY LO DRAIN TK		
1A-DLO-1164	SHUT	1A LUBE OIL DRAIN FILTER 1-PDI-10002 LOW EQUALIZER VALVE	35' SW CORNER BY LO DRAIN TK		

ATTACHMENT 2C
1A LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DLO-1165	SHUT	1A LUBE OIL DRAIN FILTER 1-PDI-10002 BLEED AND TEST VALVE	35' SW CORNER BY LO DRAIN TK		
1A1-DLO-1005	SHUT	1A1 PNEUMATIC PRELUBE PUMP DISCHARGE 1-PI-10169 TEST VALVE	45' BY 1A1 AUX DESK		
1A2-DLO-1006	SHUT	1A2 PNEUMATIC PRELUBE PUMP DISCHARGE 1-PI-10209 TEST VALVE	45' BY 1A2 AUX DESK		

ATTACHMENT 2D
1A HT/LT COOLANT SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DCW-1071	OPEN	1A COOLANT DRAIN FILTER 1-PDI-10075 HIGH BLOCK VALVE	35' N OF COOLANT DRAIN FILTER		
1A-DCW-1072	OPEN	1A COOLANT DRAIN FILTER 1-PDI-10075 LOW BLOCK VALVE	35' N OF COOLANT DRAIN FILTER		
1A-DCW-1073	SHUT	1A COOLANT DRAIN FILTER 1-PDI-10075 HIGH EQUALIZER VALVE	35' N OF COOLANT DRAIN FILTER		
1A-DCW-1074	SHUT	1A COOLANT DRAIN FILTER 1-PDI-10075 LOW EQUALIZER VALVE	35' N OF COOLANT DRAIN FILTER		
1A-DCW-1075	SHUT	1A COOLANT DRAIN FILTER 1-PDI-10075 BLEED AND TEST VALVE	35' N OF COOLANT DRAIN FILTER		
1A-DCW-1126	SHUT	1A COOLANT DRAIN PUMP DISCHARGE 1-PI-10071 TEST VALVE	35' ABOVE COOLANT DRAIN PP		

ATTACHMENT 2D
1A HT/LT COOLANT SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A-DCW-1127	SHUT	1A COOLANT MIXING TANK PP DISCHARGE 1-PI-10073 TEST VALVE	66' E SIDE BY MIXING TK		
1A1-DCW-1122	OPEN	1A1 HT EXPANSION TANK LEVEL 1-LI/LT-10081 ISOLATION VALVE	80' N WALL BY EXP TK LI		
1A1-DCW-1124	OPEN	1A1 LT EXPANSION TANK LEVEL 1-LI/LT-10121 ISOLATION VALVE	80' N WALL BY EXP TK LI		
1A1-DCW-1128	SHUT	1A1 HT EXPANSION TANK LEVEL 1-LI/LT-10081 TEST VALVE	80' N WALL BY EXP TK LI		
1A1-DCW-1129	SHUT	1A1 LT EXPANSION TANK LEVEL 1-LI/LT-10121 TEST VALVE	80' N WALL BY EXP TK LI		
1A2-DCW-1122	OPEN	1A2 HT EXPANSION TANK LEVEL 1-LI/LT-10101 ISOLATION VALVE	80' S WALL BY EXP TK LI		

ATTACHMENT 2D
1A HT/LT COOLANT SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A2-DCW-1124	OPEN	1A2 LT EXPANSION TANK LEVEL 1-LI/LT-10141 ISOLATION VALVE	80' S WALL BY EXP TK LI		
1A2-DCW-1128	SHUT	1A2 HT EXPANSION TANK LEVEL 1-LI/LT-10101 TEST VALVE	80' S WALL BY EXP TK LI		
1A2-DCW-1129	SHUT	1A2 LT EXPANSION TANK LEVEL 1-LI/LT-10141 TEST VALVE	80' S WALL BY EXP TK LI		

ATTACHMENT 2E
1A COMBUSTION AIR INTAKE SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1A1-SCA-1601	OPEN	1A1 AIR INTAKE FILTER 1-PDIS-10605 ISOLATION VALVE	80' AIR INTAKE FILTER PLATFORM		
1A2-SCA-1602	OPEN	1A2 AIR INTAKE FILTER 1-PDIS-10655 ISOLATION VALVE	80' AIR INTAKE FILTER PLATFORM		

CALVERT CLIFFS NUCLEAR POWER PLANT

UNIT TWO

OI-21A

2A DIESEL GENERATOR

REVISION 19

SAFETY RELATED

CONTINUOUS USE

Approval Authority: Tim Riti

Effective Date: 1/15/2008

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1.0 PURPOSE

This procedure provides the prerequisites, precautions, and instructions for the starting, loading, and shutdown operation of 2A Diesel Generator and associated auxiliary systems.

2.0 APPLICABILITY/SCOPE

A. This procedure provides specific instructions for operation of 2A Diesel Generator.

B. This procedure provides specific instructions for operation of 2A Diesel Generator auxiliary and support systems.

C. Conditional steps may be marked N/A if the condition does not exist or apply.

D. Signature blocks are provided for placekeeping in the slow start section. Steps shall be initialed immediately upon completion.

3.0 REFERENCES AND DEFINITIONS

3.1 DEVELOPMENTAL REFERENCES

A. P&ID

1. OM-79 (60-736-E), Fuel Oil Storage System

2. OM-69 Sh. 1 (60-727-E, Sh. 1), Diesel Generator Cooling Water, Starting Air, Fuel, & Lube Oil Diesel Generator No. 2A

3.2 PERFORMANCE REFERENCES

A. MN-1-110, Troubleshooting & Procedure Controlled Activities

B. MN-1-106, Temporary Storage Of Equipment And Material

C. NO-1-205, Locked Valves

D. OI-15, Service Water System

E. OI-21D, Fuel Oil Storage And Supply

F. OI-26A, 125 Volt Vital DC

G. OI-27B, 13.8 KV System

H. OI-27C, 4.16 KV System

I. OI-27D, Station Power 480 Volt System

J. OI-49, Operability Verification

K. EDG-10, Woodward Governor Oil Change

3.2 PERFORMANCE REFERENCES (Continued)

L. EDG-20, Emergency Diesel Generator Inspection

M. STP O-8A-2, Test of 2A DG And 21 4KV Bus LOCI Sequencer

N. STP O-90-2, AC Sources And On Site Power Distribution Systems 7 Day Operability Verification

3.3 DEFINITIONS

A. FBM - Fairbanks Morse diesel generators

B. Elective maintenance - any activity to repair or maintain equipment where the equipment is operable/fully functional prior to performing the activity. Surveillance testing is **NOT** considered maintenance for this purpose.

4.0 PREREQUISITES

Prerequisites will vary depending on which section of the procedure is being performed. Prerequisites for each section will be listed as Initial Conditions at the beginning of the applicable section.

5.0 PRECAUTIONS

A. The Overspeed Trip Mechanism must be latched for 2A DG to be considered operable. Whenever the fuel rack is tripped **AND** reset, 2A DG shall be started **AND** loaded for at least 1 hour.

B. Underfrequency/reverse power protection/loss of field (194 Device) is bypassed when 2A DG CONTR MODE SEL SW, 2-HS-4839, is in the LOCAL position.

C. In the event 2A DG fails to start on an automatic or manual start signal **OR** has a load demand failure, submit an Issue Report to document the failure.

D. Stop the engine if severe vibration **OR** unusual noises occur.

E. 2A DG should be shutdown as soon as possible if the 2A DG room ventilation system fails to maintain 2A DG room temperature less than or equal to 120° F.

F. 2A DG shall be considered inoperable for any of the following:

- 2A DG Voltage Regulator is selected to MANUAL. **[B0024][B0110]**
- The 2A DG Room Ventilation Fan is inoperable.
- 2-SRW-1588-PDIC is **NOT** in AUTOMATIC or 2-SRW-1588-CV Manual Handwheel is engaged.
- 2A DG Fuel Oil Transfer Pump is inoperable.
- 2A DG Jacket Water System temperature is less than 90° F. **[B0022]**

5.0 PRECAUTIONS (Continued)

G. An operability verification of all redundant systems, **PER** OI-49, Operability Verification, **AND** STP O-90-2, AC Sources And On Site Power Distribution Systems 7 Day Operability Verification, must be performed as listed below **AND** once every 8 hours while 2A DG remains inoperable (STP 0-90 is **NOT** required in Modes 5, 6 or defueled): **[B0105]**

- Prior to removing 2A DG from operable status for planned maintenance or testing

OR

- Within one hour of discovery if 2A DG malfunctions **OR** is found to be inoperable

H. Notify the Shift Manager if an oil spill occurs anywhere on company property. This limit applies to ALL spills, even if contained.

I. Locked valves are controlled by NO-1-205.

J. Minimize the time 2A DG air compressor is operated with the aftercooler out of service.

K. If a Safety Injection Actuation Signal (SIAS) has started 2A DG automatically, **OR** if both the NORMAL and the ALTERNATE feeder breakers to 21 4KV bus are open, then the Jacket Coolant Temperature and Pressure Trips and Crankcase Pressure Trips are bypassed. Close attention to these parameters in this condition is necessary.

L. Prior to taking 2A DG out of service, EXCEPT for short periods such as for barring over 2A DG, the CRS or Shift Manager must perform the following actions: **[B0138]** (Basis INPO SER 10-91 Loss of Offsite Power due to Switchyard Testing)

- Contact the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts.

- Determine whether other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

- **IF** 2A DG will be out of service at the same time reliability of the offsite power supplies is reduced,
  THEN the Shift Manager will determine how to minimize both the time 2A DG is out of service **AND** the time that offsite power supplies are at reduced reliability.

5.0 PRECAUTIONS (Continued)

M. In Modes 1, 2, 3, and 4, to ensure defense in depth, the following actions should be performed anytime 2A DG is out of service for greater than 72 hours, **AND SHALL** be performed prior to removing 2A DG from service for elective maintenance greater than 72 hours. **[B0906]**

NOTE
Patuxent River Naval Air Station is the preferred source for the weather report. However, any government sponsored weather agency may be used.

- Weather conditions will be evaluated within 12 hours prior to removing 2A DG from service. 2A DG will **NOT** be removed from service if official weather forecasts are predicting severe conditions for CCNPP or any of the 500 KV transmission lines rights of way.
  - Severe Thunderstorm
  - Gale/High Wind - greater than 50 mph
  - Tornado
  - Hurricane
  - Blizzard
  - Ice Storm
- The ESOP Outage Scheduler or SO-TSO will be contacted within 12 hours prior to removing 2A DG from service and after it has been returned to service.

1. Ensure 2A DG will **NOT** be out of service when grid stress conditions are considered "high".
   - 5051, 5052 and 5072 circuits are in service.
   - PJM is **NOT** in a Warning or implementing an Emergency Action for capacity shortages.
     - Primary Reserve - Warning
     - Voltage Reduction - Warning or Action
     - Manual Load Dump - Warning or Action
     - Maximum Emergency Generation - Action
   - PJM is **NOT** in Conservative Operations.
     - Thunderstorms
     - Solar Magnetic Disturbances
     - Crisis Response
     - Heavy Load, Low Voltage - Warning or Action
     - Post Contingency Local Load Relief Warning that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard
   - **NO** other known condition exists on the PJM or BGE system at this time that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard.

5.0.M PRECAUTIONS (Continued)

2. Determine that **NO** other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

- **NO** elective maintenance will be performed in the switchyard, on the 4 KV Distribution System, or on the 13 KV Distribution System.

NOTE
The Unit-2 AFW system includes 13 AFW pump and its cross-tie.

- Planned maintenance or testing will **NOT** be performed on the Unit-2 AFW System.

- **NO** maintenance or testing that affects the reliability of Unit-2 B train will be scheduled. If testing or maintenance activities must be performed, a Risk Assessment Evaluation will be performed according to NO-1-117, INTEGRATED RISK MANAGEMENT.

- Elective maintenance will **NOT** be performed on 0C DG. Personnel will be made aware of the dedication of 0C DG to 21 4KV Bus.

- The operations crews will be briefed concerning the unit activities, including compensatory measures established and the importance of promptly starting and aligning the 0C DG.

- The on-shift operations crew will discuss and review the appropriate normal and emergency operating procedures within 24 hours prior to or shortly after assuming the watch for the first time after having scheduled days off while 2A DG is out of service.

  - AOP-7I, LOSS OF 4KV, 480 VOLT OR 208/120 VOLT INSTRUMENT BUS POWER
  - EOP-0, POST-TRIP IMMEDIATE ACTIONS
  - EOP-2, LOSS OF OFFSITE POWER/LOSS OF FORCED CIRCULATION
  - EOP-7, STATION BLACKOUT
  - AOP-3F, LOSS OF OFFSITE POWER WHILE IN MODES 3, 4, 5 OR 6

6.0 PERFORMANCE

6.1 2A DG NORMAL STANDBY

A. Initial Conditions

1. 2A DG valve alignments have been verified by completion of ATTACHMENT 1B, 2A DIESEL GENERATOR VALVE LINEUP.
2. The Service Water System is aligned for 2A DG operation (OI-15).
3. The Fuel Oil System is aligned for 2A DG operation (OI-21D).
4. The 125 VDC System is aligned for 2A DG operation (OI-26A).
5. The 4.16KV System is aligned for 2A DG operation (OI-27C).
6. The 480V System is aligned for 2A DG operation (OI-27D).
7. The Saltwater System is aligned for 2A DG operation (OI-29).

B. Procedure

1. **IF** 2A DG is being returned to service following maintenance, **THEN PERFORM** ATTACHMENT 1A, POST MAINTENANCE 2A DIESEL GENERATOR LINEUP CHECKS.

CAUTION
Minimum room temperature is 60° F.

2. **IF** desired to operate the 2A DG room ventilation, **THEN PERFORM** the following:
   a. **PLACE** 2A DG EXHAUST DAMPER, 2-HS-5430, to OPEN.
   b. **IF** desired, **START** 2A DG VENT FAN by momentarily placing 2-HS-5429, to START.
   c. **WHEN** desired, **STOP** 2A DG VENT FAN by momentarily placing 2-HS-5429 , to STOP.
   d. **WHEN** desired, **PLACE** 2A DG EXHAUST DAMPER, 2-HS-5430, to AUTO.

****** END ******

6.2 2A DG NON-EMERGENCY FAST START

A. Initial Conditions

1. 2A DG is in Standby **PER** Section 6.1, 2A DG NORMAL STANDBY.
2. A calibrated electric timer is available. (NA if not used)
3. 2A Diesel Generator (DG) should be prelubed prior to any non-emergency start, except when engine has been run **OR** prelubed within the last two hours. **[B0027] [B0048]**
4. 2A DG should be run within 30 minutes after prelubing to prevent the oil trapped above the upper pistons from leaking past the rings into the combustion space.
5. Whenever 2A DG is started during non-emergency conditions, it should be loaded within one hour in incremental steps **PER** Section 6.6, PARALLEL 2A DIESEL GENERATOR. Unloaded operation beyond one hour shall be minimized and approved by the Shift Manager. **[B0027]**

B. Procedure

NOTE

The Load Shed Relay Position Verification light indicates that the 21 4KV bus feeder breaker indication switch is functioning properly. The light should be on when either bus feeder breaker is closed.

CAUTION

Damage to 2A DG may occur if a 21 4KV bus feeder breaker is closed **AND** the Load Shed Relay Position Verification light is **NOT** lit. Under this condition 2A DG may attempt to automatically load on 21 4KV bus.

1. **CHECK** the White Load Shed Relay Position Verification light is illuminated on the 21 4KV Bus Auxiliary Cabinet.
2. **CHECK** the following 2A DG annunciators are clear:
   - "JACKET COOLANT LEVEL LOW IN EXPANSION TANK"
   - "FUEL OIL LEVEL LOW IN DAY TANK"
3. **ENSURE** a minimum of 215 PSIG in the air receivers (2C62D):
   - West RCVR - 2-PI-4841
   - East RCVR - 2-PI-4842
4. **IF** desired for data collection,
   THEN ADJUST the 2A DG starting air pressure gauges minimal pressure arm(s) on 2-PI-4841 and 2-PI-4842 to the current indicated pressure.

6.2.B Procedure (Continued)

5. **ENSURE** the 2A DG Lube Oil Sump level is near FULL STOP on the dipstick.

6. **ENSURE** the visible portion of the sightglass for the governor oil level is at least 3/4 full.

NOTE
The System Engineer recommends obtaining 2A DG start time for each fast start.

7. IF obtaining 2A DG start time,
   THEN **PREPARE** the electric timer as follows:

   a. **RECORD** timer serial number in the Unit 2 Control Room Log.

   b. **RECORD** timer cal due date in the Unit 2 Control Room Log.

   c. **PLUG** the electric timer into the 2A DG Speed/Voltage TIMER JACK in 2A DG room panel 2C62B.

   d. **PLUG** the electric timer into a 120 VAC outlet.

   e. **TURN** the electric timer ON **AND RESET** the indicators to zero (0).

8. Establish communications between the Control Room and 2A DG Room.

6.2.B Procedure (Continued)

9. **IF** 2A DG has **NOT** been run **OR** prelubed within the last two hours, **THEN PERFORM** the following:

   a. **PLACE AND HOLD** PRELUBE PUMP, 2-HS-4777, to MAN. **[B0048]**

NOTE

2A DG should be started while prelubing the engine; however, **IF** it is **NOT** possible **OR** conditions do **NOT** support maintaining the prelube pump running while starting 2A DG, **THEN** 2A DG may be started without the prelube pump running as long as it is started within two hours. **[B0027]**

   b. **MAINTAIN** PRELUBE PUMP, 2-HS-4777, at MAN **AND NOTIFY** the Control Room when the prelube pump has run at least 3 minutes but **NOT** greater than 5 minutes.

   c. **START** 2A DG by depressing 2A DG START, 2-HS-2124, pushbutton, on 1C20A.

   d. **WHEN** any of the following criteria are met:

      - 2A DG starts
      - 2A DG fails to start
      - The Prelube Pump has operated for five minutes

      THEN PLACE PRELUBE PUMP, 2-HS-4777, to AUTO

   e. **PROCEED** to Step 11.

10. **START** 2A DG by depressing 2A DG START, 2-HS-2124, pushbutton, on 1C20A. **[B0027]**

11. **IF** 2A DG fails to start **AND** plant conditions permit, **THEN CONSIDER** barring over 2A DG **PER** Section 6.9, MANUALLY BAR-OVER 2A DIESEL GENERATOR, **OR** Section 6.24, ROTATING 2A DIESEL GENERATOR WITH COMPRESSED AIR, within three hours.

12. **CHECK** the following parameters:

    - 2A DG VOLTS, 2-EI-2122: 4.16 KV (4.1 to 4.35 KV)
    - 2A DG FREQUENCY, 2-SI-2101: 60 Hz (58.8 to 61.2 Hz)

13. **RECORD** the electric timer readings in the Unit 2 Control Room Log. (N/A if **NOT** recorded)

    - Time (seconds) to voltage
    - Time (seconds) to frequency

6.2.B Procedure (Continued)

14. **TURN** the electric timer OFF. (N/A if **NOT** used)

15. **REMOVE** the electric timer as follows: (N/A if **NOT** used)

    - **UNPLUG** the electric timer from the 120 VAC outlet.
    - **UNPLUG** the electric timer from the 2A DG Speed/Voltage TIMER JACK.
    - **RETURN** the electric timer to its storage location.

16. **MONITOR** 2A DG parameters **PER** TABLE 3, 2A DIESEL GENERATOR OPERATING PARAMETERS.

    a. **IF** Jacket Water Pump discharge pressure drops more than 3 PSIG from the initial value,
    THEN VENT the Jacket Water Heat Exchanger **AND** the Air Cooler Heat Exchanger as follows:

        (1) **CRACK OPEN** the following vent valves:

            - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
            - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

        (2) **WHEN** a continuous stream of water is observed from the Heat Exchanger Vents,
        THEN SHUT the following valves:

            - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
            - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

        (3) **LOG** the time **AND** duration of the vent on the Outside Operator Log.

        (4) **NOTIFY** the System Engineer.

    b. **IF** filter **OR** strainer differential pressures exceed the following values,
    THEN PERFORM the following:

        - **IF** Fuel Oil Filter differential pressure exceeds 10 PSID,
        THEN PLACE the alternate filter in service **AND SUBMIT** an IR to have the dirty filter replaced.
        - **IF** Lube Oil Filter differential pressure exceeds 10 PSID,
        THEN SUBMIT an IR to replace the cartridges.
        - **IF** Lube Oil Strainer differential pressure exceeds 5 PSID,
        THEN SUBMIT an IR to clean the strainer.

6.2.B Procedure (Continued)

NOTE
2A DG should be loaded as soon as practicable but at least within one hour after starting.
[B0027]

17. **GO TO** the desired procedure section:

    - Section 6.6, PARALLEL 2A DIESEL GENERATOR

    OR

    - Section 6.8, 2A DG SHUTDOWN

****** END ******

6.3 2A DG SLOW SPEED START

A. Initial Conditions

1. 2A DG is in Standby **PER** Section 6.1, 2A DG NORMAL STANDBY.
2. The key for 2A DG SLOW START SEQUENCE KEY SW, 2-HS-4864, is available.
3. 2A DG should be run within 30 minutes after prelubing to prevent the oil trapped above the upper pistons from leaking past the rings into the combustion space.
4. Whenever 2A DG is started during non-emergency conditions, it should be loaded within one hour in incremental steps **PER** Section 6.6, PARALLEL 2A DIESEL GENERATOR. Unloaded operation beyond one hour shall be minimized and approved by the Shift Manager. **[B0027]**
5. Signature blocks shall be completed in this section.

B. Procedure INITIALS

NOTE

- The Load Shed Relay Position Verification light indicates the 21 4KV Bus feeder breaker indication switch is functioning properly. The light should be illuminated when either bus feeder breaker is closed.
- 2A DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.

CAUTION

Damage to 2A DG may occur if the 21 4KV Bus feeder breaker is closed **AND** the Load Shed Relay Position Verification light is **NOT** lit. Under this condition 2A DG may attempt to automatically load on 21 4KV bus.

1. **CHECK** the White Load Shed Relay Position Verification light is illuminated on the 21 4KV Bus Auxiliary Cabinet. ____
2. **IF** desired for data collection,
   THEN ADJUST the 2A DG starting air pressure gauges minimal pressure arm(s) on 2-PI-4841 and 2-PI-4842 to the current indicated pressure. (N/A if **NOT** desired) ____
3. **VERIFY** PRELUBE PUMP, 2-HS-4777, is in AUTO. **[B0048]** ____

6.3.B Procedure (Continued) **INITIALS**

NOTE
Placing 2A Slow Start Mode Selector switch, 2-HS-4825, to Normal will cancel Slow Start sequence.

4. **PLACE** 2A DG SLOW START MODE SELECTOR SW, 2-HS-4825, in ENABLE. ____

NOTE
- Placing the keyswitch to Start will automatically start the Prelube pump and ramp down the controller speed setpoint to 300 rpm. After 3 minutes the DG will start and run at approximately 300 rpm.
- Failure to receive the "2A DG • ENGINE • EXCTR SHUTDOWN" alarm may indicate a problem with the Exciter Shutdown circuit **AND** that the exciter is still active.

5. MOMENTARILY **PLACE** 2A DG SLOW START SEQUENCE KEYSWITCH, 2-HS-4864, to START position **AND** **THEN** release the switch. ____

6. **CHECK** that the SLOW START SEQUENCE light illuminates on 2C62B. ____

NOTE
Prelube pump will stop after running for 4 minutes.

7. **VERIFY** that the Prelube Pump starts. ____

8. **CHECK** 2A DG ENGINE EXCTR SHUTDOWN alarm on 1C20A annunciates. ____

9. **IF** the above expected results are **NOT** met **OR** it is desired to cancel the Auto Start Sequence, **THEN RETURN** the SLOW START MODE SELECTOR HANDSWITCH, 2-HS-4825, to NORMAL. (N/A if not desired) ____

NOTE
Generator damage may occur if voltage builds up when generator is running at less than rated speed.

10. **IF** generator voltage is indicated when 2A DG is started, **THEN IMMEDIATELY NOTIFY** Control Room to stop 2A DG using Control Room Stop button at 1C20A to shutdown 2A DG. ____

6.3.B Procedure (Continued) **INITIALS**

11. **CHECK** 2A DG starts **AND** reaches approximately 300 RPM on 2C62B indication 2-SI-4855. ____

12. **IF** 2A DG fails to start **AND** plant conditions permit, **THEN CONSIDER** barring over 2A DG **PER** Section 6.9, MANUALLY BAR-OVER 2A DIESEL GENERATOR, **OR** Section 6.24, ROTATING 2A DIESEL GENERATOR WITH COMPRESSED AIR, within three hours. ____

13. **IF** perfoming slow speed start for overspeed test, **THEN PERFORM** Section 6.11, 2A DG OVERSPEED TEST. ____

NOTE
The operator has local control of the DG speed unless a SIAS or UV signal is received **OR** the operator places 2-HS-4825 to NORMAL.

14. **RAISE** 2A DG speed as follows:

    a. **MONITOR** DG speed at 2A DG SPEED INDICATOR, 2-SI-4855. ____

NOTE
The 2A DG governor Speed may be adjusted to raise **OR** lower as directed by the System Engineer to support maintenance.

    b. **GRADUALLY RAISE** the 2A DG GOVERNOR SPEED CONTROL CS/SP at 2C62B to approximately 900 rpm over a three to five minute time period. ____

NOTE
The following step will allow the field to flash and reset the slow start circuit, placing the DG in the AUTO/REMOTE control mode.

    c. **WHEN** the DG is at 900 rpm, **THEN PLACE** 2A DG SLOW **START** MODE SEL SW, 2-HS-4825, to NORMAL. ____

    d. **CHECK** the following:

    - Generator voltage is 4.16KV (4.1 to 4.35KV) ____
    - Generator frequency is 60Hz (58.8 to 61.2Hz) ____
    - Generator undervoltage annunciator clears ____

    e. **CHECK** "2A DG • ENGINE • EXCTR SHUTDOWN" annunciator is clear: ____

6.3.B Procedure (Continued) **INITIALS**

15. **MONITOR** 2A DG parameters **PER** TABLE 3, 2A DIESEL GENERATOR OPERATING PARAMETERS. ____

a. **IF** Jacket Water Pump discharge pressure drops more than 3 PSIG from the initial value,
THEN VENT the Jacket Water Heat Exchanger **AND** the Air Cooler Heat Exchanger as follows:

(1) **CRACK OPEN** the following vent valves:

- 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105 ____
- 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115 ____

(2) **WHEN** a continuous stream of water is observed from the Heat Exchanger Vents,
THEN SHUT the following valves:

- 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105 ____
- 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115 ____

(3) **LOG** the time **AND** duration of the vent on the Outside Operator Log. ____

(4) **NOTIFY** the System Engineer. ____

b. **IF** filter **OR** strainer differential pressures exceed the following values,
THEN PERFORM the following:

- **IF** Fuel Oil Filter differential pressure exceeds 10 PSID, **THEN PLACE** the alternate filter in service **AND SUBMIT** an IR to have the dirty filter replaced. ____
- **IF** Lube Oil Filter differential pressure exceeds 10 PSID, **THEN SUBMIT** an IR to replace the cartridges. ____
- **IF** Lube Oil Strainer differential pressure exceeds 5 PSID, **THEN SUBMIT** an IR to clean the strainer. ____

6.3.B Procedure (Continued) **INITIALS**

NOTE
2A DG should be loaded as soon as practicable but at least within one hour after starting. **[B0027]**

16. **GO TO** the desired procedure section: ____

- Section 6.6, PARALLEL 2A DIESEL GENERATOR

OR

- Section 6.8, 2A DG SHUTDOWN

****** END ******

6.4 2A DG AUTOMATIC START

A. Initial Conditions

1. An automatic start signal has been generated that started 2A DG.

2. If a Safety Injection Actuation Signal (SIAS) has started 2A DG automatically, **OR** if both the NORMAL and the ALTERNATE feeder breakers to 21 4KV bus are open, then the Jacket Coolant Temperature and Pressure Trips and Crankcase Pressure Trips are bypassed. Close attention to these parameters in this condition is necessary.

3. Under normal conditions, do **NOT** exceed 3.0 MW load on 2A DG unless specified by an approved Test Procedure **OR** by the General Supervisor-Nuclear Operations. During accident conditions loads of up to 3.3 MW are acceptable.

4. 2A DG load should be limited to 2.3 MW when the following conditions exist:

   - The 21 4KV Bus Normal **AND** Alternate feeder breakers are open
   - 2A DG is powering 21 4KV Bus
   - A SIAS does **NOT** exist

B. Procedure

NOTE

- 2A DG starts automatically due to any of the following:
  - A SIAS A-10 signal
  - A 21 4KV Bus undervoltage signal (U/V A-4)
  - The glass cover is broken at the local break glass station
- When 2A DG is up to frequency and voltage, 2A DG OUT BKR, 152-2103, will close automatically if 21 4KV Bus is de-energized. If 21 4KV Bus is energized from another source, 2A DG may be manually paralleled **PER** Section 6.6, PARALLEL 2A DIESEL GENERATOR.
- If the engine was **NOT** prelubed, 2A DG should be operated a minimum of 4 hours, 3 hours at greater than 1.5 MW, plus one hour at 2.7 to 3.0 MW.

1. **IF** 2A DG is powering 21 4KV Bus **AND** a SIAS does **NOT** exist, **THEN LIMIT** 2A DG to 2.3 MW.

2. **IF** 21 4KV Bus is energized from off-site power, **THEN LOAD** 2A DG **PER** Section 6.6, PARALLEL 2A DIESEL GENERATOR, as soon as practicable but at least within one hour after starting. **[B0027]**

6.4.B Procedure (Continued)

3. **IF** possible,
THEN MONITOR 2A DG parameters **PER** TABLE 3, 2A DIESEL GENERATOR OPERATING PARAMETERS.

   a. **IF** Jacket Water Pump discharge pressure drops more than 3 PSIG from the initial value,
   THEN VENT the Jacket Water Heat Exchanger **AND** the Air Cooler Heat Exchanger as follows:

      (1) **CRACK OPEN** the following valves:

      - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
      - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

      (2) **WHEN** a continuous stream of water is observed from the Heat Exchanger Vents,
      THEN SHUT the following valves:

      - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
      - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

      (3) **LOG** the time **AND** duration of the vent on the Outside Operator Log.

      (4) **NOTIFY** the System Engineer.

   b. **IF** filter **OR** strainer differential pressures exceed the following values,
   THEN PERFORM the following:

   - **IF** Fuel Oil Filter differential pressure exceeds 10 PSID,
   THEN PLACE the alternate filter in service **AND SUBMIT** an IR to have the dirty filter replaced.
   - **IF** Lube Oil Filter differential pressure exceeds 10 PSID,
   THEN SUBMIT an IR to replace the cartridges.
   - **IF** Lube Oil Strainer differential pressure exceeds 5 PSID,
   THEN SUBMIT an IR to clean the strainer.

****** END ******

6.5 RESTART OF 2A DG WITH AN AUTOMATIC START SIGNAL PRESENT [B0154]

A. Initial Conditions

1. 2A DG has failed to start with automatic start signal **OR** has experienced a trip after an automatic start.
2. The cause of the start failure **OR** automatic trip has been found **AND** corrected.
3. A SIAS **OR** 21 4KV Bus U/V signal is present.

B. Procedure

1. **IF** an overspeed trip occurred,
   THEN ENSURE the fuel rack lever is RESET.

NOTE

- 60 seconds after depressing the Local Alarm Reset Pushbutton, the stop relay timer will de-energize **AND** 2A DG will attempt to start.
- When 2A DG is up to frequency and voltage, 2A DG OUT BKR, 152-2103, will close automatically if 21 4KV Bus is de-energized. If 21 4KV Bus is energized from another source, 2A DG may be manually paralleled **PER** Section 6.6, PARALLEL 2A DIESEL GENERATOR
- If the engine was **NOT** prelubed, 2A DG should be operated a minimum of 4 hours, 3 hours at greater than 1.5 MW, plus one hour at 2.7 to 3.0 MW.

CAUTION

Jacket Cooling Water High Temperature, Jacket Cooling Water Low Pressure and Crankcase High Pressure Trips are bypassed if a SIAS exists or both the NORMAL and ALTERNATE feeder breakers to the 21 4KV Bus are open.

2. **MOMENTARILY DEPRESS** the 2A DG Local Alarm Reset Pushbutton.

6.5.B Procedure (Continued)

3. **IF** 2A DG starts,
   THEN PERFORM the following:

   a. **IF** 2A DG is powering 21 4KV Bus **AND** a SIAS does **NOT** exist,
   THEN LIMIT 2A DG to 2.3 MW.

   b. **IF** 21 4KV Bus is energized from off-site power,
   THEN PARALLEL AND LOAD 2A DG **PER** Section 6.6, PARALLEL 2A DIESEL GENERATOR, as soon as practicable but at least within one hour after starting. **[B0027]**

   c. **MONITOR** 2A DG parameters **PER** TABLE 3, 2A DIESEL GENERATOR OPERATING PARAMETERS.

      (1) **IF** Jacket Water Pump discharge pressure drops more than 3 PSIG from the initial value,
      THEN VENT the Jacket Water Heat Exchanger **AND** the Air Cooler Heat Exchanger as follows:

         (a) **CRACK OPEN** the following vent valves:

            - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
            - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

         (b) **WHEN** a continuous stream of water is observed from the heat exchanger vents,
         THEN SHUT the following valves:

            - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
            - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

         (c) **LOG** the time **AND** duration of the vent on the Outside Operator's Log.

         (d) **NOTIFY** the System Engineer.

6.5.B.3.c Procedure (Continued)

(2) **IF** filter **OR** strainer differential pressures exceed the following values, **THEN PERFORM** the following:

- **IF** Fuel Oil Filter differential pressure exceeds 10 PSID, **THEN PLACE** the alternate filter in service **AND SUBMIT** an IR to have the dirty filter replaced.
- **IF** Lube Oil Filter differential pressure exceeds 10 PSID, **THEN SUBMIT** an IR to replace the cartridges.
- **IF** Lube Oil Strainer differential pressure exceeds 5 PSID, **THEN SUBMIT** an IR to clean the strainer.

4. **IF** 2A DG does **NOT** start, **THEN INFORM** the Control Room.

****** END ******

6.6 PARALLEL 2A DIESEL GENERATOR

A. Initial Conditions

1. DC control power is available to 2A DG OUT BKR, 152-2103, as observed by a handswitch position indicating light being lit.
2. 2A DG is running unloaded.
3. 0C DG is **NOT** connected to 21 4KV Bus.
4. 21 4KV Bus is being supplied from offsite power.
5. If the engine is prelubed, 2A DG should be loaded at 2.7 to 3.0 MW for a minimum of 1 hour. If the engine is **NOT** prelubed, 2A DG should be loaded for a minimum of 4 hours, 3 hours at greater than 1.5 MW, plus one hour at 2.7 to 3.0 MW.
6. Under normal conditions, do **NOT** exceed 3.0 MW load on 2A DG unless specified by an approved Test Procedure **OR** by the General Supervisor-Nuclear Operations. During accident conditions loads of up to 3.3 MW are acceptable.
7. Normally, 2A DG should **NOT** be operated with lead KVARS. 2A DG Output Breaker, 152-2103, will automatically trip open at approximately 1000 LEADING KVARS.

NOTE

2A DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.

B. Procedure

1. **MOMENTARILY PLACE** 2A DG UNIT PARALLEL, 2-CS-2104, to PARA.

NOTE

Failure to place 2-CS-2104 to PARA **OR** failure of the paralleling circuit to energize will prevent manual frequency control.

2. **ENSURE** proper operation of 2A DG frequency control by performing the following:
   a. **RAISE AND LOWER** 2A DG frequency between 59.0 and 61.0 Hz using 2A DG SPEED CONTR, 2-CS-2103.
   b. **ADJUST** 2A DG frequency to approximately 60 Hz using 2A DG SPEED CONTR, 2-CS-2103.
3. **ENSURE** 2A DG VOLT REGULATOR SEL, 2-HS-2123, is positioned to AUTO.

6.6.B Procedure (Continued)

4. **ENSURE** the following annunciators for 2A DG are clear:
   - "GENERATOR UNDERVOLTAGE"
   - "2A DG • POT VOLT • FREQ LO"
5. **RAISE AND LOWER** 2A DG voltage between 4.1KV and 4.35KV using 2A DG AUTO VOLT CONTR, 2-CS-2102.
6. **INSERT** the Sync Stick at 2A DG OUT BKR, 2-CS-152-2103.
7. **ADJUST** 2A DG AUTO VOLT CONTR, 2-CS-2102, to match voltages on the following meters:
   - INCOMING VOLTS, 2-EI-4001A
   - RUNNING VOLTS, 2-EI-4001B

CAUTION

Excessive force may be applied to 2A DG shaft keys due to instantaneous engine slowdown during paralleling if 2A DG frequency is significantly higher than 21 4KV Bus frequency.

8. **ADJUST** 2A DG frequency so the Synchroscope is rotating slowly in the FAST (clockwise) direction using 2A DG SPEED CONTR, 2-CS-2103.

NOTE

Table 1 identifies equipment that receives an auto-start signal from the Shutdown Sequencer.

9. **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position,
   THEN PERFORM the following:
   a. **PLACE** 2A DG OUT BKR, 2-CS-152-2103, to CLOSE.
   b. **VERIFY** 2A DG loads to approximately 0.5 MW. ____
      - **IF** needed to raise load to 0.5 MW, **ADJUST** 2A DG SPEED CONTR, 2-CS-2103. ____
10. **CHECK** the "SEQUENCER INITIATED" annunciator alarms.
11. **REMOVE** the Sync Stick **AND RETURN** to Home Base.

6.6.B Procedure (Continued)

NOTE

- The "2A DG • POT VOLT • FREQ LO" annunciator may alarm during parallel operation.
- Whenever 2A DG is started, it should be loaded from 2.7 to 3.0 MW for at least one hour.

CAUTION

- Do **NOT** allow power factor to be below 0.80.
- Do **NOT** exceed 3.0 MW, 500 KVARs, and 422 amps unless directed to do so by the GS-NPO or by approved procedures.

12. **RAISE** MW **AND** KVAR loads concurrently to the desired levels **PER** the following:

    a. **HOLD** at approximately 0.5 MW for at least one minute.

    b. **MAINTAIN** 0 to 500 KVARs using 2A DG AUTO VOLT CONTR, 2-CS-2102, **AND** FIGURE 1, DIESEL GENERATOR ELECTRICAL LIMITS.

    c. **RAISE** 2A DG load in 0.3 to 0.4 MW steps at one to two minute intervals to the desired test load.

    d. **MONITOR** 21 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**

13. **RECORD** equipment operating data 15 minutes after reaching the desired load **AND** at 60 minute intervals thereafter on the 2A Diesel Generator Logsheet.

14. **WHEN** 2A DG shutdown is desired,
    THEN GO TO to Section 6.8, 2A DG SHUTDOWN.

****** END ******

6.7 TRANSFER 21 4KV BUS LOADS FROM 2A DG TO OFFSITE POWER SOURCE [B0614]

A. Initial Conditions

1. 2A DG is powering 21 4KV Bus equipment.
2. The 21 4KV Bus Normal **AND** Alternate feeder breakers are OPEN.
3. SIAS **AND** 21 4KV Bus U/V signals are RESET.
4. One of the offsite power supplies is available to the Normal or Alternate feeder breaker.
5. DC control power is available to the selected Normal **OR** Alternate feeder breaker as observed by a handswitch position indicating light being lit.
6. All 2A DG Non-Essential Trips, (Jacket Cooling Water High Temperature, Jacket Cooling Water Low Pressure and Crankcase High Pressure), are reset.

B. Procedure

NOTE

- Two Operators may be utilized to perform the transfer. One to operate 2A DG on 1C20A **AND** one to synchronize to 21 4KV Bus.
- 2A DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.

1. **MOMENTARILY PLACE** 2A DG UNIT PARALLEL, 2-CS-2104, to PARA.
2. **ADJUST** 2A DG frequency to approximately 60 Hz using 2A DG SPEED, 2-CS-2103.
3. **INSERT** the Sync Stick for the 21 4KV Bus Normal **OR** Alternate Feeder breaker handswitch:

HANDSWITCH
21 4KV BUS NORMAL FDR, 2-CS-152-2101 OR 21 4KV BUS ALT FDR, 2-CS-152-2115

4. **CHECK** the Synchroscope **AND** Sync Lights are operating.

6.7.B **Procedure (Continued)**

NOTE
Offsite power voltage indication will be on the INCOMING voltmeter.

5. **ADJUST** RUNNING VOLTS equal to INCOMING VOLTS using 2A DG AUTO VOLT CONTR, 2-CS-2102.

NOTE
The Synchroscope works in the opposite direction when 2A DG is the RUNNING power source.

6. **ADJUST** 2A DG frequency so the Synchroscope pointer is rotating slowly in the FAST (clockwise) direction using 2A DG SPEED CONTR, 2-CS-2103.

CAUTION
To avoid improper paralleling, do **NOT** start **OR** stop any large loads on 21 4KV Bus.

7. **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position,
THEN CLOSE the 21 4KV Bus Normal **OR** Alternate Feeder breaker:

HANDSWITCH
21 4KV BUS NORMAL FDR, 2-CS-152-2101 OR 21 4KV BUS ALT FDR, 2-CS-152-2115

8. **REMOVE** the Sync Stick **AND RETURN** to Home Base.

NOTE
2A DG should **NOT** be operated with LEAD KVARs under normal conditions.
2A DG Output Breaker will automatically trip open at approximately 1000 LEADING KVARs.

9. **MONITOR** 21 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**

10. **IF** continued operation of 2A DG in parallel with 21 4KV Bus is desired,
THEN GO TO Section 6.6, PARALLEL 2A DIESEL GENERATOR, Step B.13.

6.7.B Procedure (Continued)

11. **IF** 2A DG is to be stopped,
THEN GO TO Section 6.8, 2A DG SHUTDOWN.

****** END ******

6.8 2A DG SHUTDOWN

A. Initial Conditions

NOTE
If the engine was **NOT** prelubed, 2A DG should be operated a minimum of 4 hours, 3 hours at greater than 1.5 MW, plus one hour at 2.7 to 3.0 MW.

1. 2A Diesel Generator is running.
2. Stopping 2A DG energizes the 2A DG Stopping Relay Timer and prevents all 2A DG starts for one minute.
3. Do **NOT** stop two DGs at the same time. **[B0614]**

NOTE
2A DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.

B. Procedure

1. **IF** 2A DG started due to a SIAS signal,
   THEN ENSURE actuation modules are reset locally (at the ESFAS cabinets) prior to 2A DG shutdown.
2. **IF** 2A DG is in parallel operation with 21 4KV Bus,
   THEN REMOVE 2A DG load by performing the following:
   a. **LOWER** MW **AND** KVAR loads concurrently to below 0.5 MW **AND** zero KVARs **PER** the following:
      - **LOWER** MW load in increments of 0.3 to 0.4 MW at one to two minute intervals using 2A DG SPEED CONTR, 2-CS-2103.
      - **MAINTAIN** 0 to 500 KVARs using 2A DG AUTO VOLT CONTR, 2-CS-2102, **AND** FIGURE 1, DIESEL GENERATOR ELECTRICAL LIMITS.
      - **MONITOR** 21 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**
   b. **WHEN** 2A DG load is less than 0.5 MW,
      THEN PLACE 2A DG OUT BKR, 2-CS-152-2103, to TRIP.

6.8.B Procedure (Continued)

CAUTION
Any time 2A DG is started, it must be allowed to run for a minimum of one minute before it is shutdown **OR** a Start Failure will result.

3. **IF** shutdown from the Control Room is desired,
   THEN PERFORM the following:

   a. **MOMENTARILY PLACE** 2A DG UNIT PARALLEL, 2-CS-2104, to **RESET.**

   b. **CHECK** 2A DG frequency is 60 Hz (58.8 to 61.2 Hz).

      - 2A DG FREQUENCY, 2-SI-2101

   c. **ADJUST** 2A DG voltage to greater than 4.16 KV (4.16 to 4.30 KV) using 2A DG AUTO VOLT CONTR, 2-CS-2102.

      - 2A DG VOLTS, 2-EI-2122

   d. **CHECK** annunciator "2A DG • POT VOLT • FREQ LO" is clear.

   e. **DEPRESS** 2A DG STOP, 2-HS-2125, pushbutton, to shutdown the engine.

4. **IF** Local shutdown is desired,
   THEN PERFORM the following:

   a. **DECLARE** 2A DG inoperable.

   b. **PLACE** 2A DG CONTR MODE SEL SW, 2-HS-4839, in LOCAL.

   c. **DEPRESS** both local Engine Stop pushbuttons.

   d. **IF** desired,
      THEN PLACE 2A DG CONTR MODE SEL SW, 2-HS-4839, to AUTO-REMOTE **AND REMOVE** the key.

5. **ENSURE** SLOW START MODE SELECTOR, 2-HS-4825, is in the NORMAL position. **[B0048]**

6. **ENSURE** Prelube Pump is **NOT** running.

7. **ENSURE** the following pumps are operating:

   - Coolant Pump

   - Lube Oil Pump

6.8.B Procedure (Continued)

CAUTION
DO **NOT** allow the 2A DG room temperature to fall below 60° F.

8. **IF** desired,
THEN STOP the 2A DG Room Ventilation Fan by momentarily placing its handswitch to the STOP position.

NOTE
- 2A DG may remain in the Action Statement of T.S. 3.8.1 **OR** 3.8.2 until engine barring is complete.
- If barring is **NOT** performed within three hours of shutdown, its effectiveness is minimal. Therefore, barring is **NOT** required if conditions prohibit barring within three hours of engine shutdown.

9. **IF** 2A DG is **NOT** scheduled to be manually restarted within three hours, **THEN CONSIDER** barring over 2A DG **PER** Section 6.9, MANUALLY BAR-OVER 2A DIESEL GENERATOR, **OR** Section 6.24, ROTATING 2A DIESEL GENERATOR WITH COMPRESSED AIR. **[B0048]**

10. NOTIFY Plant Chemistry of the following:
    - 2A DG is shutdown
    - Jacket Water Cooling System makeup or venting performed during operation

****** END ******

6.9 MANUALLY BAR-OVER 2A DIESEL GENERATOR

A. Initial Conditions

1. 2A DG has been prelubed **OR** run **AND** requires Barring-over.
2. Technical Specification 3.8.1 or 3.8.2 has been reviewed to determine Diesel Generator operability requirements.
3. 2A DG has been shutdown more than 20 minutes but less than three hours.

B. Procedure

1. **IF** 2A DG is operable,
   THEN ENSURE Unit 2 ZB train equipment is operable **PER** OI-49, Operability Verification, prior to barring over the engine.
2. **PLACE** 2A DG OUT BKR, 2-CS-152-2103, in PULL-TO-LOCK.
3. **UNLOCK AND SHUT** the following 2A DG Air Start Header isolation valves:
   - 2A DG STARTING AIR TO DIESEL START SV-4830 ISOLATION VALVE, 2A-DSA-114
   - 2A DG STARTING AIR TO DIESEL START SV-4831 ISOLATION VALVE, 2A-DSA-117
4. **REMOVE** the pipe caps from the following 2A DG Air Start Header drain valves:
   - 2A DG STARTING AIR STRAINER YS-4830 DRAIN VALVE, 2A-DSA-124
   - 2A DG STARTING AIR STRAINER YS-4831 DRAIN VALVE, 2A-DSA-125

WARNING
Hearing Protection is required while bleeding down the Air Headers.

5. **UNLOCK AND OPEN** the following 2A DG Air Start Header drain valves:
   - 2A DG STARTING AIR STRAINER YS-4830 DRAIN VALVE, 2A-DSA-124
   - 2A DG STARTING AIR STRAINER YS-4831 DRAIN VALVE, 2A-DSA-125
6. **STATION** a Safety Watch to **INDEPENDENTLY VERIFY** that the air start valves remain shut **AND** the header drains remain open.
7. **REMOVE** one of the coupling guard access screens between the Engine **AND** the Generator.
8. **INSERT** the Jacking Bar into the access **AND SLIP** the Jacking Bar onto the pivot pin located above the flywheel.
9. **ADJUST** the Jacking Bar Anti-Slip Bolt to prevent accidental disengagement.

6.9.B Procedure (Continued)

10. **LOWER OR RAISE** the Jacking Bar, whichever is easiest, to engage the pawl into the flywheel teeth.

11. **ROTATE** the flywheel one revolution.

12. **REMOVE** the Jacking Bar **AND REPLACE** the coupling guard access screen.

13. **IF** returning 2A DG to service,
THEN PERFORM the following:

    a. **SHUT AND LOCK** the following 2A DG Air Start Header drain valves:

    - 2A DG STARTING AIR STRAINER YS-4830 DRAIN VALVE, 2A-DSA-124
    - 2A DG STARTING AIR STRAINER YS-4831 DRAIN VALVE, 2A-DSA-125

    b. **REPLACE** the pipe caps on the following 2A DG Air Start Header drain valves:

    - 2A DG STARTING AIR STRAINER YS-4830 DRAIN VALVE, 2A-DSA-124
    - 2A DG STARTING AIR STRAINER YS-4831 DRAIN VALVE, 2A-DSA-125

    c. **OPEN AND LOCK** the following 2A DG Air Start Header isolation valves:

    - 2A DG STARTING AIR TO DIESEL START SV-4830 ISOLATION VALVE, 2A-DSA-114
    - 2A DG STARTING AIR TO DIESEL START SV-4831 ISOLATION VALVE, 2A-DSA-117

    d. **ACKNOWLEDGE AND RESET** the local annunciator panel.

    e. **ENSURE** annunciator "STARTING AIR PRESSURE LOW" clears.

    f. **NOTIFY** the Control Room of the following: **[B0048]**

    - 2A Diesel Generator bar over is complete.
    - To place 2A Diesel Generator Outlet Bkr, 2-CS-152-2103, in Normal.

    g. **PLACE** 2A DG OUT BKR, 2-CS-152-2103, in NORMAL.

6.9.B.13 Procedure (Continued)

NOTE
To accurately track DG unavailability, it is necessary to document manual bar over of DG.

h. CRO **LOG** that the bar over is complete **PER** Section 6.9, OI-21A-2

****** END ******

6.10 REMOVE AND RESTORE 2A DG TO/FROM SERVICE

A. Initial Conditions

1. 2A DG is shutdown **AND** 2A DG OUT BKR, 152-2103, is OPEN.
2. Technical Specification 3.8.1 or 3.8.2 has been reviewed to determine Diesel Generator operability requirements.

B. Procedure

NOTE
These actions are required to be performed prior to removing 2A DG from service for elective maintenance greater than 72 hours. For assurance, these actions should be performed every time elective maintenance is performed.

CAUTION
After 2A DG has been removed from service, changes in weather conditions or grid stability should be evaluated for compensatory action.

1. **IF** entering Tech Spec 3.8.1 B for elective maintenance,
   THEN PERFORM the following prior to taking the 2A DG out of service:
   [B0906]
   (N/A if administrative controls are in place to ensure 2A DG returned to service within 72 hours.)

NOTE
Steps 1.a through 1.e may be performed in any order.

a. **VERIFY** the following:

- **NO** elective maintenance will be performed in the switchyard, on the 4 kV Distribution System, or on the 13 KV Distribution System.

6.10.B.1 Procedure (Continued)

NOTE
The Unit-2 AFW system includes 13 AFW pump and its cross-tie.

- **NO** planned maintenance or testing will be performed on the Unit-2 AFW System.
- **NO** maintenance or testing that affects the reliability of Unit-2 B train will be scheduled. If testing or maintenance activities must be performed, a Risk Assessment Evaluation will be performed according to NO-1-117, INTEGRATED RISK MANAGEMENT.
- **NO** elective maintenance will be performed on 0C DG.
- Personnel are aware of the dedication of 0C DG to 21 4KV Bus.
  - Flag-Off 0C DG using green chain barricades.
  - Update OWC Status Board.

NOTE
Patuxent River Naval Air Station is the preferred source for the weather report. However, any government sponsored weather agency may be used.

b. Within 12 hours prior to removing 2A DG from service, **EVALUATE** that **NO** severe weather conditions are forecast for CCNPP or any of the 500 KV transmission lines rights of way.

- Severe Thunderstorm
- Gale/High Wind - greater than 50 mph
- Tornado
- Hurricane
- Blizzard
- Ice Storm

6.10.B.1 Procedure (Continued)

c. Within 12 hours prior to removing 2A DG from service, **REQUEST** the CRS **OR** Shift Manager perform the following notification. **[B0138]**

(1) **CONTACT** the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts.

(2) **ENSURE** grid stress conditions are **NOT** considered "high":

- 5051, 5052 and 5072 circuits are in service.
- PJM is **NOT** in a Warning or implementing an Emergency Action for the following:
  - Primary Reserve - Warning
  - Voltage Reduction - Warning or Action
  - Manual Load Dump - Warning or Action
  - Maximum Emergency Generation - Action
- PJM is **NOT** in Conservative Operations for the following:
  - Thunderstorms
  - Solar Magnetic Disturbances
  - Crisis Response
  - Heavy Load, Low Voltage - Warning or Action
  - Post Contingency Local Load Relief Warning that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard
- **NO** other known condition exists on the PJM or BGE system at this time that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard.

(3) **DETERMINE** that **NO** other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

d. **BRIEF** the operations crews concerning the unit activities, including compensatory measures established and the importance of promptly starting and aligning the 0C DG.

6.10.B.1 Procedure (Continued)

e. **ENSURE** the on-shift operations crew has discussed and reviewed the appropriate normal and emergency operating procedures.

- **PLACE** a note on the Shift Turnover Sheet for oncoming crews to discuss and review the appropriate normal and emergency operating procedures within 24 hours prior to or shortly after assuming the watch for the first time after having scheduled days off.

- **REVIEW** the following procedures as appropriate:

  - AOP-7I, LOSS OF 4KV, 480 VOLT OR 208/120 VOLT INSTRUMENT BUS POWER
  - EOP-0, POST-TRIP IMMEDIATE ACTIONS
  - EOP-2, LOSS OF OFFSITE POWER/LOSS OF FORCED CIRCULATION
  - EOP-7, STATION BLACKOUT
  - AOP-3F, LOSS OF OFFSITE POWER WHILE IN MODES 3, 4, 5 OR 6

6.10.B Procedure (Continued)

2. **REMOVE** 2A DG from service as follows:

   a. **PERFORM** the following prior to taking 2A DG out of service:

   - **IF** 2A DG is operable,
     THEN ENSURE Unit 2 ZB train equipment is operable **PER** OI-49, Operability Verification, every eight hours while 2A DG is out of service.

   - **REQUEST** the CRS **OR** Shift Manager perform the following notification. **[B0138]**
     (N/A if Step 1.c performed)

     - **CONTACT** the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts.

     - **DETERMINE** whether other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

     - **IF** 2A DG will be out of service at the same time reliability of the offsite power supplies is reduced,
       THEN HAVE the Shift Manager determine how to minimize both the time 2A DG is out of service **AND** the time that offsite power supplies are at reduced reliability.

   - **IF** in Lower Mode Operation,
     THEN ENSURE the requirements of the applicable Minimum Essential Equipment section of NO-1-103, Conduct of Lower Mode Operations, are satisfied. **[B0138]**

6.10.B.2 Procedure (Continued)

CAUTION
0C DG Commitments only allow one (1) 0C DG Disconnect to be closed at a time.

b. **IF** the 0C DG is available,
THEN CLOSE the 0C DG 21 4KV Bus Disconnect 189-2106, to prealign the 0C DG to 21 4KV Bus by PERFORMING the following:

(1) **PLACE** the 0C DG 21 4KV BUS FDR handswitch, 2-CS-152-2106 in PTL.

NOTE
Kirk keys 11900, 11903, 14259 are required.

(2) **LOCK** the 0C DG 21 4KV Bus DISC, 189-2106 in the CLOSE position.

(3) **PLACE** the 0C DG 21 4KV BUS FDR handswitch 2-CS-152-2106 in the NORMAL position.

(4) **PLACE** the following handswitches in PTL with OFF NORMAL COMPONENT tags:

- 0C DG 11 4KV BUS FDR, 1-CS-152-1106
- 0C DG 14 4KV BUS FDR, 1-CS-152-1406
- 0C DG 24 4KV BUS FDR, 2-CS-152-2406

(5) **PLACE** an OFF NORMAL COMPONENT tag on control room indication for DISC 189-2106.

c. **PLACE** 2A DG OUT BKR, 2-CS-152-2103, in PULL-TO-LOCK.

d. **UNLOCK AND SHUT** the following 2A DG Air Start Header isolation valves:

- 2A DG STARTING AIR TO DIESEL START SV-4830 ISOLATION VALVE, 2A-DSA-114
- 2A DG STARTING AIR TO DIESEL START SV-4831 ISOLATION VALVE, 2A-DSA-117

e. **REMOVE** the pipe caps from the following 2A DG Air Start Header drain valves:

- 2A DG STARTING AIR STRAINER YS-4830 DRAIN VALVE, 2A-DSA-124
- 2A DG STARTING AIR STRAINER YS-4831 DRAIN VALVE, 2A-DSA-125

6.10.B.2 Procedure (Continued)

WARNING
Hearing Protection is required while bleeding down the Air Headers.

f. **UNLOCK AND OPEN** the following 2A DG Air Start Header drain valves:

- 2A DG STARTING AIR STRAINER YS-4830 DRAIN VALVE, 2A-DSA-124
- 2A DG STARTING AIR STRAINER YS-4831 DRAIN VALVE, 2A-DSA-125

3. **WHEN** desired,
THEN RETURN 2A DG to service as follows:

a. **SHUT AND LOCK** the following 2A DG Air Start Header drain valves:

- 2A DG STARTING AIR STRAINER YS-4830 DRAIN VALVE, 2A-DSA-124
- 2A DG STARTING AIR STRAINER YS-4831 DRAIN VALVE, 2A-DSA-125

b. **REPLACE** the pipe caps on the following 2A DG Air Start Header drain valves:

- 2A DG STARTING AIR STRAINER YS-4830 DRAIN VALVE, 2A-DSA-124
- 2A DG STARTING AIR STRAINER YS-4831 DRAIN VALVE, 2A-DSA-125

c. **OPEN AND LOCK** the following 2A DG Air Start Header isolation valves:

- 2A DG STARTING AIR TO DIESEL START SV-4830 ISOLATION VALVE, 2A-DSA-114
- 2A DG STARTING AIR TO DIESEL START SV-4831 ISOLATION VALVE, 2A-DSA-117

d. **ENSURE** annunciator "STARTING AIR PRESSURE LOW" clears.

e. **PLACE** 2A DG OUT BKR, 2-CS-152-2103, to NORMAL.

6.10.B.3 Procedure (Continued)

f. **IF** required,
THEN PERFORM ONE of the following to return 2A DG to service:

NOTE
2A DG should be run at least 1 hour.

- **PERFORM** STP O-8A-2, Test of 2A DG and 21 4KV Bus LOCI Sequencer, to declare 2A DG operable.

OR

- **PERFORM** the following sections to restore 2A DG operation:

  (1) 6.3, 2A DG SLOW SPEED START

  (2) Section 6.6, PARALLEL 2A DIESEL GENERATOR

  (3) **WHEN** 2A DG has been loaded for at least one hour,
  THEN STOP 2A DG **PER** Section 6.8, 2A DG SHUTDOWN.

NOTE
The OC DG should normally remain prealigned to 21 4kv bus until the 2A EDG is returned to Operable status.

g. **IF** 0C DG was prealigned to 21 4KV Bus,
THEN OPEN the 0C DG 21 4KV Bus Disconnect 189-2106, by PERFORMING the following:

(1) **PLACE** the 0C DG 21 4KV BUS FDR handswitch, 2-CS-152-2106 in PTL.

(2) **LOCK** the 0C DG 21 4KV Bus DISC, 189-2106 in the OPEN position.

(3) **PLACE** the 0C DG 21 4KV BUS FDR handswitch 2-CS-152-2106 in the NORMAL position.

(4) **PLACE** the following handswitches in NORMAL **AND REMOVE** the OFF NORMAL COMPONENT tags:

- 0C DG 11 4KV BUS FDR, 1-CS-152-1106
- 0C DG 14 4KV BUS FDR, 1-CS-152-1406
- 0C DG 24 4KV BUS FDR, 2-CS-152-2406

6.10.B.3.g **Procedure (Continued)**

(5) **REMOVE** the OFF NORMAL COMPONENT tag from the control room indication for DISC 189-2106.

h. **REQUEST** the CRS **OR** Shift Manager inform the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts that the 2A DG has been returned to service. **[B0138] [B0906]**

i. **IF** used,
THEN REMOVE 0C DG barricades.

****** END ******

6.11 2A DG OVERSPEED TEST

A. Initial Conditions

1. A calibrated speed measuring device (Laser Tach or equivalent) is installed.
2. 2A DG is out of service.
3. Mechanical Maintenance is performing EDG-20, Emergency Diesel Generator Inspection, on 2A DG **OR** as requested by the System Engineer.

B. Procedure

1. **PERFORM** a Slow Speed Start **PER** 6.3, 2A DG SLOW SPEED START.
2. **MONITOR** 2A DG speed using the speed measuring device.

6.11.B Procedure (Continued)

NOTE

- The 2A DG Speed may be adjusted to raise or lower speed as directed by the System Engineer to support maintenance.
- 2A DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.

CAUTION

Only one DG shall be tested at any one time. 2A DG is considered inoperable.

3. **GRADUALLY RAISE** the 2A DG GOVERNOR SPEED CONTROL CS/SP at 2C62B **AND HOLD** at the following speeds during the ramp:

RPM	Approx. DURATION (Minutes)
500 (475 - 525)	10
600 (575 - 625)	5
700 (675 - 725)	5
800 (775 - 825)	5
900 (875 - 925)	5

4. **WHEN** the 2A DG speed ramp is complete,
THEN ADJUST the 2A DG GOVERNOR SPEED CONTROL CS/SP at 2C62B to 900 RPM.

5. **IF** 2A DG speed control is erratic,
THEN NOTIFY Mechanical Maintenance to tune the mechanical governor **PER** EDG-10, Woodward Governor Oil Change.

6.11.B Procedure (Continued)

NOTE
The Overspeed Trip Setpoint is 1035 to 1053 RPM.

- Trips between 1008 **AND** 1035 RPM do **NOT** warrant an operability concern.
- Trips between 1053 **AND** 1085 do **NOT** warrant an equipment damage concern. However, actions should be taken to restore the trip setting to between 1035 **AND** 1053 RPM at the next convenient opportunity.

CAUTION
- 2A DG should **NOT** be run at speeds greater than 960 RPM for longer than absolutely necessary.
- Do **NOT** exceed 1085 RPM.

6. **DETERMINE** 2A DG Overspeed Trip setpoint by PERFORMING the following:

   a. **RAISE** 2A DG speed by slowly raising 2A DG GOVERNOR SPEED CONTROL CS/SP at 2C62B until 2A DG trips on overspeed or maximum HS Limit is achieved.

   b. **IF** overspeed setting has not been achieved using the Speed Control Handswitch,
   THEN HAVE Mechanical Maintenance **SLOWLY RAISE** the Governor linkage arm to increase diesel speed until the trip setpoint is reached.

7. **CHECK** the 2C62A annunciator "ENGINE OVERSPEED" alarms.

8. **RECORD** the results in EDG-20, Emergency Diesel Generator Inspection, for 2A DG.

9. **RESET** the 2A DG fuel racks.

10. **PLACE** 2A DG SLOW START MODE SELECTOR SW, 2-HS-4825, to NORMAL.

11. **DEPRESS** the Local Alarm Reset Pushbutton on the 2A Diesel Generator Control Panel **AND CHECK** the 2C62A annunciator "ENGINE OVERSPEED" clears.

CAUTION
DO **NOT** allow the 2A DG room temperature to fall below 60° F.

12. **IF** desired,
THEN STOP the 2A DG Room Ventilation Fan by momentarily placing its handswitch to the STOP position.

6.11.B Procedure (Continued)

NOTE
2A DG shall be run at least 4 hours following EDG-20.

13. **IF** returning 2A DG to service,
THEN PERFORM applicable sections of STP O-8A-2, Test of 2A DG and 21 4KV Bus LOCI Sequencer, to declare 2A DG operable.

14. **IF** 2A DG is **NOT** scheduled to be manually restarted within three hours,
THEN CONSIDER barring over 2B DG **PER** Section 6.9, MANUALLY BAR-OVER 2A DIESEL GENERATOR, **OR** Section 6.24, ROTATING 2A DIESEL GENERATOR WITH COMPRESSED AIR. **[B0048]**

****** END ******

6.12 MAKEUP TO THE 2A DG JACKET COOLING WATER EXPANSION TANK

A. Initial Conditions

1. Service Water is available to the 2A DG Air Compressor Aftercooler.

B. Procedure

1. **OPEN** 2A DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 2A-DCW-101.

2. **WHEN** the Expansion Tank has reached the desired level,
   THEN SHUT 2A DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 2A-DCW-101.

3. **NOTIFY** Plant Chemistry that makeup water has been added to the system.

****** END ******

6.13 FILL THE 2A DG JACKET WATER AND AIR COOLING SYSTEMS AFTER MAINTENANCE

A. Initial Conditions

1. The 2A DG Jacket Water Cooling System **OR** Air Cooling System has been drained for maintenance.
2. Maintenance on the affected Cooling System has been completed **AND** the systems are mechanically intact.
3. Service Water is aligned to 2A DG.

B. Procedure

1. **INSTALL** vent rigs on the following 2A DG Jacket Water Cooling valves:
   - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
   - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115
2. **ENSURE** 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-111, is SHUT.
3. **UNLOCK AND OPEN** 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER DRAIN VALVE, 2A-DCW-1003.
4. **UNLOCK AND OPEN** 2A DG JACKET WATER COOLING JACKET WATER COOLER DRAIN VALVE, 2A-DCW-104, to start filling from the SRW System.
5. **UNLOCK AND OPEN** 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-107.
6. **OPEN** 2A DG JACKET WATER COOLING TEMPERATURE CONTROL VLV 4802 BYPASS VALVE, 2A-DCW-103.
7. **MONITOR** the 2A DG Jacket Water Expansion Tank level.
8. **WHEN** the 2A DG Jacket Water Expansion Tank level is approximately 3/4 full, **THEN SHUT AND LOCK** 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER DRAIN VALVE, 2A-DCW-1003.
9. **CRACK OPEN** the following vent valves:
   - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
   - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

6.13.B Procedure (Continued)

10. **WHEN** a continuous stream of water is observed from a heat exchanger vent, **THEN SHUT** the associated valve:

    - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
    - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

11. **SHUT AND LOCK** 2A DG JACKET WATER COOLING JACKET WATER COOLER DRAIN VALVE, 2A-DCW-104.

12. **SHUT AND LOCK** 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-107.

13. **IF** necessary, **FILL** the Expansion Tank **PER** 6.12, MAKEUP TO THE 2A DG JACKET COOLING WATER EXPANSION TANK.

14. **CLOSE** the circuit breakers for the 2A DG electric Jacket Cooling Pump **AND** the Jacket Coolant Heater.

15. **ENSURE** the COOLANT PUMP handswitch, 2-HS-4803, is in AUTO.

16. **WHEN** the 2A DG electric Jacket Cooling Pump has run for at least 10 minutes, **THEN PERFORM** the following:

    a. **CRACK OPEN** the following valves:

    - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
    - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

    b. **WHEN** a continuous stream of water is observed from a heat exchanger vent,
    THEN SHUT the associated valve:

    - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
    - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

17. **REMOVE** the vent rigs on the following 2A DG Jacket Water Cooling valves:

    - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
    - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

6.13.B Procedure (Continued)

18. **SHUT** 2A DG JACKET WATER COOLING TEMPERATURE CONTROL VLV 4802 BYPASS VALVE, 2A-DCW-103.

19. **ENSURE** the COOLANT HEATER handswitch, 2-HS-4802, is in AUTO.

20. **REQUEST** Plant Chemistry obtain a 2A DG Jacket Water sample **AND CHECK** the coolant is within Chemistry specifications.

****** END ******

6.14 FILL THE 2A DG JACKET WATER AND AIR COOLING SYSTEMS WITH DI WATER AFTER MAINTENANCE

A. Initial Conditions

1. The 2A DG Jacket Water Cooling System **OR** Air Cooling System has been drained for maintenance.

2. Maintenance on the affected Cooling System has been completed **AND** the systems are mechanically intact.

B. Procedure

1. **INSTALL** vent rigs on the following 2A DG Jacket Water Cooling valves:

   - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
   - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

2. **ENSURE** the following valves are SHUT:

   - 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-111
   - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER DRAIN VALVE, 2A-DCW-1003

NOTE

The DI water connection on the 45 foot Aux BLDG Truck Bay is the normal source of makeup water.

3. **CONNECT** a hose to a DI water source.

4. **FLUSH** the hose with DI water until Chemistry determines the water is of proper quality.

5. **CONNECT** the hose to 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-117.

6. **ENSURE OPEN** the DI water source isolation valve.

7. **UNLOCK AND THROTTLE OPEN** 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-117, to begin filling.

8. **OPEN** 2A DG JACKET WATER COOLING TEMPERATURE CONTROL VLV 4802 BYPASS VALVE, 2A-DCW-103.

9. **MONITOR** the 2A DG Jacket Water Expansion Tank level.

6.14.B Procedure (Continued)

10. **WHEN** the 2A DG Jacket Water Expansion Tank level is approximately 3/4 full, **THEN SHUT** 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-117.

11. **CRACK OPEN** the following vent valves:

    - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
    - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

12. **WHEN** a continuous stream of water is observed from a heat exchanger vent, **THEN SHUT** the associated valve:

    - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
    - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

13. **IF** necessary, **THROTTLE OPEN** 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-117, to restore 2A DG Jacket Water Expansion Tank level to between 1/2 and 3/4 full.

14. **CLOSE** the circuit breakers for the 2A DG electric Jacket Cooling Pump **AND** the Jacket Coolant Heater.

15. **ENSURE** the COOLANT PUMP handswitch, 2-HS-4803, is in AUTO.

16. **WHEN** the 2A DG electric Jacket Cooling Pump has run for at least 10 minutes, **THEN PERFORM** the following:

    a. **CRACK OPEN** the following valves:

       - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
       - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

    b. **WHEN** a continuous stream of water is observed from a heat exchanger vent,
       THEN SHUT the associated valve:

       - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105
       - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

6.14.B Procedure (Continued)

17. **IF** necessary, **THROTTLE OPEN** 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-117, to restore 2A DG Jacket Water Expansion Tank level to between 1/2 and 3/4 full.

18. **LOCK SHUT** 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-117.

19. **SHUT** the DI water source isolation valve.

20. **REMOVE** the vent rigs on the following 2A DG Jacket Water Cooling valves:

    - 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105

    - 2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2A-DCW-115

21. **SHUT** 2A DG JACKET WATER COOLING TEMPERATURE CONTROL VLV 4802 BYPASS VALVE, 2A-DCW-103.

22. **ENSURE** the COOLANT HEATER handswitch, 2-HS-4802, is in AUTO.

23. **REMOVE** the hose between the DI water source **AND** 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-117.

24. **NOTIFY** Plant Chemistry that DI water was used to fill the Jacket Water Cooling system, **AND** to **ADJUST** Chemistry as required.

****** END ******

6.15 FEED AND BLEED 2A DG JACKET WATER AND AIR COOLING SYSTEMS

A. Initial Conditions

1. The 2A DG electric Jacket Cooling Pump is in service.
2. Service Water is available to 2A DG.
3. An operator is available to maintain a continuous feed and bleed operation.

B. Procedure

1. **CONNECT** a hose or sleeving from 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-117, to the nearest floor drain.

CAUTION

IF 2A DG must remain operable during feed and bleed operation,
THEN an operator must be continuously present to ensure the 2A DG Jacket Water Expansion Tank level stays above the low level alarm **AND** JCW temperature remains above 90° F. **[B0022]**

2. **NOTIFY** the Control Room that a feed and bleed to the 2A DG Jacket Water Expansion Tank is to be started.
3. **THROTTLE OPEN** 2A DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 2A-DCW-101.
4. **UNLOCK AND THROTTLE OPEN** 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-117.
5. **ENSURE** adequate suction for the 2A DG electric Jacket Coolant Pump is maintained.

CAUTION

2A DG shall be considered out of service if JCW temperature drops below 90° F.

6. **IF** any of the following occur,
   THEN LOWER the drain rate:
   - 2A DG Jacket Water Expansion Tank level approaches the Low Level Alarm
   - The 2A DG electric Jacket Cooling Pump cavitates
   - Jacket Cooling System temperature is near 90° F **AND** decreasing

6.15.B Procedure (Continued)

7. **IF** the 2A DG Jacket Water Expansion Tank level can **NOT** be maintained, **THEN STOP** the feed and bleed as follows:

   - **SHUT AND LOCK** 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-117.

   - **SHUT** 2A DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 2A-DCW-101.

NOTE
DG Room Waste Oil Collection Tank level should **NOT** rise.

8. **PERIODICALLY MONITOR** the DG Room Waste Oil Collection Tank level to ensure proper operation of the interceptor.

9. **WHEN** approximately 5 volume changes have taken place (1000 gallons **OR** 3 hours),
   THEN STOP the feed and bleed as follows:

   - **SHUT AND LOCK** 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-117.

   - **ENSURE** JCW Expansion Tank level is greater than 1/2 full,
     THEN SHUT 2A DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 2A-DCW-101.

10. **DISCONNECT** the hose or sleeving from 2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2A-DCW-117.

11. **VENT** the Jacket Cooling Heat Exchanger as follows:

    a. **CRACK OPEN** 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105.

    b. **WHEN** a steady stream of water is observed,
       THEN SHUT 2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2A-DCW-105.

12. **INFORM** the Control Room that feed and bleed operations are complete. **[B0048]**

13. **REQUEST** Plant Chemistry obtain a 2A DG Jacket Water sample **AND CHECK** the coolant is within Chemistry specifications.

****** END ******

6.16 CONTROLLED FILL OF 2A DG SRW HEADER AFTER MAINTENANCE

A. Initial Conditions

1. 2A DG is tagged out.
2. Service Water is isolated to 2A DG.
3. Vent rigs **AND** a safety ladder are available for venting the 2A DG SRW Header.
4. SRW valves for 2A DG are lined up **PER** Attachments 1 **AND** 2 of OI-15, Service Water System, except 2A DG SRW Supply **AND** Return valves are SHUT:
   - 21 SERVICE WATER HEADER SUPPLY TO 2A DIESEL GENERATOR ISOLATION VALVE, 2-SRW-509
   - 2A DIESEL GENERATOR RETURN TO 21 SERVICE WATER HEADER ISOLATION VALVE, 2-SRW-521

B. Procedure

NOTE
With T/A 2-98-032 installed, filling the 2A DG SRW header must be performed in parallel with filling the 1B DG SRW header.

1. **REMOVE** the caps **AND INSTALL** vent rigs on the following 2A DG SRW valves:
   - 2A DIESEL GENERATOR SRW 2-PDIC-1588 HP SIDE DRAIN VALVE, 2-SRW-1199
   - 2A DIESEL GENERATOR SRW 2-PDIC-1588 LP SIDE DRAIN VALVE, 2-SRW-1200
   - 2A DIESEL GENERATOR SRW SUPPLY HEADER VENT VALVE, 2-SRW-522
   - 2A DIESEL GENERATOR SRW RETURN HEADER VENT VALVE, 2-SRW-523
2. **ENSURE** 2A DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 2A-DCW-101, is SHUT.
3. **ENSURE** 2A DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1588-CV, is SHUT.

6.16.B Procedure (Continued)

4. **ENSURE** 2A DG DSA Compressor After Cooler valves are LOCKED OPEN:

   - 2A DIESEL GENERATOR STARTING AIR COMPRESSOR AIR COOLER INLET ISOLATION VALVE, 2-SRW-528
   - 2A DIESEL GENERATOR STARTING AIR COMPRESSOR AIR COOLER OUTLET ISOLATION VALVE, 2-SRW-529

NOTE
This step causes 2A DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1588-CV, to fail open.

5. **SLOWLY ROTATE** the handle on INSTRUMENT AIR TO 2A DG SRW INLET 2-CV-1588 AUTO / VENT SELECTOR VALVE, 2-IA-1588-HV, 180° to the MANUAL position.

6. **WHEN** filling is ready to begin,
   THEN INFORM the Control Room to monitor SRW Head Tank level **AND** SRW Header pressure.

7. **SLOWLY OPEN AND LOCK** OPEN, 2A DIESEL GENERATOR RETURN TO 21 SERVICE WATER HEADER ISOLATION VALVE, 2-SRW-521.

8. **CRACK OPEN** 2A DG SRW Header vent valves:

   - 2A DIESEL GENERATOR SRW SUPPLY HEADER VENT VALVE, 2-SRW-522
   - 2A DIESEL GENERATOR SRW RETURN HEADER VENT VALVE, 2-SRW-523

9. **WHEN** a steady stream of water is observed from a header vent,
   THEN SHUT the associated vent valve:

   - 2A DIESEL GENERATOR SRW SUPPLY HEADER VENT VALVE, 2-SRW-522
   - 2A DIESEL GENERATOR SRW RETURN HEADER VENT VALVE, 2-SRW-523

10. **VENT** 2-SRW-1588-PDIC as follows:

    a. **OPEN** 2A DIESEL GENERATOR SRW 2-PDIC-1588 EQUALIZING VALVE, 2-SRW-1198.

    b. **OPEN** 2A DIESEL GENERATOR SRW 2-PDIC-1588 HP SIDE DRAIN VALVE, 2-SRW-1199.

    c. **OPEN** 2A DIESEL GENERATOR SRW 2-PDIC-1588 LP SIDE DRAIN VALVE, 2-SRW-1200.

6.16.B Procedure (Continued)

NOTE
Initially, a solid stream of water issues from the drain valve due to water trapped in the line.

11. **WHEN** a steady stream of water issues from the drain valves, **THEN STOP** venting as follows:

    a. **SHUT** 2A DIESEL GENERATOR SRW 2-PDIC-1588 HP SIDE DRAIN VALVE, 2-SRW-1199.

    b. **SHUT** 2A DIESEL GENERATOR SRW 2-PDIC-1588 LP SIDE DRAIN VALVE, 2-SRW-1200.

    c. **SHUT** 2A DIESEL GENERATOR SRW 2-PDIC-1588 EQUALIZING VALVE, 2-SRW-1198.

NOTE
This step will cause 2A DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1588-CV, to shut.

12. **SLOWLY ROTATE** the handle on INSTRUMENT AIR TO 2A DG SRW INLET 2-CV-1588 AUTO / VENT SELECTOR VALVE, 2-IA-1588-HV, 180° to the AUTO position.

13. **CHECK** 2A DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1588-CV, is SHUT.

14. **SLOWLY OPEN AND LOCK** OPEN, 21 SERVICE WATER HEADER SUPPLY TO 2A DIESEL GENERATOR ISOLATION VALVE, 2-SRW-509.

15. **REMOVE** vent rigs **AND INSTALL** caps on the following 2A DG SRW valves:

    - 2A DIESEL GENERATOR SRW 2-PDIC-1588 HP SIDE DRAIN VALVE, 2-SRW-1199
    - 2A DIESEL GENERATOR SRW 2-PDIC-1588 LP SIDE DRAIN VALVE, 2-SRW-1200
    - 2A DIESEL GENERATOR SRW SUPPLY HEADER VENT VALVE, 2-SRW-522
    - 2A DIESEL GENERATOR SRW RETURN HEADER VENT VALVE, 2-SRW-523

6.16.B Procedure (Continued)

16. **INDEPENDENTLY VERIFY** the following:

- 2A DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1588-CV, is SHUT.
- U-1 INSTRUMENT AIR TO 2A DG SRW INLET 2-CV-1588 AUTO / VENT SELECTOR VALVE, 2-IA-1588-HV, is in the AUTO position.

****** END ******

6.17 SHIFT 2A DG SRW FLOW CONTROLLER, 2-SRW-1588-PDIC, AUTO/MANUAL CONTROL

A. Initial Conditions

1. The Shift Manager has approved changing 2-SRW-1588-PDIC mode of operation.
2. 2A DG is operating.
3. Instrument Air is available.

B. Procedure

CAUTION
2A DG is considered inoperable if 2-SRW-1588-CV is **NOT** in Automatic Control.

1. **SHIFT** 2A DG SRW FLOW CONTROLLER, 2-SRW-1588-PDIC, from automatic to manual control as follows:
   a. Carefully **PULL** out the Regulator knob to unlock the regulator.

NOTE
The regulator knob should be turned in the direction that the Balance Indicator Ball needs to move.

   b. Slowly **TURN** the Regulator knob to move the Balance Indicator Ball to the middle of the Balance Indicator Tube.
   c. **PLACE** the MAN/AUTO selector in M (MAN).

NOTE
2A DG SRW FLOW CONTROLLER, 2-SRW-1588-PDIC, setpoint is 8.5 PSID.

CAUTION
Long term operation with excess flow through the coolers can cause vibrations affecting expansion joint reliability.

   d. **CONTROL** 2A DIESEL GENERATOR SEVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1588-CV, with the Regulator knob.

6.17.B Procedure (Continued)

2. **WHEN** desired,
THEN SHIFT 2A DG SRW FLOW CONTROLLER, 2-SRW-1588-PDIC, from manual to automatic control as follows:

   a. Slowly **TURN** the Setpoint knob to move the Balance Indicator Ball to the middle of the Balance Indicator Tube.

   b. **PLACE** the MAN/AUTO selector in A (AUTO).

   c. **IF** necessary, **ADJUST** the 2A DG SRW FLOW CONTROLLER, 2-SRW-1588-PDIC, setpoint to 8.5 PSID, using the Setpoint knob.

   d. **ENSURE** the regulator is LOCKED by pushing in on the Regulator knob.

****** END ******

6.18 MANUAL HANDWHEEL OPERATION OF 2-SRW-1588-CV

A. Initial Conditions

1. Operation of 2A DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1588-CV, without using the Air Supply is desired.

B. Procedure

CAUTION
2A DG is considered inoperable if 2-SRW-1588-CV is **NOT** in Automatic Control.

1. **ENGAGE** the handwheel as follows:

   a. **INFORM** the Control Room that failing open 2A DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1588-CV, may affect the SRW head tank levels.

NOTE
This step causes 2A DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1588-CV, to fail open.

   b. **ROTATE** the handle on U-1 INSTRUMENT AIR TO 2A DG SRW INLET 2-CV-1588 AUTO / VENT SELECTOR VALVE, 2-IA-1588-HV, 180° to the MANUAL position.

NOTE
The handwheel must be in the open position to ensure full range of valve travel.

   c. **ROTATE** the handwheel counterclockwise to the full OPEN position.

CAUTION
Attempting to operate the valve with air supplied to the actuator **AND** the handwheel engaged may result in damage to the actuator.

   d. **LIFT OUT AND ROTATE** the clutch handle (the flat rectangular plate in the center of the Position Indicator on the valve body) 90° , allowing it to fully seat in the indicator's deep slot to engage the handwheel mechanism.

   e. **SLOWLY ROTATE** the handwheel in either direction until the spring loaded center pin on the flat rectangular plate falls into the slot.

6.18.B.1 Procedure (Continued)

CAUTION
Long term operation with excess flow through the coolers can cause vibrations affecting expansion joint reliability.

f. **TURN** the handwheel in the desired direction as indicated on the valve handwheel.

2. **WHEN** desired,
THEN DISENGAGE the handwheel as follows:

a. **INFORM** the Control Room that manual operation of 2A DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1588-CV, may affect the SRW head tank levels.

b. **ROTATE** the handwheel until the valve is in the FULL OPEN position, at which point little resistance should be felt.

NOTE
It will be difficult to pull out the clutch handle if the handwheel mechanism is transmitting torque.

c. **LIFT** the clutch handle out of the deep slot, rotate it 90° , **AND SEAT** it in the indicator shallow slot to disengage the handwheel mechanism.

d. **LOCK** the clutch handle in the shallow slot.

e. **ROTATE** the handle on U-1 INSTRUMENT AIR TO 2A DG SRW INLET 2-CV-1588 AUTO / VENT SELECTOR VALVE, 2-IA-1588-HV, 180° to the AUTO position.

f. **CHECK** 2A DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1588-CV, shuts.

3. **ENSURE** IA & SWAC AIR SUPPLY TO 2-SRW-1588-CV ISOL VALVE, 2-IA-1394, is OPEN.

4. **INFORM** the Control Room that 2A DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1588-CV, is back in AUTO.

****** END ******

6.19 BLOW DOWN 2A DG DIESEL AIR START MOISTURE TRAPS

A. Initial Conditions

1. 2A DG Starting Air System is aligned **PER** ATTACHMENT 1B, 2A DIESEL GENERATOR VALVE LINEUP.

B. Procedure

1. **BLOWDOWN** the moisture traps as follows:

   a. **UNLOCK AND SLOWLY CRACK OPEN** the selected moisture trap bypass valve:

   - 2A DG STARTING AIR WEST AIR RECEIVER DRAIN TRAP BYPASS VALVE, 2A-DSA-130
   - 2A DG STARTING AIR EAST AIR RECEIVER DRAIN TRAP BYPASS VALVE, 2A-DSA-131

   b. **WHEN** the trap is free of moisture,
   THEN SHUT AND LOCK the selected moisture trap bypass valve: **[B0048]**

   - 2A DG STARTING AIR WEST AIR RECEIVER DRAIN TRAP BYPASS VALVE, 2A-DSA-130
   - 2A DG STARTING AIR EAST AIR RECEIVER DRAIN TRAP BYPASS VALVE, 2A-DSA-131

2. **IF** excessive moisture is noted,
   THEN SUBMIT an IR to have the affected trap cleaned **AND** inspected.

****** END ******

6.20 ADD LUBE OIL TO THE 2A DG LUBE OIL DAY TANK

A. Initial Conditions

1. 2A DG Lube Oil System valves are in the NORMAL alignment **PER** ATTACHMENT 1B, 2A DIESEL GENERATOR VALVE LINEUP.

B. Procedure

1. **VERIFY** lube oil type in the 55 gallon drums with the Oil Control Manual.
2. **CHECK** each 55 gallon drum of lube oil is sealed with a factory seal **OR** has a custody seal.
3. **IF** the quality of the lube oil is questioned,
   THEN PERFORM the following:
   a. **REJECT** the drum.
   b. **RETURN** the drum to the warehouse.
   c. **INITIATE** an Issue Report for the rejected drum.
4. **WHEN** lube oil is ready to be transferred,
   THEN MOVE the drum(s) to the 2A DG Room.
5. **ENSURE** drip pans are placed under hose connections.
6. **ENSURE** the temporary transfer hose is clean.
7. **CONNECT** a temporary transfer hose to the pipe stub of the hand-operated pump **OR** 2A DG LUBE OIL FILL SAMPLE ISOLATION VALVE, 2A-DLO-117.
8. **PERFORM** the following for each lube oil drum:
   a. **INSERT** the temporary transfer hose into the drum.
   b. **OPEN** 2A DG LUBE OIL DAY TANK FILL ISOLATION VALVE, 2A-DLO-113.
   c. **TRANSFER** the lube oil drum contents to the 2A DG Lube Oil Day Tank using a hand-operated **OR** electric transfer pump.
   d. **SHUT** 2A DG LUBE OIL DAY TANK FILL ISOLATION VALVE, 2A-DLO-113.
   e. **REMOVE** the temporary transfer hose from the drum.

> **NOTE**
> Excess oil addition will cause a 2A DG Lube Oil Day Tank high level alarm.

9. **WHEN** the desired level in the 2A DG Lube Oil Day Tank has been obtained,
   THEN STOP pumping.

6.20.B Procedure (Continued)

10. **IF** the entire contents of a drum were **NOT** transferred to the 2A DG Lube Oil Day Tank,
THEN INSTALL an appropriate locking device on the drum.

11. **REMOVE** the temporary transfer hose from the pipe stub of the hand-operated pump **OR** 2A DG LUBE OIL FILL SAMPLE ISOLATION VALVE, 2A-DLO-117.

12. **DRAIN** any waste from the drip pans **AND DISPOSE** of **PER** CH-1-101, Hazardous Waste Management.

13. **REMOVE** the drum(s) from the 2A Diesel Generator Room.

14. **LOG** the amount of lube oil added **AND** information from the drum custody or factory seals in the Safety Related Consumables Log in the Control Room.

****** END ******

6.21 2A DG STARTING AIR COMPRESSOR OPERATION

A. Initial Conditions

1. 2A DG Starting Air System is aligned **PER** ATTACHMENT 1B, 2A DIESEL GENERATOR VALVE LINEUP.

B. Procedure

1. **IF** manual operation is desired,
   THEN PERFORM the following:

   a. **ENSURE** adequate oil level in the air compressor.

   b. **PLACE AND HOLD** 2A DG AIR COMPRESSOR, 2-HS-4829, to START.

   c. **WHEN** air compressor shutdown is desired,
   THEN RELEASE 2A DG AIR COMPRESSOR, 2-HS-4829.

2. **IF** automatic operation is desired,
   THEN PERFORM the following:

   a. **ENSURE** adequate oil level in the air compressor.

   b. **ENSURE** MCC 2AG breaker Air Compressor, 52-2AG03, is ON.

3. **IF** operation of the 6 HP diesel engine Starting Air Compressor is desired,
   THEN GO TO the applicable section of Unit 1 OI-21B, 1B Diesel Generator.

****** END ******

6.22 REMOVE AND RESTORE 2A DG STARTING AIR COMPRESSOR FOR SERVICE

A. Initial Conditions

1. At least one other DG Starting Air Compressor is in service and lined up for automatic operation.

B. Procedure

CAUTION

Cross-connecting Air Receivers may allow receivers on the isolated compressor to drop below normal operating pressure. The air receivers should be checked frequently for proper pressure while cross-connected.

1. **REMOVE** 2A DG Starting Air Compressor from service as follows:

   a. **ENSURE** 2A DG STARTING AIR AIR COMPR TO WEST RECEIVER ISOLATION VALVE, 2A-DSA-101, is LOCKED OPEN.

   b. **ENSURE** 2A DG STARTING AIR AIR COMPR TO EAST RECEIVER ISOLATION VALVE, 2A-DSA-102, is LOCKED OPEN.

   c. **UNLOCK AND OPEN** RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-1.

   d. **UNLOCK AND OPEN** the selected cross connect valve:

      - RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-2

      OR

      - RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-3

   e. **OPEN** MCC 2AG breaker Air Compressor, 52-2AG03.

   f. UNLOCK **AND SHUT** 2A DG STARTING AIR COMPRESSOR DISCHARGE VALVE, 2A-DSA-1016.

6.22.B Procedure (Continued)

2. **WHEN** desired,
THEN RESTORE 2A DG Air Compressor to normal as follows: **[B0048]**

   a. **ENSURE** adequate oil level in the air compressor.

   b. **LOCK OPEN** 2A DG STARTING AIR COMPRESSOR DISCHARGE VALVE, 2A-DSA-1016.

   c. **CLOSE** MCC 2AG breaker Air Compressor, 52-2AG03.

   d. **SHUT AND LOCK** RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-1.

   e. **SHUT AND LOCK** the selected cross connect valve:

      - RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-2

      OR

      - RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-3

****** END ******

6.23 COLD WEATHER OPERATIONS [B0112]

A. Initial Conditions

1. 2A Diesel Generator room temperature is less than **OR** equal to 65° F.

B. Procedure

1. **ADJUST** the 2A Diesel Generator room thermostat setting to raise room temperature.

2. **IF** raising the thermostat setting fails to maintain room temperature, **THEN PERFORM** the following:

   a. **ENSURE** MN-1-110, Troubleshooting & Procedure Controlled Activities, is filled out for installation of a portable electric heater(s).

   b. **INSTALL** a portable electric heater(s) **PER** the following guidance:

      - **POSITION** the heater(s) facing West **AND NOT** facing the Control Panel.
      - Securely **FASTEN** the portable electric heater(s) to preclude any damage to other equipment due to a seismic event **PER** MN-1-106, Temporary Storage Of Equipment And Material.

   c. **INDEPENDENTLY VERIFY** the portable electric heater(s) has been installed correctly.

3. **IF** the portable electric heater(s) fails to maintain room temperature greater than 60° F, **THEN PERFORM** the following:

   a. **START AND LOAD** 2A Diesel Generator **PER** the following sections:

      (1) Section 6.3, 2A DG SLOW SPEED START

      (2) Section 6.6, PARALLEL 2A DIESEL GENERATOR

NOTE

Turning off the 2A DG Ventilation Fan after 2A Diesel Generator has been shutdown will help to maintain a higher room temperature.

   b. **WHEN** 2A Diesel Generator has run for at least an hour, **THEN STOP** 2A DG **PER** Section 6.8, 2A DG SHUTDOWN.

   c. **STOP** the 2A DG Room Ventilation Fan by momentarily placing its handswitch to the STOP position.

6.23.B Procedure (Continued)

4. **WHEN** the portable electric heater(s) is **NOT** needed,
   THEN PERFORM the following:

   a. **REMOVE** the portable electric heater(s).

   b. **INDEPENDENTLY VERIFY** that the portable electric heater(s) has been removed.

   c. **ENSURE** MN-1-110, Troubleshooting & Procedure Controlled Activities, is completed for removal of portable electric heater(s).

****** END ******

6.24 ROTATING 2A DIESEL GENERATOR WITH COMPRESSED AIR

A. Initial Conditions

1. 2A Diesel Generator has been prelubed **OR** run and requires barring-over.
2. Technical Specification 3.8.1 or 3.8.2 has been reviewed to determine Diesel Generator operability requirements.
3. 2A Diesel Generator has been shutdown more than 20 minutes and less than three hours.

B. Procedure

1. **IF** during the performance of this section, operation of the DG is needed (i.e. loss of Offsite Power),
   THEN return the DG to operation by performing the following:
   a. **ENSURE SHUT** 2A DG STARTING AIR AIR BAR THROTTLE VALVE, 2A-DSA-135.

NOTE
DG will start if Auto Start signal is present.

   b. **ENSURE** 2A DIESEL GENERATOR CONTROL MODE SELECTOR SWITCH, 2-HS-4839, in AUTO/REMOTE.
   c. **WHEN** DG is operating,
      THEN restore DG to normal by ensuring steps Steps 11 through 17 are complete.
2. **IF** 2A DG is operable,
   THEN ENSURE that Unit 2 ZB train equipment is operable **PER** OI-49, Operability Verification, prior to barring over the engine.

NOTE
2A DG is INOPERABLE when 2-HS-4839 is in LOCAL.

3. **ENSURE** 2A DG CONTROL MODE SELECTOR SWITCH, 2-HS-4839, in LOCAL.
4. **PLACE** 2A DG AIR BAR SWITCH, 2-HS-4860, in AIR BAR.
5. **SHUT** 2A DG STARTING AIR #14 **LOWER** BEARING OIL BOOSTER ISOLATION VALVE, 2A-DSA-138.
6. **OPEN** 2A DG STARTING AIR AIR BAR 2-PI-4820 ISOLATION, 2A-DSA-137.
7. **UNLOCK AND OPEN** 2A DG STARTING AIR AIR BAR ROOT VALVE, 2A-DSA-121.

6.24.B Procedure (Continued)

8. **OPEN** 2A DG STARTING AIR AIR BAR ISOLATION VALVE, 2A-DSA-136.

CAUTION
During Air-Bar, all DG East Air Receivers will supply air to 2A DG.

NOTE
The Air Bar valve must be opened quickly to prevent the DG from stalling.

9. **OPEN** 2A DG STARTING AIR AIR BAR THROTTLE VALVE, 2A-DSA-135, as needed to rotate the 2A Diesel Engine at least one revolution, **THEN SHUT** 2A DG STARTING AIR AIR BAR THROTTLE VALVE, 2A-DSA-135.

10. **WHEN** 2A DG has been rotated at least one revolution, **THEN PERFORM** steps 11 through 18.

11. **SHUT** 2A DG STARTING AIR AIR BAR ISOLATION VALVE, 2A-DSA-136.

12. **SHUT AND LOCK** 2A DG STARTING AIR AIR BAR ROOT VALVE, 2A-DSA-121.

13. **SHUT** 2A DG STARTING AIR AIR BAR 2-PI-4820 ISOLATION, 2A-DSA-137.

14. **OPEN** 2A DG STARTING #14 LOWER BEARING OIL BOOSTER ISOLATION VALVE, 2A-DSA-138.

15. **PLACE** the AIR BAR HANDSWITCH, 2-HS-4860, in NORMAL.

16. **PLACE** the 2A DIESEL GENERATOR CONTROL MODE SELECTOR SWITCH, 2-HS-4839, in AUTO/REMOTE **AND REMOVE** the key.

17. **INDEPENDENTLY VERIFY** that:

    a. The 2A DIESEL GENERATOR AIR BAR HANDSWITCH, 2-HS-4860, is in NORMAL.

    b. The 2A DIESEL GENERATOR CONTROL MODE SELECTOR SWITCH, 2-HS-4839, is in AUTO/REMOTE.

    c. 2A DG STARTING AIR AIR BAR ROOT VALVE, 2A-DSA-121, is LOCKED SHUT.

18. **NOTIFY** the Control Room that the 2A DG bar-over is complete.

****** END ******

6.25 RAPID SHUTDOWN OF THE 2A DIESEL

A. Initial Conditions

1. 2A DG is operating in parallel operation with 21 4KV Bus **OR** unloaded **AND** a condition exists that requires a rapid shutdown. 01900
2. Stopping 2A DG energizes the 2A DG Stopping Relay Timer and prevents all 2A DG starts for one minute. 01900
3. Do **NOT** stop two DGs at the same time. **[B0614]** 01900
4. The 2A DG is **NOT** in Local. 01900

B. Procedure

NOTE
Steps 1 and 2 may be worked in parallel 01900

1. **IF** 2A DG is running with a SIAS signal present,
   THEN ENSURE actuation modules are reset locally (at the ESFAS cabinets) prior to 2A DG shutdown. 01900

NOTE
2A DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls. 01900

2. **IF** 2A DG is in parallel operation with 21 4KV Bus,
   THEN REMOVE 2A DG load by performing the following: 01900

   a. **LOWER** MW **AND** KVAR loads concurrently to below 0.5 MW **AND** zero KVARs **PER** the following:

NOTE
Load may be lowered as rapidly as necessary. 01900

- **LOWER** MW load using 2A DG SPEED CONTR, 2-CS-2103. 01900
- **MAINTAIN** 0 to 500 KVARs using 2A DG AUTO VOLT CONTR, 2-CS-2102, **AND** FIGURE 1, DIESEL GENERATOR ELECTRICAL LIMITS.
- **MONITOR** 21 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**

   b. **WHEN** 2A DG load is less than 0.5 MW,
   THEN PLACE 2A DG OUT BKR, 2-CS-152-2103, to TRIP.

3. **MOMENTARILY PLACE** 2A DG UNIT PARALLEL, 2-CS-2104, to RESET. 01900

6.25.B Procedure (Continued)

4. **CHECK** 2A DG frequency is 60 Hz (58.8 to 61.2 Hz). 01900
   - 2A DG FREQUENCY, 2-SI-2101
5. **ADJUST** 2A DG voltage to greater than 4.16 KV (4.16 to 4.30 KV) using 2A DG AUTO VOLT CONTR, 2-CS-2102. 01900
   - 2A DG VOLTS, 2-EI-2122
6. **CHECK** annunciator "2A DG • POT VOLT • FREQ LO" is clear. 01900
7. **ENSURE** 2A DG ESFAS TEST SWITCH, 2-HS-4815, on DG local control/gage panel, in NORMAL. 01900
8. **DEPRESS** 2A DG STOP pushbutton , 2-HS-2125, to shutdown the engine. 01900
9. **ENSURE** SLOW START MODE SELECTOR, 2-HS-4825, in NORMAL. **[B0048]** 01900
10. **ENSURE** Prelube Pump is **NOT** running. 01900
11. **ENSURE** the following pumps are operating: 01900
    - Coolant Pump
    - Lube Oil Pump
12. **IF** 2A DG was in parallel operation with 21 4KV Bus, **THEN ENSURE** the CPS Generation Dispatcher is notified that the 2A Diesel is no longer paralleled. 01900

CAUTION
DO **NOT** allow the 2A DG room temperature to fall below 60° F. 01900

13. **IF** desired, **THEN STOP** the 2A DG Room Ventilation Fan by momentarily placing its handswitch to the STOP position. 01900

6.25.B Procedure (Continued)

NOTE

- 2A DG may remain in the Action Statement of T.S. 3.8.1 **OR** 3.8.2 until engine barring is complete.
- If barring is **NOT** performed within three hours of shutdown, its effectiveness is minimal. Therefore, barring is **NOT** required if conditions prohibit barring within three hours of engine shutdown.

01900

14. **IF** 2A DG is **NOT** scheduled to be manually restarted within three hours, **THEN CONSIDER** barring over 2A DG **PER** Section 6.9, MANUALLY BAR-OVER 2A DIESEL GENERATOR, **OR** Section 6.24, ROTATING 2A DIESEL GENERATOR WITH COMPRESSED AIR. **[B0048]**

01900

15. **NOTIFY** Plant Chemistry of the following:

01900

- 2A DG is shutdown
- Jacket Water Cooling System makeup or venting performed during operation

****** END ******

7.0 POST-PERFORMANCE ACTIVITIES

Upon completion of this procedure, forward the original(s) to the Operations Senior Administrative Assistant for retention **PER** PR-3-100, Records Management.

8.0 BASES

[B0022] Letter to J. Lohr from B. Lang, dated 12/19/89; describing why the DGs should be considered inoperable at a jacket coolant temperature of less than or equal to 90° F.

[B0024] **[B0110]** Corrective action for LER 92-005 required modifying the affected procedure to state that the Diesel Generator is OOS when its voltage regulator is in MANUAL.

[B0027] Memo to L. G. Getz from T. M. Delaney, dated 12/4/95; No prelube required if engine has been run or prelubed in the last 2 hours since excessive prelube conflicts with efforts to reduce exhaust system oil related fires. Unloaded operation should be minimized, especially beyond one hour. Loading DG slowly in increments reduces thermal stresses, protects against rapid loading of DG, and is recommended by the vendor.

[B0048] SOER 83-01 recommends prelubing engines prior to any start, recommendation 5-2; also, listing actions required to return DG to standby, recommendation 8-1.

[B0105] **PER** LER 91-007 (Unit 2), "Loss of Boration Flowpath due to a Fuse Failure", this procedure is to be performed when an FBM Diesel Generator is to be taken out of service and at least once every 8 hours while it remains out of service. Removing SRW to the DG renders it inoperable.

[B0112] POSRC outstanding item 91-165-04 and network item OE-4457, DG inoperable due to low room temp. This section added to ensure minimum DG room temperature for DG operability.

[B0114] Maintain 17 ft. 4 inches in #21 FOST. Due to the fact that #11 FOST is not protected from tornadoes, sufficient fuel oil must be stored in #21 FOST to support shutdown of both units during a loss of off-site power. Reference memo from System Engineer.

[B0120] Memo from R. A. Buttner of the Design Basis Unit, DBU-92-059, subject: "Plant Operating Voltage Ranges", lists the new 13KV, 4KV, and 480V Bus voltage limits. Previous calculations did not ensure adequate voltage at load terminals.

[B0138] NUMARC 91-06 "Guidelines for Industry Actions to Assess Shutdown Management and NRC Letter 88-17 recommended establishing communications between the SM/CRS and the System Operator-Bulk prior to removing a diesel generator from service.

8.0 BASES (Continued)

[B0154] AOP/EOP cross reference per NUREG 1358:

a. EOP-7, STATION BLACKOUT, refers to this OI for the restart of the 2A Diesel Generator with an auto start signal present.

b. AOP-3B, ABNORMAL SHUTDOWN COOLING CONDITIONS, refers to this OI for restart of th 2A Diesel Generator with an auto start signal present.

[B0614] SOER 99-01, Recommendation 2.c. Procedure guidance reflects the importance of timely resetting (rearming) of safety system electrical sequencing equipment following the return to grid power.

9.0 RECORDS

Records generated by this procedure shall be processed **PER** PR-3-100, Records Management.

10.0 ATTACHMENTS

A. TABLE 1, SHUTDOWN SEQUENCER LOADS

B. TABLE 2, 2A DG FUEL OIL DAY TANK VOLUME

C. TABLE 3, 2A DIESEL GENERATOR OPERATING PARAMETERS

D. FIGURE 1, DIESEL GENERATOR ELECTRICAL LIMITS

E. ATTACHMENT 1A, POST MAINTENANCE 2A DIESEL GENERATOR LINEUP CHECKS

F. ATTACHMENT 1B, 2A DIESEL GENERATOR VALVE LINEUP

SHUTDOWN SEQUENCER LOADS

21 4KV BUS SHUTDOWN SEQUENCER

The following table lists loads that receive a start signal from the 21 4KV Bus Shutdown Sequencer (SDS). The SDS operates when it has a Diesel Generator breaker closed to 21 4KV Bus.

21 SWGR A/C Compr#

21 Instr Air Compr#

21 Salt Water Pump

23 Salt Water Pump*

21 Service Water Pump

23 Service Water Pump*

* 23 Salt Water Pump and 23 Service Water Pump receive a start signal from the SDS only if the associated 21 pump fails to start after receiving an SDS start signal AND they are aligned to 21 4KV Bus..

\# These components receive a start permissive signal from the SDS.

2A DG FUEL OIL DAY TANK VOLUME

Inches	Gallons	Inches	Gallons
2*	0	22	255.1
3	7.1	23	270.1
4	15.5	24	285.0
5	24.8	25	299.8
6	35.0	26	314.5
7	45.9	27	328.9
8	57.5	28	343.2
9	69.6	29	357.2
10	82.2	30	370.8
11	95.3	31	384.1
12	108.7	32	397.0
13	122.5	33	409.5
14	136.6	34	421.4
15	151.0	35	432.7
16	165.5	36	443.3
17	180.2	37	453.2
18	195.1	38	462.2
19	210.0	39	470.1
20	225.0	40	476.7
21	240.1	41	481.5

* - Approximately 9 gallons of unusable fuel oil remains below the 2 inch level.

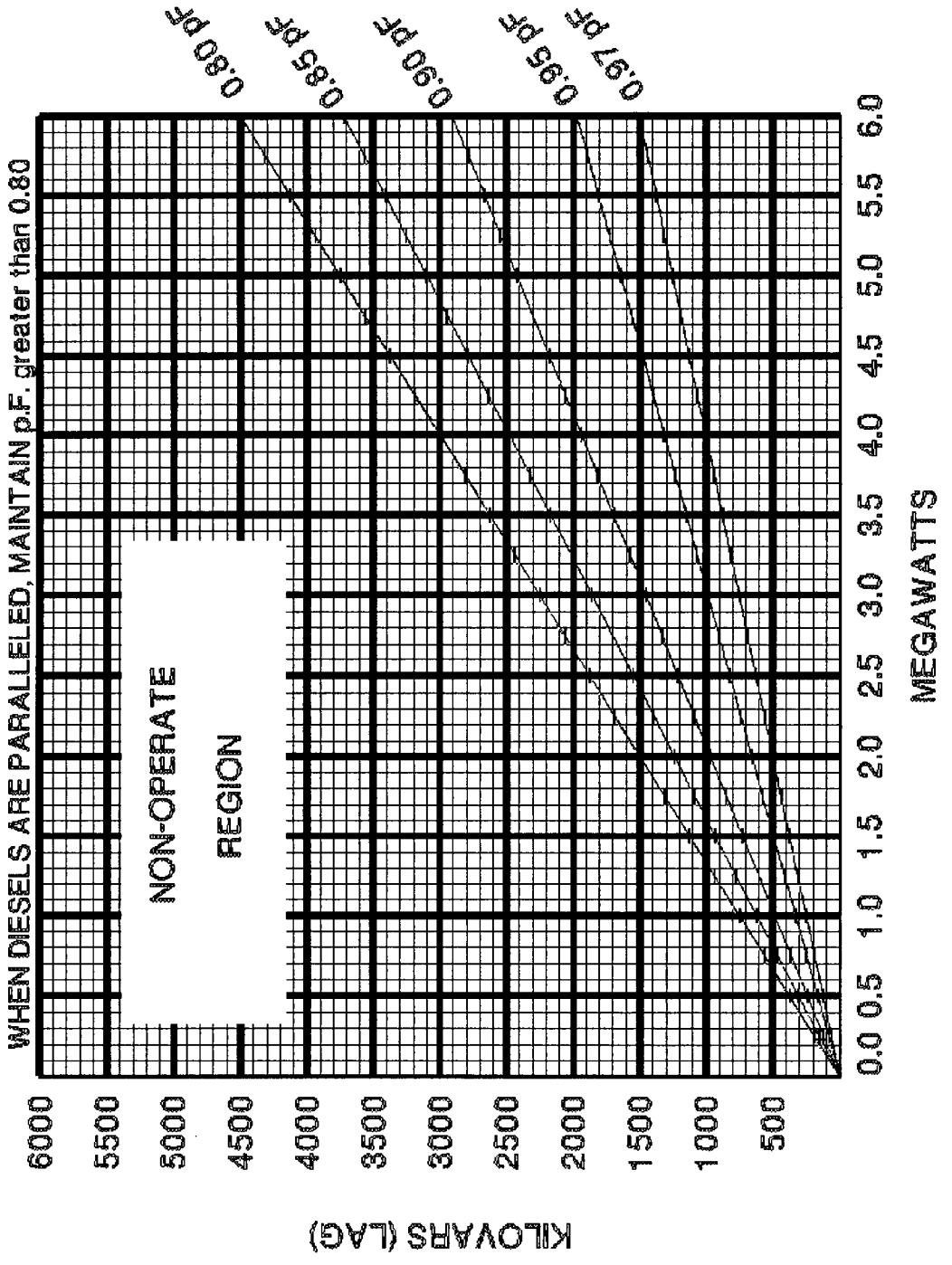
2A DIESEL GENERATOR OPERATING PARAMETERS

The following parameters apply to 2A Diesel Generator while operating. Contact the System Engineer if parameters approach OR exceed the specified values.

* Lube oil pressure to the engine	30 to 45 psig
* Lube oil temperature out of engine	170 to 195 degrees F
* Fuel oil pressure to the engine (red hand)	15 to 40 psig
* Jacket water pump discharge pressure	30 to 35 psig
* Crankcase vacuum	0.5 to 4.0 inches H2O
* Governor visible sightglass oil level (min)	1/2 full
* Jacket water engine diff temperature (max D/T) across the engine	10 degrees F
* Lube oil diff temp (max D/T)	30 degrees F
* Cylinder exhaust temp (max)	1000 degrees F
* Cylinder exhaust diff temperature (max D/T) between individual cylinders	250 degrees F
* Fuel oil filter diff press (max)	10 psid
* Lube oil filter diff press (max) with lube oil temp in operating range	18 psid
* Lube oil strainer diff press (max) with lube oil temp in operating range	12 psid

NOTE: Parameters will change due to 2A DG running time and load.

DIESEL GENERATOR ELECTRICAL LIMITS



POST MAINTENANCE 2A DIESEL GENERATOR LINEUP CHECKS

ENSURE 2A DG Standby conditions by performing the following:

		Condition	INIT/DATE
A.	1C20A in Control Room		
1.	2A DG Unit Parallel Switch 2-CS-2104	RESET (momentarily)	
2.	2A DG Volt Regulator Selector Sw, 2-HS-2123	AUTO	
B.	Panel 2C62B 2A DG Room		
1.	2A DG Governor Control	AUTO	
2.	2A DG Govenor Speed Control CS/SP	OFF	
3.	Lockout Relay Switch 186D-2A	RESET	
4.	2A DG Slow Start Mode Selector 2-HS-4825	NORMAL	
5.	2A DG Slow Start Sequence Keyswitch 2-HS-4864	NORMAL (KEY REMOVED)	
6.	Slow Start Sequence Light	LIGHT OUT	
C.	Panel 2C62C 2A DG Room		
1.	Voltage Regulator Man/Auto Selector	AUTO	
2.	2A DG Contr Mode Sel Switch, 2-HS-4839	AUTO-REMOTE (KEY REMOVED)	
D.	2A Diesel Engine Control Panel		
1.	Coolant Heater 2-HS-4802	AUTO	
2.	Coolant Pump 2-HS-4803	AUTO	
3.	Lube Oil Heater 2-HS-4779	AUTO	
4.	Lube Oil Pump 2-HS-4778	AUTO	
5.	Gen Space Heaters 2-HS-4847	AUTO	
6.	Pre Lube Pump 2-HS-4777	AUTO	
7.	ESFAS Test Switch 2-HS-4815	NORMAL	
8.	Air Bar Switch, 2-HS-4860	NORMAL	

POST MAINTENANCE 2A DIESEL GENERATOR LINEUP CHECKS

		Condition	INIT/DATE
E.	2A DG Governor		
1.	Speed Droop Control	0	_____
2.	Speed Setting Control	21	_____
3.	Load Limit Control	MAXIMUM	_____
4.	Gov. Oil Level	3/4 FULL MIN.	_____
F.	480V Diesel Gen MCC 2AG		
1.	Vent Fan 52-2AG01	ON	_____
2.	Transfer Pump 52-2AG02	ON	_____
3.	Air Compressor 52-2AG03 (N/A if Air Receivers are cross-connected)	ON	_____
4.	Engine Auxiliaries 52-2AG04	ON	_____
G.	DG Auxiliaries Breaker Panel		
1.	Coolant Heater (CB-1)	ON	_____
2.	Coolant Pump (CB-2)	ON	_____
3.	Lube Oil Heater (CB-3)	ON	_____
4.	Lube Oil Pump (CB-4)	ON	_____
5.	Pre-Lube Pump (CB-5)	ON	_____
6.	Generator Space Heater (CB-6)	ON	_____
7.	Hour Meter (CB-7)	ON	_____

POST MAINTENANCE 2A DIESEL GENERATOR LINEUP CHECKS

		Condition	INIT/DATE
H.	Miscellaneous 2A DG Switches		
1.	2A DG Fuel Oil Drip Tk Pp 2-HS-4853	AUTO	_____
2.	2A DG Exhaust Damper 2-HS-5430	AUTO or OPEN (circle one)	_____
I.	Miscellaneous Checks		
1.	2A DG Jacket Water Expansion Tank level	GREATER THAN 1/2 FULL	_____
2.	2A DG Fuel Oil Day Tank level	GREATER THAN 27 IN.	_____
3.	2A DG Air Compressor oil level	BETWEEN THE FULL AND ADD MARKS	_____
4.	2A DG Generator cooling air grilles (accessible)	OPEN AND NO DEBRIS	_____
5.	2-SRW-1588-CV Clutch Handle	SHALLOW SLOT	_____
6.	2A DG Crankcase oil level	NORMAL (NEAR FULL STOP)	_____
7.	2-SRW-1588-CV	AUTO	_____
8.	2A DG Air Receiver Press East Rcvr 2-PI-4830 West Rcvr 2-PI-4831	GREATER THAN 215 PSIG AND LESS THAN 245 PSIG	_____
9.	If performing a slow start, then PRIME 2A DG Fuel System with at least 3 strokes of manual priming pump	PRESSURE DEVELOPS ON 2A DG FUEL OIL STRNR DIFF PRESS, 2-PDI-4818	_____
10.	Jacking Bar	Jacking Bar REMOVED	_____

POST MAINTENANCE 2A DIESEL GENERATOR LINEUP CHECKS

NOTE: Sections J and K may be marked N/A if 2A DG will not be paralleled **OR** declared operable.

J. 4KV Electrical Lineup	Condition	INIT/DATE
1. 2A Diesel Generator Output Breaker, 152-2103	CONNECTED AND OPEN	_____
2. 2A DG OUT BKR, 2-CS-152-2103	NORMAL	_____
3. 2A Diesel Generator Disconnect to Bus 21, 189-2103	CLOSED AND LOCKED	_____
4. 2A Diesel Generator Disconnect to Bus 21, 189-2103A	CLOSED AND LOCKED	_____

K. 2A DG Alarm Panel

1. All alarms associated with 2A DG that are not clear	EXISTING ALARMS LISTED BELOW, INITIALED BY SM THAT AUTOMATIC OPERATION OF 2A DG IS **NOT** AFFECTED	_____

ALARM	CAUSE	SM INIT/DATE
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

NOTE: It is acceptable to perform a Slow Speed Start of the Diesel with a Low Lube Oil Temperature alarm present providing the Lube Oil sump is verified greater than or equal to 100 degrees F by contact pyrometer.

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DFO-121	LOCKED OPEN	2A DG FUEL OIL SUPPLY FROM HEADER # 1 ISOLATION VALVE	2A DG RM NW CORNER		
2A-DFO-122	LOCKED SHUT	2A DG FUEL OIL SUPPLY FROM HEADER # 2 ISOLATION VALVE	2A DG RM NW CORNER		
2A-DFO-123	----	2A DG FUEL OIL SUPPLY FROM HEADER # 2 CHECK VALVE	2A DG RM NW CORNER		
2A-DFO-124	----	2A DG FUEL OIL HAND PRIMING PUMP DISCHARGE CHECK VALVE	2A DG RM BEHIND GAGE BOARD		
2A-DFO-125	----	2A DG FUEL OIL COMBINED FUEL OIL PUMP DISCH CHECK VALVE	2A DG RM BEHIND GAGE BOARD		
2A-DFO-126	LOCKED OPEN	2A DG FUEL OIL ENGINE FUEL OIL SUPPLY ISOLATION VALVE	2A DG RM SE END OF DG		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DFO-127	SHUT	2A DG FUEL OIL DIRTY FUEL OIL DRAIN TANK DRAIN VALVE	2A DG RM UNDER DIRTY FO TK		
2A-DFO-136	----	2A DG FUEL OIL SUPPLY FROM HEADER # 1 CHECK VALVE	2A DG RM NW CORNER		
2A-DFO-138	LOCKED OPEN	2A DG FUEL OIL ENGINE SUPPLY FROM DAY TANK ISOLATION VALVE	2A DG RM BELOW DFO DAY TK		
2A-DFO-150	LOCKED SHUT	2A DG FUEL OIL DAY TANK DRAIN VALVE	2A DG RM BELOW DFO DAY TK		
2A-DFO-151	SHUT	2A DG FUEL OIL DAY TANK (SPRING CLOSED) BACKUP DRAIN VALVE	2A DG RM BELOW DFO DAY TK		
2A-DFO-152	SHUT	2A DG FUEL OIL TRANSFER PUMP SUCTION STRAINER FLUSH ISOLATION VALVE	2A DG DFO XFER PP SUCT		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DFO-153	SHUT	2A DG FUEL OIL PUMP SUCTION STRAINER FLUSH ISOLATION VALVE	2A DG 2' BELOW DFO DAY TK		
2A-DFO-154	SHUT	2A DG FUEL OIL DAY TANK VENT VALVE	2A DG RM ABOVE DFO DAY TK		
2A-DFO-155	SHUT	2A DG FUEL OIL SUPPLY HEADER TO DAY TANK DRAIN VALVE	2A DG RM BELOW DFO DAY TK		
2A-DFO-156	SHUT	2A DG FUEL OIL SUPPLY HEADER TO DAY TANK VENT VALVE	2A DG RM ABOVE DFO DAY TK		
2A-DFO-157	SHUT	2A DG FUEL OIL DRIP PUMP DISCHARGE VENT VALVE	2A DG RM W ABOVE DFO DAY TK		
2A-DFO-158	SHUT	2A DG FUEL OIL DRIP TANK DRAIN VALVE	2A DG RM W END DRIP TK		
2A-DFO-165	SHUT AND CAPPED	2A DG FUEL OIL NUMBER 1 CYLINDER TEST CONN ROOT VALVE	2A DG RM S OF CYLINDER #1		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DFO-166	SHUT AND CAPPED	2A DG FUEL OIL NUMBER 2 CYLINDER TEST CONN ROOT VALVE	2A DG RM S OF CYLINDER #2		
2A-DFO-167	SHUT AND CAPPED	2A DG FUEL OIL NUMBER 3 CYLINDER TEST CONN ROOT VALVE	2A DG RM S OF CYLINDER #3		
2A-DFO-168	SHUT AND CAPPED	2A DG FUEL OIL NUMBER 4 CYLINDER TEST CONN ROOT VALVE	2A DG RM S OF CYLINDER #4		
2A-DFO-169	NOT IN MID POSIT	2A DG FUEL OIL SUPPLY FILTER SELECTOR TRANSFER VALVE	2A DG RM ON DUPLEX		
2A-DFO-170	SHUT AND CAPPED	2A DG FUEL OIL NUMBER 5 CYLINDER TEST CONN ROOT VALVE	2A DG RM S OF CYLINDER #5		
2A-DFO-171	SHUT AND CAPPED	2A DG FUEL OIL NUMBER 6 CYLINDER TEST CONN ROOT VALVE	2A DG RM S OF CYLINDER #6		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DFO-172	SHUT AND CAPPED	2A DG FUEL OIL NUMBER 7 CYLINDER TEST CONN ROOT VALVE	2A DG RM S OF CYLINDER #7		
2A-DFO-173	SHUT AND CAPPED	2A DG FUEL OIL NUMBER 8 CYLINDER TEST CONN ROOT VALVE	2A DG RM S OF CYLINDER #8		
2A-DFO-174	SHUT AND CAPPED	2A DG FUEL OIL NUMBER 9 CYLINDER TEST CONN ROOT VALVE	2A DG RM S OF CYLINDER #9		
2A-DFO-175	SHUT AND CAPPED	2A DG FUEL OIL NUMBER 10 CYLINDER TEST CONN ROOT VALVE	2A DG RM S OF CYLINDER #10		
2A-DFO-176	SHUT AND CAPPED	2A DG FUEL OIL NUMBER 11 CYLINDER TEST CONN ROOT VALVE	2A DG RM S OF CYLINDER #11		
2A-DFO-177	SHUT AND CAPPED	2A DG FUEL OIL NUMBER 12 CYLINDER TEST CONN ROOT VALVE	2A DG RM S OF CYLINDER #12		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DFO-179	----	2A DG FUEL OIL TRANSFER PUMP DISCHARGE CHECK VALVE	2A DG RM DISCH OF TRANS PP		
2A-DFO-180	SHUT	2A DG FUEL OIL DAY TANK LS-4814, 4815, 4816, 4817 DRAIN VALVE	2A DG RM E END OF DFO DAY TK		
2A-DFO-1001	LOCKED OPEN	2A DG FUEL OIL DAY TANK LS-4814,4815,4816, 4817 UPPER ISOLATION VALVE	2A DG RM ON DAY TANK		
2A-DFO-1002	SHUT	2A DG FUEL OIL DAY TANK LS-4814,4815,4816, 4817 UPPER VENT VALVE	2A DG RM ON DFO DAY TK		
2A-DFO-1003	LOCKED OPEN	2A DG FUEL OIL DAY TANK LS-4814,4815,4816, 4817 LOWER ISOLATION VALVE	2A DG RM ON DAY TANK		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DFO-1004	OPEN	2A DG FUEL OIL DAY TANK LEVEL LI-4817 ROOT VALVE	2A DG RM ON DAY TANK		
2A-DFO-1005	OPEN	2A DG FUEL OIL DIRTY FUEL OIL DRAIN TK LG-4818 UPPER ISOLATION VALVE	2A DG RM E DIRTY FO TK		
2A-DFO-1006	OPEN	2A DG FUEL OIL DIRTY FUEL OIL DRAIN TK LG-4818 LOWER ISOLATION VALVE	2A DG RM AT DIRTY FO TK		
2A-DFO-1007	OPEN	2A DG FUEL OIL STRAINER PDI-4818 HP ROOT VALVE	2A DG RM VALVE STAND		
2A-DFO-1008	OPEN (1)	2A DG FUEL OIL STRAINER PDI-4818 HP BACKUP ROOT VALVE	2A DG RM VALVE STAND		
2A-DFO-1009	OPEN	2A DG FUEL OIL STRAINER PDI-4818 LP & PS-4818 ROOT VALVE	2A DG RM VALVE STAND		

(1) THROTTLE AS NEEDED TO DAMPEN GAGE OSCILLATIONS.

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DFO-1010	OPEN (1)	2A DG FUEL OIL STRAINER PDI-4818 LP & PS-4818 BACKUP ROOT VALVE	2A DG RM VALVE STAND		
2A-DFO-1013	OPEN	2A DG FUEL OIL DAY TANK LEVEL LI-4817 BACKUP ROOT VALVE	2A DG RM ON DAY TANK		
2A-DFO-1014	LOCKED SHUT	2A DG FUEL OIL DAY TANK LEVEL LI-4817 DRAIN VALVE	2A DG RM ON DAY TANK		
2A-DFO-4814-RV	----	2A DG FUEL OIL TRANSFER PUMP DISCHARGE RELIEF VALVE	2A DG RM ON XFER PP		
2A-DFO-4818-RV	----	2A DG FUEL OIL COMBINED FUEL OIL PUMP DISCH RELIEF VALVE	2A DG RM ON PUMP BEHIND GBRD		
0-DSA-1	LOCKED SHUT	RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE	2A DG RM E OF AIR RCVR		

(1) THROTTLE AS NEEDED TO DAMPEN GAGE OSCILLATIONS.

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DSA-101	LOCKED OPEN	2A DG STARTING AIR AIR COMPR TO WEST RECEIVER ISOLATION VALVE	2A DG RM E OF W AIR RCVR		
2A-DSA-102	LOCKED OPEN	2A DG STARTING AIR AIR COMPR TO EAST RECEIVER ISOLATION VALVE	2A DG RM E OF E AIR RCVR		
2A-DSA-103	LOCKED OPEN	2A DG STARTING AIR LOADLESS START ISOLATION VALVE	2A DG RM N OF COMPRESSOR		
2A-DSA-106	----	2A DG STARTING AIR WEST AIR RECEIVER INLET CHECK VALVE	2A DG RM E OF W AIR RCVR		
2A-DSA-107	----	2A DG STARTING AIR WEST AIR RECEIVER OUTLET CHECK VALVE	2A DG RM OUTLET W AIR RCVR		
2A-DSA-108	LOCKED OPEN	2A DG STARTING AIR WEST AIR RECEIVER OUTLET ISOLATION VALVE	2A DG RM OUTLET W AIR RCVR		
2A-DSA-109	LOCKED OPEN	2A DG STARTING AIR WEST AIR RECEIVER DRAIN VALVE	2A DG RM N OF W AIR RCVR		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DSA-110	----	2A DG STARTING AIR EAST AIR RECEIVER INLET CHECK VALVE	2A DG RM E OF EAST AIR RCVR		
2A-DSA-111	----	2A DG STARTING AIR EAST AIR RECEIVER OUTLET CHECK VALVE	2A DG RM OUTLET E AIR RCVR		
2A-DSA-112	LOCKED OPEN	2A DG STARTING AIR EAST AIR RECEIVER OUTLET ISOLATION VALVE	2A DG RM OUTLET E AIR RCVR		
2A-DSA-113	LOCKED OPEN	2A DG STARTING AIR EAST AIR RECEIVER DRAIN VALVE	2A DG RM N OF E AIR RCVR		
2A-DSA-114	LOCKED OPEN	2A DG STARTING AIR TO DIESEL START SV-4830 ISOLATION VALVE	2A DG RM N SIDE DG ON FLOOR		
2A-DSA-115	LOCKED OPEN	2A DG STARTING AIR TO DIESEL START SV-4830 BACKUP ISOLATION VALVE	2A DG RM N SIDE DG ON FLOOR		
2A-DSA-116	----	2A DG STARTING AIR TO DIESEL START SV-4830 CHECK VALVE	2A DG RM N SIDE DG ON FLOOR		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DSA-117	LOCKED OPEN	2A DG STARTING AIR TO DIESEL START SV-4831 ISOLATION VALVE	2A DG RM N SIDE DG ON FLOOR		
2A-DSA-118	LOCKED OPEN	2A DG STARTING AIR TO DIESEL START SV-4831 BACKUP ISOLATION VALVE	2A DG RM N SIDE DG ON FLOOR		
2A-DSA-119	----	2A DG STARTING AIR TO DIESEL START SV-4831 CHECK VALVE	2A DG RM N SIDE DG ON FLOOR		
2A-DSA-120	LOCKED SHUT	2A DG STARTING AIR CHECK VALVE TEST ISOLATION VALVE	2A DG RM N SIDE DG ON FLOOR		
2A-DSA-121	LOCKED SHUT	2A DG STARTING AIR AIR BAR ROOT VALVE	2A DG RM N SIDE DG ON FLOOR		
2A-DSA-122	LOCKED SHUT	2A DG STARTING AIR WEST RECEIVER CHECK VALVE TEST ISOLATION VALVE	2A DG RM SE OF W AIR RCVR		
2A-DSA-123	LOCKED SHUT	2A DG STARTING AIR EAST RECEIVER CHECK VALVE TEST ISOLATION VALVE	2A DG RM SE OF E AIR RCVR		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DSA-124	LOCKED SHUT	2A DG STARTING AIR STRAINER YS-4830 DRAIN VALVE	2A DG RM N SIDE DG ON FLOOR		
2A-DSA-125	LOCKED SHUT	2A DG STARTING AIR STRAINER YS-4831 DRAIN VALVE	2A DG RM N SIDE DG ON FLOOR		
2A-DSA-126	LOCKED OPEN	2A DG STARTING AIR TO DIESEL START SV-4830 ISOLATION VALVE	2A DG RM NE SIDE NEAR WALL		
2A-DSA-127	LOCKED OPEN	2A DG STARTING AIR TO DIESEL START SV-4831 ISOLATION VALVE	2A DG RM NE SIDE NEAR WALL		
2A-DSA-130	LOCKED SHUT	2A DG STARTING AIR WEST AIR RECEIVER DRAIN TRAP BYPASS VALVE	2A DG RM N OF W AIR RCVR		
2A-DSA-131	LOCKED SHUT	2A DG STARTING AIR EAST AIR RECEIVER DRAIN TRAP BYPASS VALVE	2A DG RM N OF E AIR RCVR		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DSA-132	LOCKED OPEN	2A DG STARTING AIR CHARGING X-CONN DRAIN TRAP ISOLATION VALVE	2A DG RM E OF COMPRESSOR		
2A-DSA-133	LOCKED SHUT	2A DG STARTING AIR CHARGING X-CONN DRAIN TRAP BYPASS VALVE	2A DG RM E OF COMPRESSOR		
2A-DSA-134	NOT VENTING	2A DG STARTING AIR EAST AIR RECEIVER HEADER MANUAL START VALVE	2A DG RM N SIDE DG ON FLOOR		
2A-DSA-135	SHUT	2A DG STARTING AIR AIR BAR THROTTLE VALVE	2A DG RM N SIDE OF DG		
2A-DSA-136	SHUT	2A DG STARTING AIR AIR BAR ISOLATION VALVE	2A DG RM N SIDE OF DG		
2A-DSA-137	SHUT	2A DG STARTING AIR AIR BAR 2-PI-4820 ISOLATION VALVE	2A DG RM N SIDE OF DG		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DSA-138	OPEN	2A DG STARTING AIR #14 BEARING OIL BOOSTER ISOLATION VALVE	2A DG RM N SIDE OF DG		
2A-DSA-1002	LOCKED OPEN	2A DG STARTING AIR EAST AIR HEADER SENSING LINE ISOLATION VALVE	2A DG RM E OF COMPRESSOR		
2A-DSA-1003	LOCKED SHUT	2A DG STARTING AIR WEST AIR HEADER SENSING LINE ISOLATION VALVE	2A DG RM E OF COMPRESSOR		
2A-DSA-1004	LOCKED OPEN	2A DG STARTING AIR EAST AIR HEADER PI & PS-4842 ROOT VALVE	2A DG RM ON VALVE STAND		
2A-DSA-1005	LOCKED OPEN	2A DG STARTING AIR EAST AIR HEADER PI & PS-4842 BACKUP ROOT VALVE	2A DG RM ON VALVE STAND		
2A-DSA-1006	LOCKED OPEN	2A DG STARTING AIR WEST AIR HEADER PI & PS-4841 ROOT VALVE	2A DG RM ON VALVE STAND		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DSA-1007	LOCKED OPEN	2A DG STARTING AIR WEST AIR HEADER PI & PS-4841 BACKUP ROOT VALVE	2A DG RM ON VALVE STAND		
2A-DSA-1008	LOCKED OPEN	2A DG STARTING AIR WEST AIR RECEIVER PS-4829A ROOT VALVE	2A DG RM N OF W AIR RCVR		
2A-DSA-1009	LOCKED OPEN	2A DG STARTING AIR EAST AIR RECEIVER PS-4829 ROOT VALVE	2A DG RM N OF E AIR RCVR		
2A-DSA-1010	LOCKED OPEN	2A DG STARTING AIR EAST AIR RECEIVER PS-4829 BACKUP ROOT VALVE	2A DG RM N OF W AIR RCVR		
2A-DSA-1011	LOCKED OPEN	2A DG STARTING AIR WEST AIR RECEIVER PS-4829A BACKUP ROOT VALVE	2A DG RM N OF W AIR RCVR		
2A-DSA-1012	LOCKED SHUT	2A DG STARTING AIR EAST AIR RECEIVER PS-4829 VENT VALVE	2A DG RM N OF W AIR RCVR		
2A-DSA-1013	LOCKED SHUT	2A DG STARTING AIR WEST AIR RECEIVER PS-4829A VENT VALVE	2A DG RM N OF W AIR RCVR		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DSA-1014	OPEN	2A DG STARTING AIR EAST AIR RECEIVER PI-4830 ROOT VALVE	2A DG RM ON E AIR RCVR		
2A-DSA-1015	OPEN	2A DG STARTING AIR WEST AIR RECEIVER PI-4831 ROOT VALVE	2A DG RM ON W AIR RCVR		
2A-DSA-1016	LOCKED OPEN	2A DG STARTING AIR COMPRESSOR DISCHARGE VALVE	2A DG RM NE CORNER @ COMPR		
2A-DSA-4810-PCV	----	2A DG STARTING AIR AIR COMPRESSOR HYDRAULIC UNLOADER VALVE	2A DG RM ON COMPRESSOR		
2A-DSA-4823-PCV	----	2A DG STARTING AIR #14 BEARING OIL BOOSTER PCV	2A DG RM N SIDE OF DG		
2A-DSA-4829-RV	----	2A DG STARTING AIR COMPRESSOR DISCHARGE RELIEF VALVE	2A DG RM W OF COMPRESSOR		
2A-DSA-4830-CV	----	2A DG STARTING AIR DIESEL AIR START CONTROL VALVE	2A DG RM N DG NEAR FLOOR		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DSA-4830-RV	----	2A DG STARTING AIR EAST AIR RECEIVER RELIEF VALVE	2A DG RM ON E AIR RCVR		
2A-DSA-4830-SV	----	2A DG STARTING AIR DIESEL AIR START SOLENOID VALVE	2A DG RM N END DG AT FLOOR		
2A-DSA-4831-CV	----	2A DG STARTING AIR DIESEL AIR START CONTROL VALVE	2A DG RM N DG NEAR FLOOR		
2A-DSA-4831-RV	----	2A DG STARTING AIR WEST AIR RECEIVER RELIEF VALVE	2A DG RM ON W AIR RCVR		
2A-DSA-4831-SV	----	2A DG STARTING AIR DIESEL AIR START SOLENOID VALVE	2A DG RM N END DG AT FLOOR		
2A-DSA-4832-SV	----	2A DG STARTING AIR DIESEL AIR START HEADER SOLENOID VENT VALVE	2A DG RM N END DG AT FLOOR		
2A-SCA-1001	OPEN	2A DG SCAVENGING AIR PRESSURE PI-4772 ROOT VALVE	2A DG RM E OF GAGE BOARD		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-SCA-1002	OPEN	2A DG SCAVENGING AIR PRESSURE PI-4772 BACKUP ROOT VALVE	2A DG RM @ GAGE BOARD		
2A-DLO-100	LOCKED SHUT	2A DG LUBE OIL DAY TANK DRAIN VALVE	2A DG RM UNDER DLO DAY TK		
2A-DLO-101	LOCKED OPEN	2A DG LUBE OIL DAY TANK TO ENGINE SUMP ISOLATION VALVE	2A DG RM S END ON FLOOR		
2A-DLO-102	LOCKED SHUT	2A DG LUBE OIL FILTER TO ENGINE SUMP DRAIN VALVE	2A DG RM E OF LO FILTER		
2A-DLO-103	LOCKED SHUT	2A DG LUBE OIL COOLER TO ENGINE SUMP DRAIN VALVE	2A DG RM N & UNDER LO CLR		
2A-DLO-104	LOCKED SHUT	2A DG LUBE OIL STRAINER DRAIN VALVE	2A DG RM ON STRAINER		
2A-DLO-105	LOCKED SHUT	2A DG LUBE OIL STRAINER TO ENGINE SUMP DRAIN VALVE	2A DG RM S OF STRAINER		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DLO-106	----	2A DG PRELUBE PUMP OUTLET CHECK VALVE	2A DG RM @ DISCH OF PP		
2A-DLO-107	LOCKED SHUT	2A DG ENGINE SUMP DRAIN VALVE	2A DG RM N END UNDER DECK		
2A-DLO-108	LOCKED OPEN	2A DG ELECTRIC STANDBY LUBE OIL CIRCULATING PUMP SUCTION VALVE	S OF DG UNDER DECK		
2A-DLO-109	(2)	2A DG ELECTRIC STANDBY LUBE OIL CIRCULATING PUMP OUTLET 3-WAY VALVE	2A DG RM S END UNDER DECK		
2A-DLO-110	LOCKED SHUT	2A DG ELECTRIC STANDBY LUBE OIL CIRCULATING PUMP OUTLET DRAIN VALVE	2A DG RM S DG ON FLOOR		
2A-DLO-111	----	2A DG LUBE OIL HEATER OUTLET CHECK VALVE	2A DG RM @ OUTLET OF HTR		
2A-DLO-112	OPEN	2A DG PRELUBE PUMP SUCTION VALVE	2A DG RM BELOW HTR		

(2) 3-WAY VALVE NORMALLY LINED UP TO PASS OIL FROM STANDBY CIRC PUMP TO LO HEATER.

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DLO-113	SHUT	2A DG LUBE OIL DAY TANK FILL ISOLATION VALVE	2A DG RM BELOW DLO DAY TK		
2A-DLO-115	LOCKED SHUT	2A DG LUBE OIL FILTER DRAIN VALVE	2A DG RM ON LO FILTER		
2A-DLO-116	LOCKED SHUT	2A DG LUBE OIL DAY TANK SAMPLE ISOLATION VALVE	2A DG RM S END ON FLOOR		
2A-DLO-117	SHUT	2A DG LUBE OIL FILL SAMPLE ISOLATION VALVE	2A DG RM BELOW DLO DAY TK		
2A-DLO-118	----	2A DG LUBE OIL TO TURBOCHARGER CHECK VALVE	2A DG RM NW END UNDER TURBO		
2A-DLO-120	LOCKED SHUT	2A DG LUBE OIL COOLER OUTLET TEST CONN ISOLATION VALVE	2A DG RM SW CRNR OF DG		
2A-DLO-1001	OPEN	2A DG LUBE OIL DAY TANK HIGH LS-4780, 4781 UPPER ISOLATION VALVE	2A DG RM W OF DLO DAY TK		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DLO-1002	SHUT	2A DG LUBE OIL DAY TANK LS-4780, 4781 VENT VALVE	2A DG RM W OF DLO DAY TK		
2A-DLO-1003	OPEN	2A DG LUBE OIL DAY TANK LOW LS-4780, 4781 LOWER ISOLATION VALVE	2A DG RM W OF DLO DAY TK		
2A-DLO-1004	LOCKED OPEN	2A DG LUBE OIL PI-4780 & PS-4779,4780,4781, 4782 ROOT VALVE	2A DG RM VALVE STAND		
2A-DLO-1005	LOCKED OPEN	2A DG LUBE OIL PI-4780 & PS-4779,4780,4781, 4782 BACKUP ROOT VALVE	2A DG RM VALVE STAND		
2A-DLO-1006	OPEN	2A DG LUBE OIL FILTER PDI-4778 LP ROOT VALVE	2A DG RM ON DLO FILT		
2A-DLO-1007	OPEN	2A DG LUBE OIL STRAINER PDI-4779 LP ROOT VALVE	2A DG RM ON DLO STRN		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DLO-1008	LOCKED OPEN	2A DG CRANKCASE PRESSURE TRIP PS-4783 ROOT VALVE	2A DG RM NE CORNER		
2A-DLO-1009	LOCKED OPEN	2A DG CRANKCASE PRESSURE TRIP PS-4784 ROOT VALVE	2A DG RM NE CORNER		
2A-DLO-1010	LOCKED OPEN	2A DG CRANKCASE PRESSURE TRIP PS-4785 ROOT VALVE	2A DG RM NE CORNER		
2A-DLO-1011	LOCKED OPEN TO CRANKCASE	2A DG CRANKCASE PRESSURE SELECTOR ISOLATION VALVE	2A DG RM NE CORNER		THIS SELECTOR VALVE IS NOT TO BE USED FOR ISOLATION
2A-DLO-1012	OPEN	2A DG CRANKCASE VACUUM PI-4797 ROOT VALVE	2A DG RM VALVE STAND		
2A-DLO-1013	OPEN	2A DG CRANKCASE VACUUM PI-4797 BACKUP ROOT VALVE	2A DG RM VALVE STAND		
2A-DLO-1014	SHUT	2A DG LUBE OIL DAY TANK LS-4780, 4781 DRAIN VALVE	2A DG RM W DLO DAY TK		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DLO-1015	OPEN	2A DG LUBE OIL FILTER PDI-4778 HP ROOT VALVE	2A DG RM ON DLO FILT		
2A-DLO-1016	OPEN	2A DG LUBE OIL STRAINER PDI-4779 HP ROOT VALVE	2A DG RM ON DLO STRN		
2A-DLO-4775-RV	----	2A DG LUBE OIL SUPPLY TO TURBOCHARGER RELIEF VALVE	2A DG RM UNDER N TURBO N END		
2A-DLO-4778-TCV	----	2A DG LUBE OIL COOLER TEMPERATURE CONTROL VALVE	2A DG RM ON LO CLR		
2A-DLO-4779-RV	----	2A DG ELECTRIC MOTOR DRIVEN PRELUBE PUMP RELIEF VALVE	2A DG RM ON PRELUBE PP		INTERNAL TO PUMP
2A-DLO-4780-LCV	----	2A DG ENGINE SUMP LEVEL CONTROL VALVE	S OF DG SUMP		
2A-DLO-4780-RV	----	2A DG STANDBY LUBE OIL CIRCULATING PUMP RELIEF VALVE	2A DG RM ON TOP OF PUMP		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DCW-101	SHUT	2A DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE	2A DG RM NEXT TO EXP TK		
2A-DCW-102	LOCKED SHUT	2A DG JACKET WATER COOLING EXPANSION TANK DRAIN VALVE	2A DG RM UNDER EXP TK		
2A-DCW-103	SHUT	2A DG JACKET WATER COOLING TEMPERATURE CONTROL VLV 4802 BYPASS VALVE	2A DG RM ABOVE JCW COOLER		
2A-DCW-104	LOCKED SHUT	2A DG JACKET WATER COOLING JACKET WATER COOLER DRAIN VALVE	2A DG RM E OF AIR CLR		
2A-DCW-105	SHUT	2A DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE	2A DG RM W ON TOP CLR		
2A-DCW-106	----	2A DG JACKET WATER COOLING JACKET WATER COOLER OUTLET CHECK VALVE	2A DG RM W OF TURBOCHARGER		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DCW-107	LOCKED SHUT	2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE	2A DG RM NE OF AIR CLR		
2A-DCW-108	LOCKED OPEN	2A DG JACKET WATER COOLING ELECTRIC JACKET COOLING PUMP SUCTION VALVE	2A DG RM SW CORNER BY HTR		
2A-DCW-109	LOCKED OPEN	2A DG JACKET WATER COOLING ELECTRIC JACKET COOLING PUMP DISCHARGE VALVE	2A DG RM SW BY HTR		
2A-DCW-110	LOCKED OPEN	2A DG JACKET WATER COOLING HEATED WATER SUPPLY TO AIR CLR ISOLATION VALVE	2A DG RM NW OF DG		
2A-DCW-111	SHUT	2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE	2A DG RM NW BELOW AIR CLR		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DCW-112	----	2A DG JACKET WATER COOLING AIR CLR HEAT EXCHANGER OUTLET CHECK VALVE	2A DG RM W OF DLO STRN		
2A-DCW-113	LOCKED SHUT	2A DG JACKET WATER COOLING AIR COOLING SYSTEM DRAIN VALVE	2A DG RM N OF CONTROL PANEL		
2A-DCW-114	LOCKED SHUT	2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER DRAIN VALVE	2A DG RM N OF CONTROL PANEL		
2A-DCW-115	SHUT	2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE	2A DG RM ABOVE AIR CLR		
2A-DCW-116	LOCKED SHUT	2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE	2A DG RM N OF CONTROL PANEL		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DCW-117	LOCKED SHUT	2A DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE	2A DG RM SW BY HEATER		
2A-DCW-120	LOCKED OPEN	2A DG JACKET WATER COOLING JACKET WATER RET FROM TURBO ISOLATION VALVE	2A DG E OF N TURBOCHARGER		
2A-DCW-121	LOCKED SHUT	2A DG JACKET WATER COOLING JACKET WTR CLR OUTLET TEST CONN ISOLATION VALVE	2A DG RM IN NW CORNER OF DG		
2A-DCW-122	LOCKED SHUT	2A DG JACKET WATER COOLING AIR COOLER HX OUTLET TEST CONN ISOLATION VALVE	2A DG RM IN NW CORNER OF DG		
2A-DCW-123	----	2A DG JACKET WATER COOLING AIR COOLER HX OUTLET CHECK VALVE	2A DG RM IN NW CORNER		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DCW-1001	LOCKED OPEN	2A DG JACKET WATER COOLING LOW PRESS TRIP PS-4802, 4803 & 4804 ROOT VALVE	2A DG RM NEAR VALVE STAND		
2A-DCW-1002	LOCKED OPEN	2A DG JACKET WATER COOLING LOW PRESS TRIP PS-4802, 4803 & 4804 BACKUP ROOT VALVE	2A DG RM ON VALVE STAND		
2A-DCW-1003	LOCKED SHUT	2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER DRAIN VALVE	2A DG RM NW BELOW AIR CLR		
2A-DCW-1004	LOCKED OPEN	2A DG JACKET WATER COOLING AIR COOLING HX PS-4775 ROOT VALVE	2A DG RM NW BELOW AIR CLR		
2A-DCW-1005	OPEN	2A DG JACKET WATER COOLING ENGINE DRIVEN PUMP PI-4802 BACKUP ROOT VALVE	2A DG RM NEAR VALVE STAND		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DCW-1006	OPEN	2A DG JACKET WATER COOLING ENGINE DRIVEN PUMP PI-4802 ROOT VALVE	2A DG RM AT VALVE STAND		
2A-DCW-1007	OPEN	2A DG JACKET WATER COOLING EXPANSION TANK LI-4802 LOWER ISOLATION VALVE	2A DG RM ON EXP TK		
2A-DCW-1008	OPEN	2A DG JACKET WATER COOLING EXPANSION TANK LI-4802 UPPER ISOLATION VALVE	2A DG RM ON EXP TK		
2A-DCW-1009	OPEN	2A DG JACKET WATER COOLING INTERCOOLER AIR COOLANT PI-4775 ROOT VALVE	2A DG RM NW CORNER OF DG		
2A-DCW-1010	LOCKED OPEN	2A DG JACKET WATER COOLING LOW COOLANT PRESS TRIP PS-4802 ISOLATION VALVE	2A DG RM INSIDE GAGE BOARD		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2A-DCW-1011	LOCKED OPEN	2A DG JACKET WATER COOLING LOW COOLANT PRESS TRIP PS-4803 ISOLATION VALVE	2A DG RM INSIDE GAGE BOARD		
2A-DCW-1012	LOCKED OPEN	2A DG JACKET WATER COOLING LOW COOLANT PRESS TRIP PS-4804 ISOLATION VALVE	2A DG RM INSIDE GAGE BOARD		
2A-DCW-1013	OPEN	2A DG JACKET WATER COOLING INTERCOOLER AIR COOLANT PI-4775 BACKUP ROOT VALVE	2A DG RM NW OF DG		
2A-DCW-4775-TCV	----	2A DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER TEMPERATURE CONTROL VALVE	2A DG RM E OF AIR COOLER		
2A-DCW-4802-TCV	----	2A DG JACKET WATER COOLING JACKET WATER COOLER TEMPERATURE CONTROL VALVE	2A DG RM ABOVE COOLER		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2-HVAC-5429-PO	----	2A DIESEL GENERATOR ROOM VENTILATION EXHAUST DAMPER	2A DIESEL GEN RM OVER DOOR		
2-HVAC-5429B-PO	----	2A DIESEL GENERATOR ROOM VENTILATION EXHAUST DAMPER	2A DIESEL GEN RM OVER DOOR		
2-HVAC-5429-SV	----	2A DIESEL GENERATOR ROOM VENTILATION EXHAUST DAMPER SOLENOID VALVE	2A DIESEL GEN RM WEST WALL		
2-HVAC-5430-PO	----	2A DIESEL GENERATOR ROOM VENTILATION FAN RECIRC DAMPER	2A DIESEL GEN RM OVHD		
2-HVAC-5430A-PO	----	2A DIESEL GENERATOR ROOM VENTILATION FAN SUPPLY DAMPER	2A DIESEL GEN RM OVHD		

ATTACHMENT 1B
2A DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2-HVAC-5430-SV	----	2A DIESEL GENERATOR ROOM VENT FAN SUPPLY/RECIRC DAMPER SOLENOID VALVE	2A DIESEL GEN RM W WALL		

CALVERT CLIFFS NUCLEAR POWER PLANT

UNIT ONE

OI-21B

1B DIESEL GENERATOR

REVISION 18

SAFETY RELATED

CONTINUOUS USE

Approval Authority: Tim Riti

Effective Date: 1/15/2008

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1.0 PURPOSE

This procedure provides the prerequisites, precautions, and instructions for the starting, loading, and shutdown operation of 1B Diesel Generator and associated auxiliary systems.

2.0 APPLICABILITY/SCOPE

A. This procedure provides specific instructions for operation of 1B Diesel Generator.

B. This procedure provides specific instructions for operation of 1B Diesel Generator auxiliary and support systems.

C. Conditional steps may be marked N/A if the condition does not exist or apply.

D. Signature blocks are provided for placekeeping in the slow start sections. Steps shall be initialed immediately upon completion.

3.0 REFERENCES AND DEFINITIONS

3.1 DEVELOPMENTAL REFERENCES

A. P&ID

1. OM-79 (60-736-E), Fuel Oil Storage System

2. OM-69 (60-727-E, Sht 2), Diesel Generator Cooling Water, Starting Air, Fuel, & Lube Oil Diesel Generator No. 1B

3.2 PERFORMANCE REFERENCES

A. MN-1-110, Procedure Controlled Activities

B. MN-1-106, Temporary Storage Of Equipment And Material

C. NO-1-205, Locked Valves

D. OI-15, Service Water System

E. OI-21D, Fuel Oil Storage And Supply

F. OI-26A, 125 Volt Vital DC

G. OI-27B, 13.8 KV System

H. OI-27C, 4.16 KV System

I. OI-27D, Station Power 480 Volt System

J. OI-49, Operability Verification

K. EDG-10, Woodward Governor Oil Change

3.2 PERFORMANCE REFERENCES (Continued)

L. EDG-20, Emergency Diesel Generator Inspection

M. STP O-8B-1, Test of 1B DG And 14 4KV Bus LOCI Sequencer

N. STP O-90-1, AC Sources And On Site Power Distribution Systems 7 Day Operability Verification

3.3 DEFINITIONS

A. FBM - Fairbanks Morse diesel generator

B. Elective maintenance - any activity to repair or maintain equipment where the equipment is operable/fully functional prior to performing the activity. Surveillance testing is **NOT** considered maintenance for this purpose.

4.0 PREREQUISITES

Prerequisites will vary depending on which section of the procedure is being performed. Prerequisites for each section will be listed as Initial Conditions at the beginning of the applicable section.

5.0 PRECAUTIONS

A. The Overspeed Trip Mechanism must be latched for 1B DG to be considered operable. Whenever the fuel rack is tripped **AND** reset, 1B DG shall be started **AND** loaded for at least 1 hour.

B. Underfrequency/reverse power protection/loss of field (194 Device) is bypassed when 1B DG CONTR MODE SEL SW, 1-HS-4840, is in the LOCAL position.

C. In the event 1B DG fails to start on an automatic or manual start signal **OR** has a load demand failure, submit an Issue Report to document the failure.

D. Stop the engine if severe vibration **OR** unusual noises occur.

E. 1B DG should be shutdown as soon as possible if the 1B DG room ventilation system fails to maintain 1B DG room temperature less than or equal to 120° F.

F. 1B DG shall be considered inoperable for any of the following:

- 1B DG Voltage Regulator is selected to MANUAL. **[B0024][B0110]**
- The 1B DG Room Ventilation Fan is inoperable.
- 1-SRW-1588-PDIC is **NOT** in AUTOMATIC or 1-SRW-1588-CV Manual Handwheel is engaged.
- 1B DG Fuel Oil Transfer Pump is inoperable.
- 1B DG Jacket Water System temperature is less than 90° F. **[B0022]**

5.0 PRECAUTIONS (Continued)

G. An operability verification of all redundant systems, **PER** OI-49, Operability Verification, **AND** STP O-90-1, AC Sources And On Site Power Distribution Systems 7 Day Operability Verification, must be performed as listed below **AND** once every 8 hours while 1B DG remains inoperable (STP 0-90 is **NOT** required in Modes 5, 6 or defueled): **[B0105]**

- Prior to removing 1B DG from operable status for planned maintenance or testing

OR

- Within one hour of discovery if 1B DG malfunctions **OR** is found to be inoperable

H. Notify the Shift Manager if an oil spill occurs anywhere on company property. This limit applies to ALL spills, even if contained.

I. Locked Valves are controlled by NO-1-205.

J. Minimize the time 1B DG air compressor is operated with the aftercooler out of service.

K. If a Safety Injection Actuation Signal (SIAS) has started 1B DG automatically, **OR** if both the NORMAL and the ALTERNATE feeder breakers to 14 4KV bus are open, then Jacket Coolant Temperature and Pressure Trips and Crankcase Pressure Trips are bypassed. Close attention to these parameters in this condition is necessary.

L. Prior to taking 1B DG out of service, EXCEPT for short periods such as for barring over 1B DG, the CRS or Shift Manager must perform the following actions: **[B0138]** (Basis INPO SER 10-91 Loss of Offsite Power due to Switchyard Testing)

- Contact the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts.

- Determine whether other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

- **IF** 1B DG will be out of service at the same time reliability of the offsite power supplies is reduced,
  THEN the Shift Manager will determine how to minimize both the time 1B DG is out of service **AND** the time that offsite power supplies are at reduced reliability.

5.0 PRECAUTIONS (Continued)

M. In Modes 1, 2, 3, and 4, to ensure defense in depth, the following actions should be performed anytime 1B DG is out of service for greater than 72 hours, **AND SHALL** be performed prior to removing 1B DG from service for elective maintenance greater than 72 hours. **[B0906]**

NOTE
Patuxent River Naval Air Station is the preferred source for the weather report. However, any government sponsored weather agency may be used.

- Weather conditions will be evaluated within 12 hours prior to removing 1B DG from service. 1B DG will **NOT** be removed from service if official weather forecasts are predicting severe conditions for CCNPP or any of the 500 KV transmission lines rights of way.
  - Severe Thunderstorm
  - Gale/High Wind - greater than 50 mph
  - Tornado
  - Hurricane
  - Blizzard
  - Ice Storm
- The ESOP Outage Scheduler or SO-TSO will be contacted within 12 hours prior to removing 1B DG from service and after it has been returned to service.
  1. Ensure 1B DG will **NOT** be out of service when grid stress conditions are considered "high".
     - 5051, 5052 and 5072 circuits are in service.
     - PJM is **NOT** in a Warning or implementing an Emergency Action for capacity shortages.
       - Primary Reserve - Warning
       - Voltage Reduction - Warning or Action
       - Manual Load Dump - Warning or Action
       - Maximum Emergency Generation - Action
     - PJM is **NOT** in Conservative Operations.
       - Thunderstorms
       - Solar Magnetic Disturbances
       - Crisis Response
       - Heavy Load, Low Voltage - Warning or Action
       - Post Contingency Local Load Relief Warning that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard
     - **NO** other known condition exists on the PJM or BGE system at this time that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard.

5.0.M PRECAUTIONS (Continued)

2. Determine that **NO** other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

- **NO** elective maintenance will be performed in the switchyard, on the 4 KV Distribution System, or on the 13 KV Distribution System.

NOTE
The Unit-1 AFW system includes 23 AFW pump and its cross-tie.

- Planned maintenance or testing will **NOT** be performed on the Unit-1 AFW System.
- **NO** maintenance or testing that affects the reliability of Unit-1 A train will be scheduled. If testing or maintenance activities must be performed, a Risk Assessment Evaluation will be performed according to NO-1-117, INTEGRATED RISK MANAGEMENT.
- Elective maintenance will **NOT** be performed on 0C DG. Personnel will be made aware of the dedication of 0C DG to 14 4KV Bus.
- The operations crews will be briefed concerning the unit activities, including compensatory measures established and the importance of promptly starting and aligning the 0C DG.
- The on-shift operations crew will discuss and review the appropriate normal and emergency operating procedures within 24 hours prior to or shortly after assuming the watch for the first time after having scheduled days off while 1B DG is out of service.
  - AOP-7I, LOSS OF 4KV, 480 VOLT OR 208/120 VOLT INSTRUMENT BUS POWER
  - EOP-0, POST-TRIP IMMEDIATE ACTIONS
  - EOP-2, LOSS OF OFFSITE POWER/LOSS OF FORCED CIRCULATION
  - EOP-7, STATION BLACKOUT
  - AOP-3F, LOSS OF OFFSITE POWER WHILE IN MODES 3, 4, 5 OR 6

6.0 PERFORMANCE

6.1 1B DG NORMAL STANDBY

A. Initial Conditions

1. 1B DG valve alignments have been verified by completion of ATTACHMENT 1B, 1B DIESEL GENERATOR VALVE LINEUP.
2. The Service Water System is aligned for 1B DG operation (OI-15).
3. The Fuel Oil System is aligned for 1B DG operation (OI-21D).
4. The 125 VDC System is aligned for 1B DG operation (OI-26A).
5. The 4.16KV System is aligned for 1B DG operation (OI-27C).
6. The 480V System is aligned for 1B DG operation (OI-27D).
7. The Saltwater System is aligned for 1B DG operation (OI-29).

B. Procedure

1. **IF** 1B DG is being returned to service following maintenance, **THEN PERFORM** ATTACHMENT 1A, POST MAINTENANCE 1B DIESEL GENERATOR LINEUP CHECKS.

CAUTION
Minimum room temperature is 60° F.

2. **IF** desired to operate the 1B DG room ventilation, **THEN PERFORM** the following:
   a. **PLACE** 1B DG EXHAUST DAMPER, 1-HS-5432, to OPEN.
   b. **IF** desired, **START** 1B DG VENT FAN by momentarily placing 1-HS-5431, to START.
   c. **WHEN** desired, **STOP** 1B DG VENT FAN by momentarily placing 1-HS-5431 , to STOP.
   d. **WHEN** desired, **PLACE** 1B DG EXHAUST DAMPER, 1-HS-5432, to AUTO.

****** END ******

6.2 1B DG NON-EMERGENCY FAST START

A. Initial Conditions

1. 1B DG is in Standby **PER** Section 6.1, 1B DG NORMAL STANDBY.
2. A calibrated electric timer is available. (NA if not used)
3. 1B Diesel Generator (DG) should be prelubed prior to any non-emergency start, except when engine has been run **OR** prelubed within the last two hours. **[B0027] [B0048]**
4. 1B DG should be run within 30 minutes after prelubing to prevent the oil trapped above the upper pistons from leaking past the rings into the combustion space.
5. Whenever 1B DG is started during non-emergency conditions, it should be loaded within one hour in incremental steps **PER** Section 6.6, PARALLEL 1B DIESEL GENERATOR. Unloaded operation beyond one hour shall be minimized and approved by the Shift Manager. **[B0027]**

B. Procedure

NOTE

The Load Shed Relay Position Verification light indicates that the 14 4KV bus feeder breaker indication switch is functioning properly. The light should be on when either bus feeder breaker is closed.

CAUTION

Damage to 1B DG may occur if a 14 4KV bus feeder breaker is closed **AND** the Load Shed Relay Position Verification light is **NOT** lit. Under this condition 1B DG may attempt to automatically load on 14 4KV bus.

1. **CHECK** the Load Shed Relay Position Verification light is illuminated on the 14 4KV Bus Auxiliary Cabinet.
2. **CHECK** the following 1B DG annunciators are clear:
   - "JACKET COOLANT LEVEL LOW IN EXPANSION TANK"
   - "FUEL OIL LEVEL LOW IN DAY TANK"
3. **ENSURE** a minimum of 215 PSIG in the air receivers (1C62D):
   - West RCVR - 1-PI-4843
   - East RCVR - 1-PI-4844
4. **IF** desired for data collection,
   THEN ADJUST the 1B DG starting air pressure gauges minimal pressure arm(s) on 1-PI-4843 and 1-PI-4844 to the current indicated pressure.

6.2.B Procedure (Continued)

5. **ENSURE** the 1B DG Lube Oil Sump level is near FULL STOP on the dipstick.

6. **ENSURE** the visible portion of the sightglass for the governor oil level is at least 3/4 full.

NOTE
The System Engineer recommends obtaining 1B DG start time for each fast start.

7. **IF** obtaining 1B DG start time,
THEN PREPARE the electric timer as follows:

   a. **RECORD** timer serial number in the Unit 1 Control Room Log.

   b. **RECORD** timer cal due date in the Unit 1 Control Room Log.

   c. **PLUG** the electric timer into the 1B DG Speed/Voltage TIMER JACK in 1B DG room panel 1C62B.

   d. **PLUG** the electric timer into a 120 VAC outlet.

   e. **TURN** the electric timer ON **AND RESET** the indicators to zero (0).

8. Establish communications between the Control Room and 1B DG Room.

6.2.B Procedure (Continued)

9. **IF** 1B DG has **NOT** been run **OR** prelubed within the last two hours, **THEN PERFORM** the following:

   a. **PLACE AND HOLD** PRELUBE PUMP, 1-HS-4785, to MAN. **[B0048]**

NOTE

1B DG should be started while prelubing the engine; however, **IF** it is **NOT** possible **OR** conditions do **NOT** support maintaining the prelube pump running while starting 1B DG, **THEN** 1B DG may be started without the prelube pump running as long as it is started within two hours. **[B0027]**

   b. **MAINTAIN** PRELUBE PUMP, 1-HS-4785, at MAN **AND NOTIFY** the Control Room when the prelube pump has run at least 3 minutes but **NOT** greater than 5 minutes.

   c. **START** 1B DG by depressing 1B DG START, 1-HS-1424, pushbutton, on 1C18B.

   d. **WHEN** any of the following criteria are met:

      - 1B DG starts
      - 1B DG fails to start
      - The Prelube Pump has operated for five minutes

      THEN PLACE PRELUBE PUMP, 1-HS-4785, to AUTO.

   e. **PROCEED** to Step 11.

10. **START** 1B DG by depressing 1B DG START, 1-HS-1424, pushbutton, on 1C18B. **[B0027]**

11. **IF** 1B DG fails to start **AND** plant conditions permit, **THEN CONSIDER** barring over 1B DG **PER** Section 6.9, MANUALLY BAR-OVER 1B DIESEL GENERATOR, **OR** Section 6.24, ROTATING 1B DIESEL GENERATOR WITH COMPRESSED AIR, within three hours.

12. **CHECK** the following parameters:

    - 1B DG VOLTS, 1-EI-1422: 4.16 KV (4.1 to 4.35 KV)
    - 1B DG FREQUENCY, 1-SI-1401: 60 Hz (58.8 to 61.2 Hz)

13. **RECORD** the electric timer readings in the Unit 1 Control Room Log.

    - Time (seconds) to RPM
    - Time (seconds) to voltage

6.2.B Procedure (Continued)

14. **TURN** the electric timer OFF.

15. **REMOVE** the electric timer as follows:

    a. **UNPLUG** the electric timer from the 120 VAC outlet.

    b. **UNPLUG** the electric timer from the 1B DG Speed/Voltage TIMER JACK in 1B DG room panel 1C62B.

    c. **RETURN** the electric timer to its storage location.

16. **MONITOR** 1B DG parameters **PER** TABLE 3, 1B DIESEL GENERATOR OPERATING PARAMETERS.

    a. **IF** Jacket Water Pump discharge pressure drops more than 3 PSIG from the initial value,
    THEN VENT the Jacket Water Heat Exchanger **AND** the Air Cooler Heat Exchanger as follows:

        (1) **CRACK OPEN** the following vent valves:

            - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
            - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

        (2) **WHEN** a continuous stream of water is observed from the Heat Exchanger Vents,
        THEN SHUT the following valves:

            - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
            - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

        (3) **LOG** the time **AND** duration of the vent on the Outside Operator Log.

        (4) **NOTIFY** the System Engineer.

6.2.B.16 Procedure (Continued)

b. **IF** filter **OR** strainer differential pressures exceed the following values, **THEN PERFORM** the following:

- **IF** Fuel Oil Filter differential pressure exceeds 10 PSID, **THEN PLACE** the alternate filter in service **AND SUBMIT** an IR to have the dirty filter replaced.
- **IF** Lube Oil Filter differential pressure exceeds 10 PSID, **THEN SUBMIT** an IR to replace the cartridges.
- **IF** Lube Oil Strainer differential pressure exceeds 5 PSID, **THEN SUBMIT** an IR to clean the strainer.

NOTE

1B DG should be loaded as soon as practicable but at least within one hour after starting. **[B0027]**

17. **GO TO** the desired procedure section:

- Section 6.6, PARALLEL 1B DIESEL GENERATOR

OR

- Section 6.8, 1B DG SHUTDOWN

****** END ******

6.3 1B DG SLOW SPEED START

A. Initial Conditions

1. 1B DG is in Standby **PER** Section 6.1, 1B DG NORMAL STANDBY.
2. The key for 1B DG SLOW START SEQUENCE KEY SW, 1-HS-4865, is available.
3. 1B DG should be run within 30 minutes after prelubing to prevent the oil trapped above the upper pistons from leaking past the rings into the combustion space.
4. Whenever 1B DG is started during non-emergency conditions, it should be loaded within one hour in incremental steps **PER** Section 6.6, PARALLEL 1B DIESEL GENERATOR. Unloaded operation beyond one hour shall be minimized and approved by the Shift Manager. **[B0027]**
5. Signature blocks shall be completed in this section.

B. Procedure **INITIALS**

NOTE

- 1B DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.
- The Load Shed Relay Position Verification light indicates the 14 4KV Bus feeder breaker indication switch is functioning properly. The light should be illuminated when either bus feeder breaker is closed.

CAUTION

Damage to 1B DG may occur if the 14 4KV Bus feeder breaker is closed **AND** the Load Shed Relay Position Verification light is **NOT** lit. Under this condition 1B DG may attempt to automatically load on 14 4KV bus.

1. **CHECK** the Load Shed Relay Position Verification light is illuminated on the 14 4KV Bus Auxiliary Cabinet. ____
2. **IF** desired for data collection,
   THEN ADJUST the 1B DG starting air pressure gauges minimal pressure arm(s) on 1-PI-4843 and 1-PI-4844 to the current indicated pressure. (N/A if **NOT** desired) ____
3. **VERIFY** PRELUBE PUMP, 1-HS-4785, is in AUTO. **[B0048]** ____

6.3.B Procedure (Continued) **INITIALS**

NOTE
Placing 1B Slow Start Mode Selector switch, 1-HS-4826, to Normal will cancel Slow Start sequence.

4. **PLACE** 1B DG SLOW START MODE SELECTOR SW, 1-HS-4826, in ENABLE. ____

NOTE
- Placing the keyswitch to Start will automatically start the Prelube pump and ramp down the controller speed setpoint to 300 rpm. After 3 minutes the DG will start and run at approximately 300 rpm.
- Failure to receive the "1B DG • ENGINE • EXCTR SHUTDOWN" alarm may indicate a problem with the Exciter Shutdown circuit **AND** that the exciter is still active.

5. MOMENTARILY **PLACE** 1B DG SLOW START SEQUENCE KEYSWITCH, 1-HS-4865, to START position **AND** **THEN** release the switch. ____

6. **CHECK** that the SLOW START SEQUENCE light illuminates on 1C62B. ____

NOTE
Prelube pump will stop after running for 4 minutes.

7. **VERIFY** that the Prelube Pump starts. ____

8. **CHECK** 1B DG ENGINE EXCTR SHUTDOWN alarm on 1C18B annunciates. ____

9. **IF** the above expected results are **NOT** met **OR** it is desired to cancel the Auto Start Sequence,
THEN RETURN the SLOW START MODE SELECTOR HANDSWITCH, 1-HS-4826, to NORMAL. (N/A if not desired) ____

NOTE
Generator damage may occur if voltage builds up when generator is running at less than rated speed.

10. **IF** generator voltage is indicated when 1B DG is started,
THEN IMMEDIATELY NOTIFY Control Room to stop 1B DG using Control Room Stop button at 1C18B to shutdown 1B DG. ____

6.3.B Procedure (Continued) **INITIALS**

11. **CHECK** 1B DG starts **AND** reaches approximately 300 RPM on 1C62B indication 1-SI-4856. ____

12. **IF** 1B DG fails to start **AND** plant conditions permit, **THEN CONSIDER** barring over 1B DG **PER** Section 6.9, MANUALLY BAR-OVER 1B DIESEL GENERATOR, **OR** 6.24, ROTATING 1B DIESEL GENERATOR WITH COMPRESSED AIR, within three hours. ____

13. **IF** 1B DG was started for overspeed testing **THEN GO TO** Section 6.11, 1B DG MECHANICAL GOVERNOR ADJUSTMENT AND OVERSPEED TEST. ____

NOTE
The operator has local control of the DG speed unless a SIAS or UV signal is received **OR** the operator places 2-HS-4826 to NORMAL.

14. **RAISE** 1B DG speed as follows:

    a. **MONITOR** DG speed at 1B DG SPEED INDICATOR, 1-SI-4856. ____

NOTE
The 1B DG governor Speed may be adjusted to raise **OR** lower as directed by the System Engineer to support maintenance.

    b. **GRADUALLY RAISE** the 1B DG GOVERNOR SPEED CONTROL CS/SP at 1C62B to approximately 900 rpm over a three to five minute time period. ____

NOTE
The following step will allow the field to flash and reset the slow start circuit, placing the DG in the AUTO/REMOTE control mode.

    c. **WHEN** the 1B DG is at 900 rpm, **THEN PLACE** 1B DG SLOW **START** MODE SEL SW, 1-HS-4826, to NORMAL. ____

    d. **CHECK** the following:

    - Generator voltage is 4.16KV (4.1 to 4.35KV) ____
    - Generator frequency is 60Hz (58.8 to 61.2Hz) ____
    - Generator undervoltage annunciator clears ____

6.3.B.14 Procedure (Continued) **INITIALS**

e. **CHECK** "1B DG • ENGINE • EXCTR SHUTDOWN" annunciator is clear: ____

15. **MONITOR** 1B DG parameters **PER** TABLE 3, 1B DIESEL GENERATOR OPERATING PARAMETERS. ____

a. **IF** Jacket Water Pump discharge pressure drops more than 3 PSIG from the initial value,
THEN VENT the Jacket Water Heat Exchanger **AND** the Air Cooler Heat Exchanger as follows:

(1) **CRACK OPEN** the following vent valves:

- 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105 ____
- 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115 ____

(2) **WHEN** a continuous stream of water is observed from the Heat Exchanger Vents,
THEN SHUT the following valves:

- 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105 ____
- 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115 ____

(3) **LOG** the time **AND** duration of the vent on the Outside Operator Log. ____

(4) **NOTIFY** the System Engineer. ____

b. **IF** filter **OR** strainer differential pressures exceed the following values,
THEN PERFORM the following:

- **IF** Fuel Oil Filter differential pressure exceeds 10 PSID, **THEN PLACE** the alternate filter in service **AND SUBMIT** an IR to have the dirty filter replaced. ____
- **IF** Lube Oil Filter differential pressure exceeds 10 PSID, **THEN SUBMIT** an IR to replace the cartridges. ____
- **IF** Lube Oil Strainer differential pressure exceeds 5 PSID, **THEN SUBMIT** an IR to clean the strainer. ____

6.3.B Procedure (Continued) **INITIALS**

NOTE
1B DG should be loaded as soon as practicable but at least within one hour after starting.
[B0027]

16. **GO TO** the desired procedure section: ____

- Section 6.6, PARALLEL 1B DIESEL GENERATOR

OR

- Section 6.8, 1B DG SHUTDOWN

****** END ******

6.4 1B DG AUTOMATIC START

A. Initial Conditions

1. An automatic start signal has been generated that started 1B DG.

2. If a Safety Injection Actuation Signal (SIAS) has started 1B DG automatically, **OR** if both the NORMAL and the ALTERNATE feeder breakers to 14 4KV bus are open, then Jacket Coolant Temperature and Pressure Trips and Crankcase Pressure Trips are bypassed. Close attention to these parameters in this condition is necessary.

3. Under normal conditions, do **NOT** exceed 3.0 MW load on 1B DG unless specified by an approved Test Procedure **OR** by the General Supervisor-Nuclear Operations. During accident conditions loads of up to 3.3 MW are acceptable.

4. 1B DG load should be limited to 2.3 MW when the following conditions exist:

   - The 14 4KV Bus Normal **AND** Alternate feeder breakers are open
   - 1B DG is powering 14 4KV Bus
   - A SIAS does **NOT** exist

B. Procedure

NOTE

- 1B DG starts automatically due to any of the following:
  - A SIAS B-10 signal
  - A 14 4KV Bus undervoltage signal (U/V B-4)
  - The glass cover is broken at the local break glass station
- When 1B DG is up to frequency and voltage, 1B DG OUT BKR, 152-1403, will close automatically if 14 4KV Bus is de-energized. If 14 4KV Bus is energized from another source, 1B DG may be manually paralleled **PER** Section 6.6, PARALLEL 1B DIESEL GENERATOR.
- If the engine was **NOT** prelubed, 1B DG should be operated a minimum of 4 hours, 3 hours at greater than 1.5 MW, plus one hour at 2.7 to 3.0 MW.

1. **IF** 1B DG is powering 14 4KV Bus **AND** a SIAS does **NOT** exist, **THEN LIMIT** 1B DG to 2.3 MW.

2. **IF** 14 4KV Bus is energized from off-site power, **THEN LOAD** 1B DG **PER** Section 6.6, PARALLEL 1B DIESEL GENERATOR, as soon as practicable but at least within one hour after starting. **[B0027]**

6.4.B Procedure (Continued)

3. IF possible,
THEN **MONITOR** 1B DG parameters **PER** TABLE 3, 1B DIESEL GENERATOR OPERATING PARAMETERS.

   a. IF Jacket Water Pump discharge pressure drops more than 3 PSIG from the initial value,
   THEN **VENT** the Jacket Water Heat Exchanger **AND** the Air Cooler Heat Exchanger as follows:

      (1) **CRACK OPEN** the following valves:

      - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
      - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

      (2) **WHEN** a continuous stream of water is observed from the Heat Exchanger Vents,
      THEN SHUT the following valves:

      - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
      - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

      (3) **LOG** the time **AND** duration of the vent on the Outside Operator Log.

      (4) **NOTIFY** the System Engineer.

   b. IF filter **OR** strainer differential pressures exceed the following values,
   THEN **PERFORM** the following:

   - IF Fuel Oil Filter differential pressure exceeds 10 PSID,
   THEN **PLACE** the alternate filter in service **AND SUBMIT** an IR to have the dirty filter replaced.
   - IF Lube Oil Filter differential pressure exceeds 10 PSID,
   THEN **SUBMIT** an IR to replace the cartridges.
   - IF Lube Oil Strainer differential pressure exceeds 5 PSID,
   THEN **SUBMIT** an IR to clean the strainer.

****** END ******

6.5 RESTART OF 1B DG WITH AN AUTOMATIC START SIGNAL PRESENT [B0154]

A. Initial Conditions

1. 1B DG has failed to start with automatic start signal **OR** has experienced a trip after an automatic start.
2. The cause of the start failure **OR** automatic trip has been found **AND** corrected.
3. A SIAS **OR** 14 4KV Bus U/V signal is present.

B. Procedure

1. **IF** an overspeed trip occurred,
   THEN ENSURE the fuel rack lever is RESET.

NOTE

- 60 seconds after depressing the Local Alarm Reset Pushbutton, the stop relay timer will de-energize **AND** 1B DG will attempt to start.
- When 1B DG is up to frequency and voltage, 1B DG OUT BKR, 152-1403, will close automatically if 14 4KV Bus is de-energized. If 14 4KV Bus is energized from another source, 1B DG may be manually paralleled **PER** Section 6.6, PARALLEL 1B DIESEL GENERATOR.
- If the engine was **NOT** prelubed, 1B DG should be operated a minimum of 4 hours, 3 hours at greater than 1.5 MW, plus one hour at 2.7 to 3.0 MW.

CAUTION

Jacket Cooling Water High Temperature, Jacket Cooling Water Low Pressure and Crankcase High Pressure Trips are bypassed if a SIAS exists or both the NORMAL and the ALTERNATE feeder breakers to the 14 4KV bus are open.

2. **MOMENTARILY DEPRESS** the 1B DG Local Alarm Reset Pushbutton.

6.5.B Procedure (Continued)

3. **IF** 1B DG starts,
THEN PERFORM the following:

   a. **IF** 1B DG is powering 14 4KV Bus **AND** a SIAS does **NOT** exist,
   THEN LIMIT 1B DG to 2.3 MW.

   b. **IF** 14 4KV Bus is energized from off-site power,
   THEN PARALLEL AND LOAD 1B DG **PER** Section 6.6, PARALLEL 1B DIESEL GENERATOR, as soon as practicable but at least within one hour after starting. **[B0027]**

   c. **MONITOR** 1B DG parameters **PER** TABLE 3, 1B DIESEL GENERATOR OPERATING PARAMETERS.

      (1) **IF** Jacket Water Pump discharge pressure drops more than 3 PSIG from the initial value,
      THEN VENT the Jacket Water Heat Exchanger **AND** the Air Cooler Heat Exchanger as follows:

         (a) **CRACK OPEN** the following vent valves:

            - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
            - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

         (b) **WHEN** a continuous stream of water is observed from the heat exchanger vents,
         THEN SHUT the following valves:

            - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
            - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

         (c) **LOG** the time **AND** duration of the vent on the Outside Operator's Log.

         (d) **NOTIFY** the System Engineer.

6.5.B.3.c Procedure (Continued)

(2) **IF** filter **OR** strainer differential pressures exceed the following values, **THEN PERFORM** the following:

- **IF** Fuel Oil Filter differential pressure exceeds 10 PSID, **THEN PLACE** the alternate filter in service **AND SUBMIT** an IR to have the dirty filter replaced.
- **IF** Lube Oil Filter differential pressure exceeds 10 PSID, **THEN SUBMIT** an IR to replace the cartridges.
- **IF** Lube Oil Strainer differential pressure exceeds 5 PSID, **THEN SUBMIT** an IR to clean the strainer.

4. **IF** 1B DG does **NOT** start, **THEN INFORM** the Control Room.

****** END ******

6.6 PARALLEL 1B DIESEL GENERATOR

A. Initial Conditions

1. DC control power is available to 1B DG OUT BKR, 152-1403, as observed by a handswitch position indicating light being lit.
2. 1B DG is running unloaded.
3. 0C DG is **NOT** connected to 14 4KV Bus.
4. 14 4KV Bus is being supplied from offsite power.
5. If the engine is prelubed, 1B DG should be loaded at 2.7 to 3.0 MW for a minimum of 1 hour. If the engine is **NOT** prelubed, 1B DG should be loaded for a minimum of 4 hours, 3 hours at greater than 1.5 MW, plus one hour at 2.7 to 3.0 MW.
6. Under normal conditions, do **NOT** exceed 3.0 MW load on 1B DG unless specified by an approved Test Procedure **OR** by the General Supervisor-Nuclear Operations. During accident conditions loads of up to 3.3 MW are acceptable.
7. Normally, 1B DG should **NOT** be operated with lead KVARS. 1B DG Output Breaker, 152-1403, will automatically trip open at approximately 1000 LEADING KVARS.

NOTE

1B DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.

B. Procedure

1. **MOMENTARILY PLACE** 1B DG UNIT PARALLEL, 1-CS-1404, to PARA.

NOTE

Failure to place 1-CS-1404 to PARA **OR** failure of the paralleling circuit to energize will prevent manual frequency control.

2. **ENSURE** proper operation of 1B DG frequency control by performing the following:
   a. **RAISE AND LOWER** 1B DG frequency between 59.0 and 61.0 Hz using 1B DG SPEED CONTR, 1-CS-1403.
   b. **ADJUST** 1B DG frequency to approximately 60 Hz using 1B DG SPEED CONTR, 1-CS-1403.
3. **ENSURE** 1B DG VOLT REGULATOR SEL, 1-HS-1423, is positioned to AUTO.

6.6.B Procedure (Continued)

4. **ENSURE** the following annunciators for 1B DG are clear:
   - "GENERATOR UNDERVOLTAGE"
   - "1B DG • POT VOLT • FREQ LO"
5. **RAISE AND LOWER** 1B DG voltage between 4.1KV and 4.35KV using 1B DG AUTO VOLT CONTR, 1-CS-1402.
6. **INSERT** the Sync Stick at 1B DG OUT BKR, 1-CS-152-1403.
7. **ADJUST** 1B DG AUTO VOLT CONTR, 1-CS-1402, to match voltages on the following meters:
   - INCOMING VOLTS, 1-EI-4001A
   - RUNNING VOLTS, 1-EI-4001B

CAUTION
Excessive force may be applied to 1B DG shaft keys due to instantaneous engine slowdown during paralleling if 1B DG frequency is significantly higher than 14 4KV Bus frequency.

8. **ADJUST** 1B DG frequency so the Synchroscope is rotating slowly in the FAST (clockwise) direction using 1B DG SPEED CONTR, 1-CS-1403.

NOTE
Table 1 identifies equipment that receives an auto-start signal from the Shutdown Sequencer.

9. **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position,
   THEN PERFORM the following:
   a. **PLACE** 1B DG OUT BKR, 1-CS-152-1403, to CLOSE.
   b. **VERIFY** 1B DG loads to approximately 0.5 MW.
   c. **IF** needed to raise load to 0.5 MW, **ADJUST** 1B DG SPEED CONTR, 1-CS-1403.
10. **CHECK** the "SEQUENCER INITIATED" annunciator alarms.
11. **REMOVE** the Sync Stick **AND RETURN** to Home Base.

6.6.B Procedure (Continued)

NOTE

- The "1B DG • POT VOLT • FREQ LO" annunciator may alarm during parallel operation.
- Whenever 1B DG is started, it should be loaded from 2.7 to 3.0 MW for at least one hour.

CAUTION

- Do **NOT** allow power factor to be below 0.80.
- Do **NOT** exceed 3.0 MW, 500 KVARS, and 422 amps unless directed to do so by the GS-NPO or by approved procedures.

12. **RAISE** MW **AND** KVAR loads concurrently to the desired levels **PER** the following:

    a. **HOLD** at approximately 0.5 MW for at least one minute.

    b. **MAINTAIN** 0 to 500 KVARs using 1B DG AUTO VOLT CONTR, 1-CS-1402, **AND** FIGURE 1, DIESEL GENERATOR ELECTRICAL LIMITS.

    c. **RAISE** 1B DG load in 0.3 to 0.4 MW steps at one to two minute intervals to the desired test load.

    d. **MONITOR** 14 4KV Bus voltage is between 4.1KV and 4.35KV. **[B0120]**

13. **RECORD** equipment operating data 15 minutes after reaching the desired load **AND** at 60 minute intervals thereafter on the 1B Diesel Generator Logsheet.

14. **WHEN** 1B DG shutdown is desired,
    THEN GO TO to Section 6.8, 1B DG SHUTDOWN.

****** END ******

6.7 TRANSFER 14 4KV BUS LOADS FROM 1B DG TO OFFSITE POWER SOURCE [B0614]

A. Initial Conditions

1. 1B DG is powering 14 4KV Bus equipment.
2. The 14 4KV Bus Normal **AND** Alternate feeder breakers are OPEN.
3. SIAS **AND** 14 4KV Bus U/V signals are RESET.
4. One of the offsite power supplies is available to the Normal or Alternate feeder breaker.
5. DC control power is available to the selected Normal **OR** Alternate feeder breaker as observed by a handswitch position indicating light being lit.

B. Procedure

NOTE

- 1B DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.
- Two Operators may be utilized to perform the transfer. One to operate 1B DG on 1C18B **AND** one to synchronize to 14 4KV Bus.

1. **MOMENTARILY PLACE** 1B DG UNIT PARALLEL, 1-CS-1404, to PARA.
2. **ADJUST** 1B DG frequency to approximately 60 Hz using 1B DG SPEED, 1-CS-1403.
3. **INSERT** the Sync Stick for the 14 4KV Bus Normal **OR** Alternate Feeder breaker handswitch:

HANDSWITCH
14 4KV BUS ALT FDR, 1-CS-152-1401 **OR** 14 4KV BUS NORMAL FDR, 1-CS-152-1414

4. **CHECK** the Synchroscope **AND** Sync Lights are operating.

NOTE

Offsite power voltage indication will be on the INCOMING voltmeter.

5. **ADJUST** RUNNING VOLTS equal to INCOMING VOLTS using 1B DG AUTO VOLT CONTR, 1-CS-1402.

6.7.B Procedure (Continued)

NOTE
The Synchroscope works in the opposite direction when 1B DG is the RUNNING power source.

6. **ADJUST** 1B DG frequency so the Synchroscope pointer is rotating slowly in the FAST (clockwise) direction using 1B DG SPEED CONTR, 1-CS-1403.

CAUTION
To avoid improper paralleling, do **NOT** start **OR** stop any large loads on 14 4KV Bus.

7. **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position,
THEN CLOSE the 14 4KV Bus Normal **OR** Alternate Feeder breaker:

HANDSWITCH
14 4KV BUS ALT FDR, 1-CS-152-1401
OR
14 4KV BUS NORMAL FDR, 1-CS-152-1414

8. **REMOVE** the Sync Stick **AND RETURN** to Home Base.

NOTE
1B DG should **NOT** be operated with LEAD KVARs under normal conditions.
1B DG Output Breaker will automatically trip open at approximately 1000 LEADING KVARs.

9. **MONITOR** 14 4KV Bus voltage between 4.1KV and 4.35KV **[B0120]**

10. **IF** continued operation of 1B DG in parallel with 14 4KV Bus is desired,
THEN GO TO Section 6.6, PARALLEL 1B DIESEL GENERATOR, Step B.13.

11. **IF** 1B DG is to be stopped,
THEN GO TO Section 6.8, 1B DG SHUTDOWN.

****** END ******

6.8 1B DG SHUTDOWN

A. Initial Conditions

NOTE
If the engine was **NOT** prelubed, 1B DG should be operated a minimum of 4 hours, 3 hours at greater than 1.5 MW, plus one hour at 2.7 to 3.0 MW.

1. 1B Diesel Generator is running.
2. Stopping 1B DG energizes the 1B DG Stopping Relay Timer and prevents all 1B DG starts for one minute.
3. Do **NOT** stop two DGs at the same time. **[B0614]**

NOTE
1B DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.

B. Procedure

1. **IF** 1B DG started due to a SIAS signal,
   THEN ENSURE actuation modules are reset locally (at the ESFAS cabinets) prior to 1B DG shutdown.
2. **IF** 1B DG is in parallel operation with 14 4KV Bus,
   THEN REMOVE 1B DG load by performing the following:
   a. **LOWER** MW **AND** KVAR loads concurrently to below 0.5 MW **AND** zero KVARs **PER** the following:
      - **LOWER** MW load in increments of 0.3 to 0.4 MW at one to two minute intervals using 1B DG SPEED CONTR, 1-CS-1403.
      - **MAINTAIN** 0 to 500 KVARs using 1B DG AUTO VOLT CONTR, 1-CS-1402, **AND** FIGURE 1, DIESEL GENERATOR ELECTRICAL LIMITS.
      - **MONITOR** 14 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**
   b. **WHEN** 1B DG load is less than 0.5 MW,
      THEN PLACE 1B DG OUT BKR, 1-CS-152-1403, to TRIP.

6.8.B Procedure (Continued)

CAUTION
Any time 1B DG is started, it must be allowed to run for a minimum of one minute before it is shutdown **OR** a Start Failure will result.

3. **IF** shutdown from the Control Room is desired,
   THEN PERFORM the following:

   a. **MOMENTARILY PLACE** 1B DG UNIT PARALLEL, 1-CS-1404, to **RESET.**

   b. **CHECK** 1B DG frequency is 60 Hz (58.8 to 61.2 Hz).

      - 1B DG FREQUENCY, 1-SI-1401

   c. **ADJUST** 1B DG voltage to greater than 4.16 KV (4.1 to 4.35 KV) using 1B DG AUTO VOLT CONTR, 1-CS-1402.

      - 1B DG VOLTS, 1-EI-1422

   d. **CHECK** annunciator "1B DG • POT VOLT • FREQ LO" is clear.

   e. **DEPRESS** 1B DG STOP, 1-HS-1425, pushbutton, to shutdown the engine.

4. **IF** Local shutdown is desired,
   THEN PERFORM the following:

   a. **DECLARE** 1B DG inoperable.

   b. **PLACE** 1B DG CONTR MODE SEL SW, 1-HS-4840, in LOCAL.

   c. **DEPRESS** both local Engine Stop pushbuttons.

   d. **IF** desired,
      THEN PLACE 1B DG CONTR MODE SEL SW, 1-HS-4840, to AUTO-REMOTE **AND REMOVE** the key.

5. **ENSURE** SLOW START MODE SELECTOR, 1-HS-4826, is in the NORMAL position. **[B0048]**

6. **ENSURE** Prelube Pump is **NOT** running.

7. **ENSURE** the following pumps are running:

   - Coolant Pump

   - Lube Oil Pump

6.8.B Procedure (Continued)

CAUTION
DO **NOT** allow the 1B DG room temperature to fall below 60° F.

8. **IF** desired,
THEN STOP the 1B DG Room Ventilation Fan by momentarily placing its handswitch to the STOP position.

NOTE
- 1B DG may remain in the Action Statement of T.S. 3.8.1 **OR** 3.8.2 until engine barring is complete.
- If barring is **NOT** performed within three hours of shutdown, its effectiveness is minimal. Therefore, barring is **NOT** required if conditions prohibit barring within three hours of engine shutdown.

9. **IF** 1B DG is **NOT** scheduled to be manually restarted within three hours, **THEN CONSIDER** manually barring 1B DG **PER** Section 6.9, MANUALLY BAR-OVER 1B DIESEL GENERATOR, **OR** 6.24, ROTATING 1B DIESEL GENERATOR WITH COMPRESSED AIR. **[B0048]**

10. **NOTIFY** Plant Chemistry of the following:
    - 1B DG is shutdown
    - Jacket Water Cooling System makeup or venting performed during operation

****** END ******

6.9 MANUALLY BAR-OVER 1B DIESEL GENERATOR

A. Initial Conditions

1. 1B DG has been prelubed **OR** run **AND** requires Barring-over.
2. Technical Specification 3.8.1 or 3.8.2 has been reviewed to determine Diesel Generator operability requirements.
3. 1B DG has been shutdown more than 20 minutes but less than three hours.

B. Procedure

1. **IF** 1B DG is operable,
   THEN ENSURE Unit 1 A train equipment is operable **PER** OI-49, Operability Verification, prior to barring over the engine.
2. **PLACE** 1B DG OUT BKR, 1-CS-152-1403, in PULL-TO-LOCK.
3. **UNLOCK AND SHUT** the following 1B DG Air Start Header isolation valves:
   - 1B DG STARTING AIR TO DIESEL START SV-4834 ISOLATION VALVE, 1B-DSA-114
   - 1B DG STARTING AIR TO DIESEL START SV-4835 ISOLATION VALVE, 1B-DSA-117
4. **REMOVE** the pipe caps from the following 1B DG Air Start Header drain valves:
   - 1B DG STARTING AIR STRAINER YS-4834 DRAIN VALVE, 1B-DSA-124
   - 1B DG STARTING AIR STRAINER YS-4835 DRAIN VALVE, 1B-DSA-125

WARNING
Hearing Protection is required while bleeding down the Air Headers.

5. **UNLOCK AND OPEN** the following 1B DG Air Start Header drain valves:
   - 1B DG STARTING AIR STRAINER YS-4834 DRAIN VALVE, 1B-DSA-124
   - 1B DG STARTING AIR STRAINER YS-4835 DRAIN VALVE, 1B-DSA-125
6. **STATION** a Safety Watch to **INDEPENDENTLY VERIFY** that the air start valves remain shut **AND** the header drains remain open.
7. **REMOVE** one of the coupling guard access screens between the Engine **AND** the Generator.
8. **INSERT** the Jacking Bar into the access **AND SLIP** the Jacking Bar onto the pivot pin located above the flywheel.
9. **ADJUST** the Jacking Bar Anti-Slip Bolt to prevent accidental disengagement.

6.9.B Procedure (Continued)

10. **LOWER OR RAISE** the Jacking Bar, whichever is easiest, to engage the pawl into the flywheel teeth.

11. **ROTATE** the flywheel one revolution.

12. **REMOVE** the Jacking Bar **AND REPLACE** the coupling guard access screen.

13. **IF** returning 1B DG to service,
THEN PERFORM the following:

    a. **SHUT AND LOCK** the following 1B DG Air Start Header drain valves:

    - 1B DG STARTING AIR STRAINER YS-4834 DRAIN VALVE, 1B-DSA-124
    - 1B DG STARTING AIR STRAINER YS-4835 DRAIN VALVE, 1B-DSA-125

    b. **REPLACE** the pipe caps on the following 1B DG Air Start Header drain valves:

    - 1B DG STARTING AIR STRAINER YS-4834 DRAIN VALVE, 1B-DSA-124
    - 1B DG STARTING AIR STRAINER YS-4835 DRAIN VALVE, 1B-DSA-125

    c. **OPEN AND LOCK** the following 1B DG Air Start Header isolation valves:

    - 1B DG STARTING AIR TO DIESEL START SV-4834 ISOLATION VALVE, 1B-DSA-114
    - 1B DG STARTING AIR TO DIESEL START SV-4835 ISOLATION VALVE, 1B-DSA-117

    d. **ACKNOWLEDGE AND RESET** the local annunciator panel.

    e. **ENSURE** annunciator "STARTING AIR PRESSURE LOW" clears.

    f. **NOTIFY** the Control Room of the following: **[B0048]**

    - 1B Diesel Generator bar over is complete.
    - To place 1B Diesel Generator Outlet Bkr, 1-CS-152-1403, in Normal.

    g. **PLACE** 1B DG OUT BKR, 1-CS-152-1403, in NORMAL.

6.9.B.13 Procedure (Continued)

NOTE
To accurately track DG unavailability, it is necessary to document manual bar over of DG.

h. CRO **LOG** that the bar over is complete **PER** Section 6.9, OI-21B-1.

****** END ******

6.10 REMOVE AND RESTORE 1B DG TO/FROM SERVICE

A. Initial Conditions

1. 1B DG is shutdown **AND** 1B DG OUT BKR, 152-1403, is OPEN.

2. Technical Specification 3.8.1 or 3.8.2 has been reviewed to determine Diesel Generator operability requirements.

B. Procedure

NOTE
These actions are required to be performed prior to removing 1B DG from service for elective maintenance greater than 72 hours. For assurance, these actions should be performed every time elective maintenance is performed.

CAUTION
After 1B DG has been removed from service, changes in weather conditions or grid stability should be evaluated for compensatory action.

1. **IF** entering Tech Spec 3.8.1 B for elective maintenance,
THEN PERFORM the following prior to taking the 1B DG out of service:
[B0906]
(N/A if administrative controls are in place to ensure 1B DG returned to service within 72 hours.)

NOTE
Steps 1.a through 1.e may be performed in any order.

01801

a. **VERIFY** the following:

- **NO** elective maintenance will be performed in the switchyard, on the 4 kV Distribution System, or on the 13 KV Distribution System.

6.10.B.1 **Procedure (Continued)**

NOTE
The Unit-1 AFW system includes 23 AFW pump and its cross-tie.

- **NO** planned maintenance or testing will be performed on the Unit-1 AFW System.
- **NO** maintenance or testing that affects the reliability of Unit-1 A train will be scheduled. If testing or maintenance activities must be performed, a Risk Assessment Evaluation will be performed according to NO-1-117, INTEGRATED RISK MANAGEMENT.
- **NO** elective maintenance will be performed on 0C DG.
- Personnel are aware of the dedication of 0C DG to 14 4KV Bus.
  - Flag-Off 0C DG using green chain barricades.
  - Update OWC Status Board.

NOTE
Patuxent River Naval Air Station is the preferred source for the weather report. However, any government sponsored weather agency may be used.

b. Within 12 hours prior to removing 1B DG from service, **EVALUATE** that **NO** severe weather conditions are forecast for CCNPP or any of the 500 KV transmission lines rights of way.

- Severe Thunderstorm
- Gale/High Wind - greater than 50 mph
- Tornado
- Hurricane
- Blizzard
- Ice Storm

6.10.B.1 Procedure (Continued)

c. Within 12 hours prior to removing 1B DG from service, **REQUEST** the CRS **OR** Shift Manager perform the following notification. **[B0138]**

(1) **CONTACT** the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts.

(2) **ENSURE** grid stress conditions are **NOT** considered "high":

- 5051, 5052 and 5072 circuits are in service.
- PJM is **NOT** in a Warning or implementing an Emergency Action for the following:
  - Primary Reserve - Warning
  - Voltage Reduction - Warning or Action
  - Manual Load Dump - Warning or Action
  - Maximum Emergency Generation - Action
- PJM is **NOT** in Conservative Operations for the following:
  - Thunderstorms
  - Solar Magnetic Disturbances
  - Crisis Response
  - Heavy Load, Low Voltage - Warning or Action
  - Post Contingency Local Load Relief Warning that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard
- **NO** other known condition exists on the PJM or BGE system at this time that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard.

(3) **DETERMINE** that **NO** other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

d. **BRIEF** the operations crews concerning the unit activities, including compensatory measures established and the importance of promptly starting and aligning the 0C DG.

6.10.B.1 Procedure (Continued)

e. **ENSURE** the on-shift operations crew has discussed and reviewed the appropriate normal and emergency operating procedures.

- **PLACE** a note on the Shift Turnover Sheet for oncoming crews to discuss and review the appropriate normal and emergency operating procedures within 24 hours prior to or shortly after assuming the watch for the first time after having scheduled days off.

- **REVIEW** the following procedures as appropriate:

  - AOP-7I, LOSS OF 4KV, 480 VOLT OR 208/120 VOLT INSTRUMENT BUS POWER
  - EOP-0, POST-TRIP IMMEDIATE ACTIONS
  - EOP-2, LOSS OF OFFSITE POWER/LOSS OF FORCED CIRCULATION
  - EOP-7, STATION BLACKOUT
  - AOP-3F, LOSS OF OFFSITE POWER WHILE IN MODES 3, 4, 5 OR 6

6.10.B Procedure (Continued)

2. **REMOVE** 1B DG from service as follows:

   a. **PERFORM** the following prior to taking 1B DG out of service:

   - **IF** 1B DG is operable,
     THEN ENSURE Unit 1 A train equipment is operable **PER** OI-49, Operability Verification, every eight hours while 1B DG is out of service.

   - **REQUEST** the CRS **OR** Shift Manager perform the following notification. **[B0138]**
     (N/A if Step 1.c performed)

     - **CONTACT** the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts.

     - **DETERMINE** whether other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

     - **IF** 1B DG will be out of service at the same time reliability of the offsite power supplies is reduced,
       THEN HAVE the Shift Manager determine how to minimize both the time 1B DG is out of service **AND** the time that offsite power supplies are at reduced reliability.

   - **IF** in Lower Mode Operation,
     THEN ENSURE the requirements of the applicable Minimum Essential Equipment section of NO-1-103, Conduct of Lower Mode Operations, are satisfied. **[B0138]**

6.10.B.2 Procedure (Continued)

CAUTION
0C DG Commitments only allow one (1) 0C DG Disconnect to be closed at a time.

b. **IF** the 0C DG is available,
THEN CLOSE the 0C DG 14 4KV Bus Disconnect 189-1406, to prealign the 0C DG to 14 4KV Bus by PERFORMING the following:

(1) **PLACE** the 0C DG 14 4KV BUS FDR handswitch, 1-CS-152-1406 in PTL.

NOTE
Kirk keys 11895, 11896, and 11901 are required.

(2) **LOCK** the 0C DG 14 4KV Bus DISC, 189-1406 in the CLOSE position.

(3) **PLACE** the 0C DG 14 4KV BUS FDR handswitch 1-CS-152-1406 in the NORMAL position.

(4) **PLACE** the following handswitches in PTL with OFF NORMAL COMPONENT tags:

- 0C DG 11 4KV BUS FDR, 1-CS-152-1106
- 0C DG 21 4KV BUS FDR, 2-CS-152-2106
- 0C DG 24 4KV BUS FDR, 2-CS-152-2406

(5) **PLACE** an OFF NORMAL COMPONENT tag on control room indication for DISC 189-1406.

c. **PLACE** 1B DG OUT BKR, 1-CS-152-1403, in PULL-TO-LOCK.

d. **UNLOCK AND SHUT** the following 1B DG Air Start Header isolation valves:

- 1B DG STARTING AIR TO DIESEL START SV-4834 ISOLATION VALVE, 1B-DSA-114
- 1B DG STARTING AIR TO DIESEL START SV-4835 ISOLATION VALVE, 1B-DSA-117

e. **REMOVE** the pipe caps from the following 1B DG Air Start Header drain valves:

- 1B DG STARTING AIR STRAINER YS-4834 DRAIN VALVE, 1B-DSA-124
- 1B DG STARTING AIR STRAINER YS-4835 DRAIN VALVE, 1B-DSA-125

6.10.B.2 Procedure (Continued)

WARNING
Hearing Protection is required while bleeding down the Air Headers.

f. **UNLOCK AND OPEN** the following 1B DG Air Start Header drain valves:

- 1B DG STARTING AIR STRAINER YS-4834 DRAIN VALVE, 1B-DSA-124
- 1B DG STARTING AIR STRAINER YS-4835 DRAIN VALVE, 1B-DSA-125

3. **WHEN** desired,
THEN RETURN 1B DG to service as follows:

a. **SHUT AND LOCK** the following 1B DG Air Start Header drain valves:

- 1B DG STARTING AIR STRAINER YS-4834 DRAIN VALVE, 1B-DSA-124
- 1B DG STARTING AIR STRAINER YS-4835 DRAIN VALVE, 1B-DSA-125

b. **REPLACE** the pipe caps on the following 1B DG Air Start Header drain valves:

- 1B DG STARTING AIR STRAINER YS-4834 DRAIN VALVE, 1B-DSA-124
- 1B DG STARTING AIR STRAINER YS-4835 DRAIN VALVE, 1B-DSA-125

c. **OPEN AND LOCK** the following 1B DG Air Start Header isolation valves:

- 1B DG STARTING AIR TO DIESEL START SV-4834 ISOLATION VALVE, 1B-DSA-114
- 1B DG STARTING AIR TO DIESEL START SV-4835 ISOLATION VALVE, 1B-DSA-117

d. **ENSURE** annunciator "STARTING AIR PRESSURE LOW" clears.

e. **PLACE** 1B DG OUT BKR, 1-CS-152-1403, to NORMAL.

6.10.B.3 Procedure (Continued)

f. **IF** required,
THEN PERFORM ONE of the following to return 1B DG to service:

NOTE
1B DG should be run at least 1 hour.

- **PERFORM** STP O-8B-1, Test of 1B DG and 14 4KV Bus LOCI Sequencer, to declare 1B DG operable.

OR

- **PERFORM** the following sections to restore 1B DG operation:

  (1) Section 6.3, 1B DG SLOW SPEED START

  (2) Section 6.6, PARALLEL 1B DIESEL GENERATOR

  (3) **WHEN** 1B DG has been loaded for at least one hour,
  THEN STOP 1B DG **PER** Section 6.8, 1B DG SHUTDOWN.

NOTE
The OC DG should normally remain prealigned to 14 4kv bus until the 1B EDG is returned to Operable status.

g. **IF** 0C DG is prealigned to 14 4KV Bus,
THEN OPEN the 0C DG 14 4KV Bus Disconnect 189-1406, by PERFORMING the following:

(1) **ENSURE** the 0C DG 14 4KV BUS FDR handswitch, 1-CS-152-1406 in PTL.

(2) **LOCK** the 0C DG 14 4KV Bus DISC, 189-1406 in the OPEN position.

(3) **PLACE** the 0C DG 14 4KV BUS FDR handswitch 1-CS-152-1406 in the NORMAL position.

(4) **PLACE** the following handswitches in NORMAL **AND REMOVE** the OFF NORMAL COMPONENT tags:

- 0C DG 11 4KV BUS FDR, 1-CS-152-1106
- 0C DG 21 4KV BUS FDR, 2-CS-152-2106
- 0C DG 24 4KV BUS FDR, 2-CS-152-2406

6.10.B.3.g **Procedure (Continued)**

(5) **REMOVE** the OFF NORMAL COMPONENT tag from the control room indication for DISC 189-1406.

h. **REQUEST** the CRS **OR** Shift Manager inform the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts that the 1B DG has been returned to service. **[B0138] [B0906]**

i. **IF** used,
THEN REMOVE 0C DG barricades.

****** END ******

6.11 1B DG MECHANICAL GOVERNOR ADJUSTMENT AND OVERSPEED TEST

A. Initial Conditions

1. A calibrated speed measuring device (Laser Tach or equivalent) is installed.
2. 1B DG is out of service.
3. Mechanical Maintenance is performing EDG-20, Emergency Diesel Generator Inspection, on 1B DG **OR** as requested by the System Engineer.

B. Procedure

1. **PERFORM** a Slow Speed Start **PER** Section 6.3, 1B DG SLOW SPEED START.
2. **MONITOR** 1B DG speed using the speed measuring device.

6.11.B Procedure (Continued)

NOTE

- The 1B DG Speed may be adjusted to raise or lower speed as directed by the System Engineer to support maintenance.
- 1B DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.

CAUTION

Only one DG shall be tested at any one time. 1B DG is considered inoperable.

3. **GRADUALLY RAISE** the 1B DG GOVERNOR SPEED CONTROL CS/SP at 1C62B **AND HOLD** at the following speeds during the ramp:

RPM	Approx. DURATION (Minutes)
500 (475 - 525)	10
600 (575 - 625)	5
700 (675 - 725)	5
800 (775 - 825)	5
900 (875 - 925)	5

4. **WHEN** the 1B DG speed ramp is complete,
THEN ADJUST the 1B DG GOVERNOR SPEED CONTROL CS/SP at 1C62B to 900 RPM.

5. **IF** 1B DG speed control is erratic,
THEN NOTIFY mechanical maintenance to tune the mechanical governor **PER** EDG-10, Woodward Governor Oil Change.

6.11.B Procedure (Continued)

NOTE
The Overspeed Trip Setpoint is 1035 to 1053 RPM.

- Trips between 1008 **AND** 1035 RPM do **NOT** warrant an operability concern.
- Trips between 1053 **AND** 1085 do **NOT** warrant an equipment damage concern. However, actions should be taken to restore the trip setting to between 1035 **AND** 1053 RPM at the next convenient opportunity.

CAUTION
- 1B DG should **NOT** be run at speeds greater than 960 RPM for longer than absolutely necessary.
- Do **NOT** exceed 1085 RPM.

6. **DETERMINE** 1B DG Overspeed Trip setpoint by PERFORMING the following:

   a. **RAISE** 1B DG speed by slowly raising 1B DG GOVERNOR SPEED CONTROL CS/SP at 1C62B until 1B DG trips on overspeed or maximum HS Limit is achieved.

   b. **IF** overspeed setting has not been achieved using the Speed Control Handswitch,
   THEN HAVE Mechanical Maintenance **SLOWLY RAISE** the Governor linkage arm to increase diesel speed until the trip setpoint is reached.

7. **CHECK** 1C62A annunciator "ENGINE OVERSPEED" alarms.

8. **RECORD** the results in EDG-20, Emergency Diesel Generator Inspection, for 1B DG.

9. **RESET** the 1B DG fuel racks.

10. **PLACE** 1B DG SLOW START MODE SELECTOR SW, 1-HS-4826, to NORMAL.

11. **DEPRESS** the Local Alarm Reset Pushbutton on the 1B Diesel Generator Control Panel **AND CHECK** the 1C62A annunciator "ENGINE OVERSPEED" clears.

CAUTION
DO **NOT** allow the 1B DG room temperature to fall below 60° F.

12. **IF** desired,
THEN STOP the 1B DG Room Ventilation Fan by momentarily placing its handswitch to the STOP position.

6.11.B Procedure (Continued)

NOTE
1B DG should be run at least 4 hours following EDG-20.

13. **IF** returning 1B DG to service,
THEN PERFORM applicable sections of STP O-8B-1, Test of 1B DG and 14 4KV Bus LOCI Sequencer, to declare 1B DG operable.

14. **IF** 1B DG is **NOT** scheduled to be manually restarted within three hours,
THEN CONSIDER barring over 1B DG **PER** 6.24, ROTATING 1B DIESEL GENERATOR WITH COMPRESSED AIR, **OR** 6.9, MANUALLY BAR-OVER 1B DIESEL GENERATOR. **[B0048]**

****** END ******

6.12 MAKEUP TO THE 1B DG JACKET COOLING WATER EXPANSION TANK

A. Initial Conditions

1. Service Water is available to the 1B DG Air Compressor Aftercooler.

B. Procedure

1. **OPEN** 1B DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 1B-DCW-101.

2. **WHEN** the Expansion Tank has reached the desired level,
   THEN SHUT 1B DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 1B-DCW-101.

3. **NOTIFY** Plant Chemistry that makeup water has been added to the system.

****** END ******

6.13 FILL THE 1B DG JACKET WATER AND AIR COOLING SYSTEMS AFTER MAINTENANCE

A. Initial Conditions

1. The 1B DG Jacket Water Cooling System **OR** Air Cooling System has been drained for maintenance.
2. Maintenance on the affected Cooling System has been completed **AND** the systems are mechanically intact.
3. Service Water is aligned to 1B DG.

B. Procedure

1. **INSTALL** vent rigs on the following 1B DG Jacket Water Cooling valves:
   - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
   - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115
2. **ENSURE** 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-111, is SHUT.
3. **UNLOCK AND OPEN** 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER DRAIN VALVE, 1B-DCW-1003.
4. **UNLOCK AND OPEN** 1B DG JACKET WATER COOLING JACKET WATER COOLER DRAIN VALVE, 1B-DCW-104, to start filling from the SRW System.
5. **UNLOCK AND OPEN** 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-107.
6. **OPEN** 1B DG JACKET WATER COOLING TEMPERATURE CONTROL VLV 4806 BYPASS VALVE, 1B-DCW-103.
7. **MONITOR** the 1B DG Jacket Water Expansion Tank level.
8. **WHEN** the 1B DG Jacket Water Expansion Tank level is approximately 3/4 full, **THEN SHUT AND LOCK** 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER DRAIN VALVE, 1B-DCW-1003.
9. **CRACK OPEN** the following vent valves:
   - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
   - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

6.13.B Procedure (Continued)

10. **WHEN** a continuous stream of water is observed from a heat exchanger vent, **THEN SHUT** the associated valve:

    - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
    - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

11. **SHUT AND LOCK** 1B DG JACKET WATER COOLING JACKET WATER COOLER DRAIN VALVE, 1B-DCW-104.

12. **SHUT AND LOCK** 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-107.

13. **IF** necessary, **FILL** the Expansion Tank **PER** 6.12, MAKEUP TO THE 1B DG JACKET COOLING WATER EXPANSION TANK.

14. **CLOSE** the circuit breakers for the 1B DG electric Jacket Cooling Pump **AND** the Jacket Coolant Heater.

15. **ENSURE** the COOLANT PUMP handswitch, 1-HS-4807, is in AUTO.

16. **WHEN** the 1B DG electric Jacket Cooling Pump has run for at least 10 minutes, **THEN PERFORM** the following:

    a. **CRACK OPEN** the following valves:

       - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
       - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

    b. **WHEN** a continuous stream of water is observed from a heat exchanger vent,
       THEN SHUT the associated valve:

       - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
       - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

17. **REMOVE** the vent rigs on the following 1B DG Jacket Water Cooling valves:

    - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
    - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

6.13.B Procedure (Continued)

18. **SHUT** 1B DG JACKET WATER COOLING TEMPERATURE CONTROL VLV 4806 BYPASS VALVE, 1B-DCW-103.

19. **ENSURE** the COOLANT HEATER handswitch, 1-HS-4806, is in AUTO.

20. **REQUEST** Plant Chemistry obtain a 1B DG Jacket Water sample **AND CHECK** the coolant is within Chemistry specifications.

****** END ******

6.14 FILL THE 1B DG JACKET WATER AND AIR COOLING SYSTEMS WITH DI WATER AFTER MAINTENANCE

A. Initial Conditions

1. The 1B DG Jacket Water Cooling System **OR** Air Cooling System has been drained for maintenance.

2. Maintenance on the affected Cooling System has been completed **AND** the systems are mechanically intact.

B. Procedure

1. **INSTALL** vent rigs on the following 1B DG Jacket Water Cooling valves:

   - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
   - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

2. **ENSURE** the following valves are SHUT:

   - 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-111
   - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER DRAIN VALVE, 1B-DCW-1003

NOTE

The DI water connection on the 45 foot Aux BLDG Truck Bay is the normal source of makeup water.

3. **CONNECT** a hose to a DI water source.

4. **FLUSH** the hose with DI water until Chemistry determines the water is of proper quality.

5. **CONNECT** the hose to 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-117.

6. **ENSURE OPEN** the DI water source isolation valve.

7. **UNLOCK AND THROTTLE OPEN** 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-117, to begin filling.

8. **OPEN** 1B DG JACKET WATER COOLING TEMPERATURE CONTROL VLV 4806 BYPASS VALVE, 1B-DCW-103.

9. **MONITOR** the 1B DG Jacket Water Expansion Tank level.

6.14.B Procedure (Continued)

10. **WHEN** the 1B DG Jacket Water Expansion Tank level is approximately 3/4 full, **THEN SHUT** 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-117.

11. **CRACK OPEN** the following vent valves:

    - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
    - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

12. **WHEN** a continuous stream of water is observed from a heat exchanger vent, **THEN SHUT** the associated valve:

    - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
    - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

13. **IF** necessary, **THROTTLE OPEN** 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-117, to restore 1B DG Jacket Water Expansion Tank level to between 1/2 and 3/4 full.

14. **CLOSE** the circuit breakers for the 1B DG electric Jacket Cooling Pump **AND** the Jacket Coolant Heater.

15. **ENSURE** the COOLANT PUMP handswitch, 1-HS-4807, is in AUTO.

16. **WHEN** the 1B DG electric Jacket Cooling Pump has run for at least 10 minutes, **THEN PERFORM** the following:

    a. **CRACK OPEN** the following valves:

       - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
       - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

    b. **WHEN** a continuous stream of water is observed from a heat exchanger vent,
       THEN SHUT the associated valve:

       - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105
       - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

6.14.B Procedure (Continued)

17. **IF** necessary, **THROTTLE OPEN** 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-117, to restore 1B DG Jacket Water Expansion Tank level to between 1/2 and 3/4 full.

18. **LOCK SHUT** 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-117.

19. **SHUT** the DI water source isolation valve.

20. **REMOVE** the vent rigs on the following 1B DG Jacket Water Cooling valves:

    - 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105

    - 1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 1B-DCW-115

21. **SHUT** 1B DG JACKET WATER COOLING TEMPERATURE CONTROL VLV 4806 BYPASS VALVE, 1B-DCW-103.

22. **ENSURE** the COOLANT HEATER handswitch, 1-HS-4806, is in AUTO.

23. **REMOVE** the hose between the DI water source **AND** 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-117.

24. **NOTIFY** Plant Chemistry that DI water was used to fill the Jacket Water Cooling system, **AND** to **ADJUST** Chemistry as required.

****** END ******

6.15 FEED AND BLEED 1B DG JACKET WATER AND AIR COOLING SYSTEMS

A. Initial Conditions

1. The 1B DG electric Jacket Cooling Pump is in service.
2. Service Water is available to 1B DG.
3. An operator is available to maintain a continuous feed and bleed operation.

B. Procedure

1. **CONNECT** a hose or sleeving from 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-117, to the nearest floor drain.

CAUTION

IF 1B DG must remain operable during feed and bleed operation, **THEN** an operator must be continuously present to ensure the 1B DG Jacket Water Expansion Tank level stays above the low level alarm **AND** JCW temperature remains above 90° F. **[B0022]**

2. **NOTIFY** the Control Room that a feed and bleed to the 1B DG Jacket Water Expansion Tank is to be started.
3. **THROTTLE OPEN** 1B DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 1B-DCW-101.
4. **UNLOCK AND THROTTLE OPEN** 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-117.
5. **ENSURE** adequate suction for the 1B DG electric Jacket Coolant Pump is maintained.

CAUTION

1B DG shall be considered out of service if JCW temperature drops below 90° F.

6. **IF** any of the following occur, **THEN LOWER** the drain rate:
   - 1B DG Jacket Water Expansion Tank level approaches the Low Level Alarm
   - The 1B DG electric Jacket Cooling Pump cavitates
   - Jacket Cooling System temperature is near 90° F **AND** decreasing

6.15.B Procedure (Continued)

7. **IF** the 1B DG Jacket Water Expansion Tank level can **NOT** be maintained, **THEN STOP** the feed and bleed as follows:

   - **SHUT AND LOCK** 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-117.

   - **SHUT** 1B DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 1B-DCW-101.

NOTE
DG Room Waste Oil Collection Tank level should **NOT** rise.

8. **PERIODICALLY MONITOR** the DG Room Waste Oil Collection Tank level to ensure proper operation of the interceptor.

9. **WHEN** approximately 5 volume changes have taken place (1000 gallons **OR** 3 hours),
   THEN STOP the feed and bleed as follows:

   - **SHUT AND LOCK** 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-117.

   - **ENSURE** Jacket Water Expansion Tank level greater than 1/2 full, **THEN SHUT** 1B DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 1B-DCW-101.

10. **DISCONNECT** the hose or sleeving from 1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 1B-DCW-117.

11. **VENT** the Jacket Cooling Heat Exchanger as follows:

    a. **CRACK OPEN** 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105.

    b. **WHEN** a steady stream of water is observed, **THEN SHUT** 1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 1B-DCW-105.

12. **INFORM** the Control Room that feed and bleed operations are complete. **[B0048]**

13. **REQUEST** Plant Chemistry obtain a 1B DG Jacket Water sample **AND CHECK** the coolant is within Chemistry specifications.

****** END ******

6.16 CONTROLLED FILL OF 1B DG SRW HEADER AFTER MAINTENANCE

A. Initial Conditions

1. 1B DG is tagged out.
2. Service Water is isolated to 1B DG.
3. Vent rigs **AND** a safety ladder are available for venting the 1B DG SRW Header.
4. SRW valves for 1B DG are lined up **PER** Attachments 1 **AND** 2 of OI-15, Service Water System, except 1B DG SRW Supply **AND** Return valves are **SHUT**:
   - 12 SERVICE WATER HEADER SUPPLY TO 1B DIESEL GENERATOR ISOLATION VALVE, 1-SRW-170
   - 1B DIESEL GENERATOR RETURN TO 12 SERVICE WATER HEADER ISOLATION VALVE, 1-SRW-172

B. Procedure

1. **REMOVE** the caps **AND INSTALL** vent rigs on the following 1B DG SRW valves:
   - 1B DIESEL GENERATOR SRW 1-PDIC-1588 HP SIDE DRAIN VALVE, 1-SRW-1004
   - 1B DIESEL GENERATOR SRW 1-PDIC-1588 LP SIDE DRAIN VALVE, 1-SRW-1005
   - 1B DIESEL GENERATOR SRW SUPPLY HEADER VENT VALVE, 1-SRW-1185
   - 1B DIESEL GENERATOR SRW RETURN HEADER VENT VALVE, 1-SRW-1186
2. **ENSURE** 1B DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 1B-DCW-101, is SHUT.
3. **ENSURE** 1B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 1-SRW-1588-CV, is SHUT.
4. **ENSURE** 1B DG DSA Compressor After Cooler valves are LOCKED OPEN:
   - 1B DIESEL GENERATOR STARTING AIR COMPRESSOR AIR COOLER INLET ISOLATION VALVE, 1-SRW-506
   - 1B DIESEL GENERATOR STARTING AIR COMPRESSOR AIR COOLER OUTLET ISOLATION VALVE, 1-SRW-507

6.16.B Procedure (Continued)

NOTE
This step causes 1B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 1-SRW-1588-CV, to fail open.

5. **SLOWLY ROTATE** the handle on INSTRUMENT AIR TO 1B DG SRW INLET 1-CV-1588 AUTO / VENT SELECTOR VALVE, 1-IA-1588-HV, 180° to the MANUAL position.

6. **WHEN** filling is ready to begin,
THEN INFORM the Control Room to monitor SRW Head Tank level **AND** SRW Header pressure.

7. **SLOWLY OPEN AND** LOCK OPEN, 1B DIESEL GENERATOR RETURN TO 12 SERVICE WATER HEADER ISOLATION VALVE, 1-SRW-172.

8. **CRACK OPEN** 1B DG SRW Header vent valves:

   - 1B DIESEL GENERATOR SRW SUPPLY HEADER VENT VALVE, 1-SRW-1185
   - 1B DIESEL GENERATOR SRW RETURN HEADER VENT VALVE, 1-SRW-1186

9. **WHEN** a steady stream of water is observed from a header vent,
THEN SHUT the associated vent valve:

   - 1B DIESEL GENERATOR SRW SUPPLY HEADER VENT VALVE, 1-SRW-1185
   - 1B DIESEL GENERATOR SRW RETURN HEADER VENT VALVE, 1-SRW-1186

10. **VENT** 1-SRW-1588-PDIC as follows:

    a. **OPEN** 1B DIESEL GENERATOR SRW 1-PDIC-1588 EQUALIZING VALVE, 1-SRW-1003.

    b. **OPEN** 1B DIESEL GENERATOR SRW 1-PDIC-1588 HP SIDE DRAIN VALVE, 1-SRW-1004.

    c. **OPEN** 1B DIESEL GENERATOR SRW 1-PDIC-1588 LP SIDE DRAIN VALVE, 1-SRW-1005.

6.16.B Procedure (Continued)

NOTE
Initially, a solid stream of water issues from the drain valve due to water trapped in the line.

11. **WHEN** a steady stream of water issues from the drain valves, **THEN STOP** venting as follows:

    a. **SHUT** 1B DIESEL GENERATOR SRW 1-PDIC-1588 HP SIDE DRAIN VALVE, 1-SRW-1004.

    b. **SHUT** 1B DIESEL GENERATOR SRW 1-PDIC-1588 LP SIDE DRAIN VALVE, 1-SRW-1005.

    c. **SHUT** 1B DIESEL GENERATOR SRW 1-PDIC-1588 EQUALIZING VALVE, 1-SRW-1003.

NOTE
This step will cause 1B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 1-SRW-1588-CV, to shut.

12. **SLOWLY ROTATE** the handle on INSTRUMENT AIR TO 1B DG SRW INLET 1-CV-1588 AUTO / VENT SELECTOR VALVE, 1-IA-1588-HV, 180° to the AUTO position.

13. **CHECK** 1B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 1-SRW-1588-CV, is SHUT.

14. **SLOWLY OPEN AND** LOCK OPEN, 12 SERVICE WATER HEADER SUPPLY TO 1B DIESEL GENERATOR ISOLATION VALVE, 1-SRW-170.

15. **REMOVE** vent rigs **AND INSTALL** caps on the following 1B DG SRW valves:

    - 1B DIESEL GENERATOR SRW 1-PDIC-1588 HP SIDE DRAIN VALVE, 1-SRW-1004
    - 1B DIESEL GENERATOR SRW 1-PDIC-1588 LP SIDE DRAIN VALVE, 1-SRW-1005
    - 1B DIESEL GENERATOR SRW SUPPLY HEADER VENT VALVE, 1-SRW-1185
    - 1B DIESEL GENERATOR SRW RETURN HEADER VENT VALVE, 1-SRW-1186

6.16.B Procedure (Continued)

16. **INDEPENDENTLY VERIFY** the following:

    - 1B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 1-SRW-1588-CV, is SHUT.

    - INSTRUMENT AIR TO 1B DG SRW INLET 1-CV-1588 AUTO / VENT SELECTOR VALVE, 1-IA-1588-HV, is in the AUTO position.

****** END ******

6.17 SHIFT 1B DG SRW FLOW CONTROLLER, 1-SRW-1588-PDIC, AUTO/MANUAL CONTROL

A. Initial Conditions

1. The Shift Manager has approved changing 1-SRW-1588-PDIC mode of operation.
2. 1B DG is operating.
3. Instrument Air is available.

B. Procedure

CAUTION
1B DG is considered inoperable if 1-SRW-1588-CV is **NOT** in Automatic Control.

1. **SHIFT** 1B DG SRW FLOW CONTROLLER, 1-SRW-1588-PDIC, from automatic to manual control as follows:
   a. Carefully **PULL** out the Regulator knob to unlock the regulator.

NOTE
The regulator knob should be turned in the direction that the Balance Indicator Ball needs to move.

   b. Slowly **TURN** the Regulator knob to move the Balance Indicator Ball to the middle of the Balance Indicator Tube.
   c. **PLACE** the MAN/AUTO selector in M (MAN).

NOTE
1B DG SRW FLOW CONTROLLER, 1-SRW-1588-PDIC, setpoint is 8.5 PSID.

CAUTION
Long term operation with excess flow through the coolers can cause vibrations affecting expansion joint reliability.

   d. **CONTROL** 1B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 1-SRW-1588-CV, with the Regulator knob.

6.17.B Procedure (Continued)

2. **WHEN** desired,
THEN SHIFT 1B DG SRW FLOW CONTROLLER, 1-SRW-1588-PDIC, from manual to automatic control as follows:

   a. Slowly **TURN** the Setpoint knob to move the Balance Indicator Ball to the middle of the Balance Indicator Tube.

   b. **PLACE** the MAN/AUTO selector in A (AUTO).

   c. **IF** necessary, **ADJUST** the 1B DG SRW CONTROLLER, 1-SRW-1588-PDIC, setpoint to 8.5 PSID, using the Setpoint knob.

   d. **ENSURE** the regulator is LOCKED by pushing in on the Regulator knob.

****** END ******

6.18 MANUAL HANDWHEEL OPERATION OF 1-SRW-1588-CV

A. Initial Conditions

1. Operation of 1B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 1-SRW-1588-CV, without using the Air Supply is desired.

B. Procedure

CAUTION
1B DG is considered inoperable if 1-SRW-1588-CV is **NOT** in Automatic Control.

1. **ENGAGE** the handwheel as follows:

   a. **INFORM** the Control Room that failing open 1B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 1-SRW-1588-CV, may affect the SRW head tank levels.

NOTE
This step causes 1B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 1-SRW-1588-CV, to fail open.

   b. **ROTATE** the handle on INSTRUMENT AIR TO 1B DG SRW INLET 1-CV-1588 AUTO / VENT SELECTOR VALVE, 1-IA-1588-HV, 180° to the MANUAL position.

NOTE
The handwheel must be in the open position to ensure full range of valve travel

   c. **ROTATE** the handwheel counterclockwise to the full OPEN position.

CAUTION
Attempting to operate the valve with air supplied to the actuator **AND** the handwheel engaged may result in damage to the actuator.

   d. **LIFT OUT AND ROTATE** the clutch handle (the flat rectangular plate in the center of the Position Indicator on the valve body) 90° , allowing it to fully seat in the indicator's deep slot to engage the handwheel mechanism.

   e. **SLOWLY ROTATE** the handwheel in either direction until the spring loaded center pin on the flat rectangular plate falls into the slot.

6.18.B.1 **Procedure (Continued)**

CAUTION
Long term operation with excess flow through the coolers can cause vibrations affecting expansion joint reliability.

f. **TURN** the handwheel in the desired direction as indicated on the valve handwheel.

2. **WHEN** desired,
THEN DISENGAGE the handwheel as follows:

a. **INFORM** the Control Room that manual operation of 1B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 1-SRW-1588-CV, may affect the SRW head tank levels.

b. **ROTATE** the handwheel until the valve is in the FULL OPEN position, at which point little resistance should be felt.

NOTE
It will be difficult to pull out the clutch handle if the handwheel mechanism is transmitting torque.

c. **LIFT** the clutch handle out of the deep slot, rotate it 90°, **AND SEAT** it in the indicator shallow slot to disengage the handwheel mechanism.

d. **LOCK** the clutch handle in the shallow slot.

e. **ROTATE** the handle on INSTRUMENT AIR TO 1B DG SRW INLET 1-CV-1588 AUTO / VENT SELECTOR VALVE, 1-IA-1588-HV, 180° to the AUTO position.

f. **CHECK** 1B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 1-SRW-1588-CV, shuts.

3. **ENSURE** INSTRUMENT AIR SUPPLY TO 1B DG SRW INLET 1-SRW-1588-CV ISOLATION VALVE, 1-IA-875, is OPEN.

4. **INFORM** the Control Room that 1B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 1-SRW-1588-CV, is back in AUTO.

****** END ******

6.19 BLOW DOWN 1B DG DIESEL AIR START MOISTURE TRAPS

A. Initial Conditions

1. 1B DG Starting Air System is aligned **PER** ATTACHMENT 1B, 1B DIESEL GENERATOR VALVE LINEUP.

B. Procedure

1. **BLOWDOWN** the moisture traps as follows:

   a. **UNLOCK AND SLOWLY CRACK OPEN** the selected moisture trap bypass valve:

   - 1B DG STARTING AIR WEST AIR RECEIVER DRAIN TRAP BYPASS VALVE, 1B-DSA-130
   - 1B DG STARTING AIR EAST AIR RECEIVER DRAIN TRAP BYPASS VALVE, 1B-DSA-131

   b. **WHEN** the trap is free of moisture,
   THEN SHUT AND LOCK the selected moisture trap bypass valve: **[B0048]**

   - 1B DG STARTING AIR WEST AIR RECEIVER DRAIN TRAP BYPASS VALVE, 1B-DSA-130
   - 1B DG STARTING AIR EAST AIR RECEIVER DRAIN TRAP BYPASS VALVE, 1B-DSA-131

2. **IF** excessive moisture is noted,
   THEN SUBMIT an IR to have the affected trap cleaned **AND** inspected.

****** END ******

6.20 ADD LUBE OIL TO THE 1B DG LUBE OIL DAY TANK

A. Initial Conditions

1. 1B DG Lube Oil System valves are in the NORMAL alignment **PER** ATTACHMENT 1B, 1B DIESEL GENERATOR VALVE LINEUP.

B. Procedure

1. **VERIFY** lube oil type in the 55 gallon drums with the Oil Control Manual.
2. **CHECK** each 55 gallon drum of lube oil is sealed with a factory seal **OR** has a custody seal.
3. **IF** the quality of the lube oil is questioned,
   THEN PERFORM the following:
   a. **REJECT** the drum.
   b. **RETURN** the drum to the warehouse.
   c. **INITIATE** an Issue Report for the rejected drum.
4. **WHEN** lube oil is ready to be transferred,
   THEN MOVE the drum(s) to the 1B DG Room.
5. **ENSURE** drip pans are placed under hose connections.
6. **ENSURE** the temporary transfer hose is clean.
7. **CONNECT** a temporary transfer hose to the pipe stub of the hand-operated pump **OR** 1B DG LUBE OIL FILL SAMPLE ISOLATION VALVE, 1B-DLO-117.
8. **PERFORM** the following for each lube oil drum:
   a. **INSERT** the temporary transfer hose into the drum.
   b. **OPEN** 1B DG LUBE OIL DAY TANK FILL ISOLATION VALVE, 1B-DLO-113.
   c. **TRANSFER** the lube oil drum contents to the 1B DG Lube Oil Day Tank using a hand-operated **OR** electric transfer pump.
   d. **SHUT** 1B DG LUBE OIL DAY TANK FILL ISOLATION VALVE, 1B-DLO-113.
   e. **REMOVE** the temporary transfer hose from the drum.

NOTE
Excess oil addition will cause a 1B DG Lube Oil Day Tank high level alarm.

9. **WHEN** the desired level in the 1B DG Lube Oil Day Tank has been obtained,
   THEN STOP pumping.

6.20.B Procedure (Continued)

10. **IF** the entire contents of a drum were **NOT** transferred to the 1B DG Lube Oil Day Tank,
THEN INSTALL an appropriate locking device on the drum.

11. **REMOVE** the temporary transfer hose from the pipe stub of the hand-operated pump **OR** 1B DG LUBE OIL FILL SAMPLE ISOLATION VALVE, 1B-DLO-117.

12. **DRAIN** any waste from the drip pans **AND DISPOSE** of **PER** CH-1-101, Hazardous Waste Management.

13. **REMOVE** the drum(s) from the 1B Diesel Generator Room.

14. **LOG** the amount of lube oil added **AND** information from the drum custody or factory seals in the Safety Related Consumables Log in the Control Room.

****** END ******

6.21 1B DG STARTING AIR COMPRESSOR OPERATION

A. Initial Conditions

1. 1B DG Starting Air System is aligned **PER** ATTACHMENT 1B, 1B DIESEL GENERATOR VALVE LINEUP.

B. Procedure

1. **IF** manual operation is desired,
   THEN PERFORM the following:

   a. **ENSURE** adequate oil level in the air compressor.

   b. **PLACE AND HOLD** 1B DG AIR COMPRESSOR, 1-HS-4833, to START.

   c. **WHEN** air compressor shutdown is desired,
   THEN RELEASE 1B DG AIR COMPRESSOR, 1-HS-4833.

2. **IF** automatic operation is desired,
   THEN PERFORM the following:

   a. **ENSURE** adequate oil level in the air compressor.

   b. **ENSURE** MCC 1BG breaker Air Compressor, 52-1BG03, is ON.

6.21.B Procedure (Continued)

3. **IF** operation of the 6 HP diesel engine Starting Air Compressor is desired, **THEN PERFORM** the following:

   a. **ENSURE** MCC 1BG breaker Air Compressor, 52-1BG03, is OFF before switching drive belts.

NOTE
Routine switching of drive belts shall be performed by Mechanical Maintenance.

   b. **REQUEST** Mechanical Maintenance to **PERFORM** the following:

      - **REMOVE** the pulley guard.
      - **SWITCH** the drive belts and pulley guard from the electric motor to the 6 HP diesel engine.

   c. **ENSURE** adequate oil level in the air compressor **AND** engine.

   d. **SHUT** 1B DG STARTING AIR DIESEL AIR COMPR EXHAUST LINE DRAIN VALVE, 1B-DSA-127.

   e. **CHECK** adequate fuel oil supply **AND OPEN** 1B DG FUEL OIL DIESEL AIR COMPR FUEL OIL SUPPLY ISOLATION VALVE, 1B-DFO-161.

   f. **OPEN** DIESEL STARTING AIR COMPRESSOR VARIABLE DISCHARGE PILOT SENSING ISOLATION VALVE, 1B-DSA-126, to place the VD pilot in operation.

   g. **MOVE** the decompressor lever towards the flywheel (South).

   h. **REMOVE** starting handle from the shaft.

NOTE
- Lubricating the shaft will make it easier to remove the starting handle after the engine has started.
- REGAL R&O 68 should be used to lubricate the camshaft.

   i. LUBRICATE the shaft with a light coating of oil.

   j. **PLACE** the starting handle on a shaft which extends from the North side of the 6 HP engine.

   k. **TURN** the engine over a few times with the starting handle to prime it.

6.21.B.3 Procedure (Continued)

l. **TURN** the starting handle sharply **AND SIMULTANEOUSLY MOVE** the decompressor lever towards the fuel tank.

WARNING

If the starting handle is released after the engine is started, it will rotate and be difficult to remove, and may result in personnel injury. This will require securing the engine for its removal.

m. **WHEN** the engine starts,
THEN REMOVE the starting handle.

(1) **IF** the handle is released prior to removing it,
THEN SHUTDOWN the Engine with its mechanical stop device, located on the left side of engine down low.

(2) **IF** the Engine was shutdown in Step 3.m.1 **AND** it is desired to restart,
THEN PERFORM Step 3.l and continue with the procedure.

NOTE

The compressor will cycle automatically with the VD pilot.

n. **WHEN** no longer needed,
THEN SHUTDOWN the 6 HP diesel engine Starting Air Compressor with its mechanical stop device, located on the left side of engine down low.

NOTE

Routine switching of drive belts shall be performed by Mechanical Maintenance.

o. **REQUEST** Mechanical Maintenance to **PERFORM** the following:

- **REMOVE** the pulley guard.
- **SWITCH** the drive belts and pulley guard from the 6 HP diesel engine to the electric motor.

p. **SHUT** 1B DG FUEL OIL AIR COMPR FUEL OIL SUPPLY ISOLATION VALVE, 1B-DFO-161.

q. **PLACE** the starting handle on the shaft which extends from the North side of the 6 HP engine.

6.21.B.3 Procedure (Continued)

r. **RETURN** the electric Starting Air Compressor to automatic operation by performing the following: **[B0048]**

- **SHUT** DIESEL STARTING AIR COMPRESSOR VARIABLE DISCHARGE PILOT SENSING ISOLATION VALVE, 1B-DSA-126.
- **PLACE** MCC 1BG breaker Air Compressor, 52-1BG03, to ON.

s. **OPEN** 1B DG STARTING AIR DIESEL AIR COMPR EXHAUST LINE DRAIN VALVE, 1B-DSA-127.

t. **IF** necessary,
THEN REFILL fuel tank using 1B DG FUEL OIL DIESEL COMPRESSOR DAY TANK FILL ISOLATION VALVE, 1B-DFO-160.

****** END ******

6.22 REMOVE AND RESTORE 1B DG STARTING AIR COMPRESSOR FOR SERVICE

A. Initial Conditions

1. At least one other DG Starting Air Compressor is in service and lined up for automatic operation.

B. Procedure

CAUTION

Cross-connecting Air Receivers may allow receivers on the isolated compressor to drop below normal operating pressure. The air receivers should be checked frequently for proper pressure while cross-connected.

1. **REMOVE** 1B DG Air Compressor from service as follows:

   a. **ENSURE** 1B DG STARTING AIR AIR COMPR TO WEST RECEIVER ISOLATION VALVE, 1B-DSA-101, is LOCKED OPEN.

   b. **ENSURE** 1B DG STARTING AIR AIR COMPR TO EAST RECEIVER ISOLATION VALVE, 1B-DSA-102, is LOCKED OPEN.

   c. **UNLOCK AND OPEN** RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-3.

   d. **UNLOCK AND OPEN** the selected cross connect valve:

      - RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-1

      OR

      - RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-2

   e. **OPEN** MCC 1BG breaker Air Compressor, 52-1BG03.

   f. **UNLOCK AND SHUT** 1B DG STARTING AIR COMPRESSOR DISCHARGE VALVE, 1B-DSA-1016.

6.22.B Procedure (Continued)

2. **WHEN** desired,
THEN RESTORE 1B DG Air Compressor to normal as follows: **[B0048]**

   a. **ENSURE** adequate oil level in the air compressor.

   b. **LOCK OPEN** 1B DG STARTING AIR COMPRESSOR DISCHARGE VALVE, 1B-DSA-1016.

   c. **CLOSE** MCC 1BG breaker Air Compressor, 52-1BG03.

   d. **SHUT AND LOCK** RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-3.

   e. **SHUT AND LOCK** the selected cross connect valve:

      - RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-1

      OR

      - RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-2

****** END ******

6.23 COLD WEATHER OPERATIONS [B0112]

A. Initial Conditions

1. 1B Diesel Generator room temperature is less than **OR** equal to 65° F.

B. Procedure

1. **ADJUST** the 1B Diesel Generator room thermostat setting to raise room temperature.

2. **IF** raising the thermostat setting fails to maintain room temperature, **THEN PERFORM** the following:

   a. **ENSURE** MN-1-110, Procedure Controlled Activities, is filled out for installation of portable electric heaters.

   b. **INSTALL** a portable electric heater(s) **PER** the following guidance:

      - **POSITION** the heater(s) facing West **AND NOT** facing the Control Panel.
      - Securely **FASTEN** the portable electric heater(s) to preclude any damage to other equipment due to a seismic event **PER** MN-1-106, Temporary Storage Of Equipment And Material.

   c. **INDEPENDENTLY VERIFY** the portable electric heater(s) has been installed correctly.

3. **IF** the portable electric heater(s) fails to maintain room temperature greater than 60° F, **THEN PERFORM** the following:

   a. **START AND LOAD** 1B Diesel Generator **PER** the following sections:

      (1) Section 6.2, 1B DG NON-EMERGENCY FAST START

      (2) Section 6.6, PARALLEL 1B DIESEL GENERATOR

NOTE

Turning off the 1B DG Ventilation Fan after 1B Diesel Generator has been shutdown will help to maintain a higher room temperature.

   b. **WHEN** 1B Diesel Generator has run for at least an hour, **THEN STOP** 1B DG **PER** Section 6.8, 1B DG SHUTDOWN.

   c. **STOP** the 1B DG Room Ventilation Fan by momentarily placing its handswitch to the STOP position.

6.23.B Procedure (Continued)

4. **WHEN** the portable electric heater(s) is **NOT** needed, **THEN PERFORM** the following:

   a. **REMOVE** the portable electric heater(s).

   b. **INDEPENDENTLY VERIFY** that the portable electric heater(s) has been removed.

   c. **ENSURE** MN-1-110, Procedure Controlled Activities, is completed for removal of portable electric heaters.

****** END ******

6.24 ROTATING 1B DIESEL GENERATOR WITH COMPRESSED AIR

A. Initial Conditions

1. 1B Diesel Generator has been prelubed **OR** run and requires barring-over.
2. Technical Specification 3.8.1 **OR** 3.8.2 has been reviewed to determine Diesel Generator operability requirements.
3. 1B Diesel Generator has been shutdown more than 20 minutes and less than three hours.

B. Procedure

1. **IF** during the performance of this section, operation of the DG is needed (i.e. loss of Offsite Power),
   THEN return the DG to operation by performing the following:
   a. **ENSURE SHUT** 1B DG STARTING AIR AIR BAR THROTTLE VALVE, 1B-DSA-135.

NOTE
DG will start if Auto Start signal is present.

   b. **ENSURE** 1B DIESEL GENERATOR CONTROL MODE SELECTOR SWITCH, 1-HS-4840, in AUTO/REMOTE
   c. **WHEN** DG is operating,
      THEN restore DG to normal by ensuring Steps 11 through 17 are complete. 01801
2. **IF** 1B DG is operable,
   THEN ENSURE that Unit 1 ZA train equipment is operable **PER** OI-49, Operability Verification, prior to barring over the engine.

NOTE
1B DG is INOPERABLE when 1-HS-4840 is in LOCAL.

3. **ENSURE** 1B DG CONTROL MODE SELECTOR SWITCH, 1-HS-4840, in LOCAL.
4. **PLACE** 1B DG AIR BAR SWITCH, 1-HS-4861, in AIR BAR.
5. **SHUT** 1B DG STARTING AIR #14 LOWER BEARING OIL BOOSTER ISOLATION VALVE, 1B-DSA-138.
6. **OPEN** 1B DG STARTING AIR AIR BAR 1-PI-4821 ISOLATION, 1B-DSA-137.
7. **UNLOCK AND OPEN** 1B DG STARTING AIR AIR BAR ROOT VALVE, 1B-DSA 121.

6.24.B Procedure (Continued)

8. **OPEN** 1B DG STARTING AIR AIR BAR ISOLATION VALVE, 1B-DSA-136.

CAUTION
During Air-Bar, all DG East Air Receivers will supply air to 1B DG.

NOTE
The Air Bar valve must be opened quickly to prevent the DG from stalling.

9. **OPEN** 1B DG STARTING AIR AIR BAR THROTTLE VALVE, 1B-DSA-135, as needed to rotate the 1B Diesel Engine at least one revolution, **THEN SHUT** 1B DG STARTING AIR AIR BAR THROTTLE VALVE, 1B-DSA-135.

10. **WHEN** 1B DG has been rotated at least one revolution, **THEN PERFORM** steps 11 through 18.

11. **SHUT** 1B DG STARTING AIR AIR BAR ISOLATION VALVE, 1B-DSA-136.

12. **SHUT AND LOCK** 1B DG STARTING AIR AIR BAR ROOT VALVE, 1B-DSA-121.

13. **SHUT** 1B DG STARTING AIR AIR BAR 1-PI-4821 ISOLATION, 1B-DSA-137.

14. **OPEN** 1B DG STARTING #14 LOWER BEARING OIL BOOSTER ISOLATION VALVE, 1B-DSA-138.

15. **PLACE** the AIR BAR HANDSWITCH, 1-HS-4861, in NORMAL.

16. **PLACE** the 1B DIESEL GENERATOR CONTROL MODE SELECTOR SWITCH, 1-HS-4840, in AUTO/REMOTE **AND REMOVE** the key.

17. **INDEPENDENTLY VERIFY** that:

    a. The 1B DIESEL GENERATOR AIR BAR HANDSWITCH, 1-HS-4861, is in NORMAL.

    b. The 1B DIESEL GENERATOR CONTROL MODE SELECTOR SWITCH, 1-HS-4840, is in AUTO/REMOTE.

    c. 1B DG STARTING AIR AIR BAR ROOT VALVE, 1B-DSA-121, is LOCKED SHUT.

18. **NOTIFY** the Control Room that the 1B DG bar-over is complete.

****** END ******

6.25 PERIODIC RUN OF DIESEL STARTING AIR COMPRESSOR (PE 1-24-1-O-Q)

A. Initial Conditions

1. The Diesel Starting Air Compressor is shutdown.

B. Procedure

1. **ENSURE** adequate oil level in the engine.
2. **SHUT** 1B STARTING AIR DIESEL AIR COMPR EXHAUST LINE DRAIN VALVE, 1B-DSA-127.
3. **CHECK** for adequate fuel oil supply.
4. **OPEN** 1B DG FUEL OIL DIESEL AIR COMPR FUEL OIL SUPPLY ISOLATION VALVE, 1B-DFO-161.
5. **MOVE** the decompressor lever towards the flywheel (South).
6. **REMOVE** starting handle from the shaft.

NOTE

- Lubricating the shaft will make it easier to remove the starting handle after the engine has started.
- REGAL R&O 68 should be used to lubricate the camshaft.

7. **LUBRICATE** the shaft with a light coating of oil.
8. **PLACE** the handle on a shaft which extends from the North side of the 6 HP engine.
9. **TURN** the engine over a few times with the manual starting handle to prime it.
10. **TURN** the starting handle sharply **AND SIMULTANEOUSLY MOVE** the decompressor lever towards the fuel tank.

6.25.B **Procedure** (Continued)

WARNING

If the starting handle is released after the engine is started, it will rotate and be difficult to remove, and may result in personnel injury. This will require securing the engine for its removal.

11. **WHEN** the engine starts,
THEN REMOVE the starting handle.

    a. **IF** the handle is released prior to removing it,
    THEN SHUTDOWN the Engine with its mechanical stop device, located on the left side of engine down low.

    b. **IF** the Engine was shutdown in Step 11.a **AND** it is desired to restart,
    THEN PERFORM Step 10 and continue with the procedure.

12. **RUN** the engine for 15 minutes unless the engine was started for training.

13. **SHUTDOWN** the Diesel Starting Air Compressor with its mechanical stop device, located on the left side of engine down low.

14. **SHUT** 1B DG FUEL OIL AIR COMPR FUEL OIL SUPPLY ISOLATION VALVE, 1B-DFO-161.

15. **PLACE** the starting handle on the shaft which extends from the North side of the 6 HP engine.

16. **OPEN** 1B STARTING AIR DIESEL AIR COMPR EXHAUST LINE DRAIN VALVE, 1B-DSA-127.

17. **IF** necessary,
THEN REFILL fuel tank using 1B DG FUEL OIL DIESEL COMPRESSOR DAY TANK FILL ISOLATION VALVE, 1B-DFO-160.

****** END ******

6.26 RAPID SHUTDOWN OF THE 1B DIESEL

A. Initial Conditions

1. 1B DG is operating in parallel operation with 14 4KV Bus **OR** unloaded **AND** a condition exists that requires a rapid shutdown.
2. Stopping 1B DG energizes the 1B DG Stopping Relay Timer and prevents all 1B DG starts for one minute.
3. Do **NOT** stop two DGs at the same time. **[B0614]**
4. The 1B DG is **NOT** in Local.

B. Procedure

NOTE
Steps 1 and 2 may be worked in parallel

1. **IF** 1B DG is running with a SIAS signal present,
   THEN ENSURE actuation modules are reset locally (at the ESFAS cabinets) prior to 1B DG shutdown.

NOTE
1B DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.

2. **IF** 1B DG is in parallel operation with 14 4KV Bus,
   THEN REMOVE 1B DG load by performing the following:
   a. **LOWER** MW **AND** KVAR loads concurrently to below 0.5 MW **AND** zero KVARs **PER** the following:

NOTE
Load may be lowered as rapidly as necessary.

- **LOWER** MW load using 1B DG SPEED CONTR, 1-CS-1403.
- **MAINTAIN** 0 to 500 KVARs using 1B DG AUTO VOLT CONTR, 1-CS-1402, **AND** FIGURE 1, DIESEL GENERATOR ELECTRICAL LIMITS.
- **MONITOR** 14 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**

   b. **WHEN** 1B DG load is less than 0.5 MW,
   THEN PLACE 1B DG OUT BKR, 1-CS-152-1403, to TRIP.

3. **MOMENTARILY PLACE** 1B DG UNIT PARALLEL, 1-CS-1404, to RESET.

6.26.B Procedure (Continued)

4. **CHECK** 1B DG frequency is 60 Hz (58.8 to 61.2 Hz).
   - 1B DG FREQUENCY, 1-SI-1401
5. **ADJUST** 1B DG voltage to greater than 4.16 KV (4.1 to 4.35 KV) using 1B DG AUTO VOLT CONTR, 1-CS-1402.
   - 1B DG VOLTS, 1-EI-1422
6. **CHECK** annunciator "1B DG • POT VOLT • FREQ LO" is clear.
7. **ENSURE** 1B DG ESFAS TEST SWITCH, 1-HS-4816, on DG local control/gage panel, in NORMAL.
8. **DEPRESS** 1B DG STOP, 1-HS-1425, pushbutton, to shutdown the engine.
9. **ENSURE** SLOW START MODE SELECTOR, 1-HS-4826, in NORMAL. **[B0048]**
10. **ENSURE** Prelube Pump is **NOT** running.
11. **ENSURE** the following pumps are running:
    - Coolant Pump
    - Lube Oil Pump
12. **IF** 1B DG was in parallel operation with 14 4KV Bus,
    THEN ENSURE the CPS Generation Dispatcher is notified that the 1B Diesel is no longer paralleled.

CAUTION
DO **NOT** allow the 1B DG room temperature to fall below 60° F.

13. **IF** desired,
    THEN STOP the 1B DG Room Ventilation Fan by momentarily placing its handswitch to the STOP position.

6.26.B Procedure (Continued)

NOTE

- 1B DG may remain in the Action Statement of T.S. 3.8.1 **OR** 3.8.2 until engine barring is complete.
- If barring is **NOT** performed within three hours of shutdown, its effectiveness is minimal. Therefore, barring is **NOT** required if conditions prohibit barring within three hours of engine shutdown.

14. **IF** 1B DG is **NOT** scheduled to be manually restarted within three hours, **THEN CONSIDER** manually barring 1B DG **PER** Section 6.9, MANUALLY BAR-OVER 1B DIESEL GENERATOR, **OR** 6.24, ROTATING 1B DIESEL GENERATOR WITH COMPRESSED AIR. **[B0048]**

15. **NOTIFY** Plant Chemistry of the following:

    - 1B DG is shutdown
    - Jacket Water Cooling System makeup or venting performed during operation

****** END ******

7.0 POST-PERFORMANCE ACTIVITIES

Upon completion of this procedure, forward the original(s) to the Operations Senior Administrative Assistant for retention **PER** CNG-PR-3.01-1000, Records Management.

8.0 BASES

[B0022] Letter to J. Lohr from B. Lang, dated 12/19/89; describing why the DGs should be considered inoperable at a jacket coolant temperature of less than or equal to 90° F.

[B0024] **[B0110]** Corrective action for LER 92-005 required modifying the affected procedure to state that the Diesel Generator is OOS when its voltage regulator is in MANUAL.

[B0027] Memo to L. G. Getz from T. M. Delaney, dated 12/4/95; No prelube required if engine has been run or prelubed in the last 2 hours since excessive prelube conflicts with efforts to reduce exhaust system oil related fires. Unloaded operation should be minimized, especially beyond one hour. Loading DG slowly in increments reduces thermal stresses, protects against rapid loading of DG, and is recommended by the vendor.

[B0036] **PER** Maintenance and Surveillance Test Performances Manual 12310-168, Part 1, Tab 3, Pg. 2. Provide time interval for increasing the governor speed control knob.

[B0048] SOER 83-01 recommends prelubing engines prior to any start, recommendation 5-2; also, listing actions required to return DG to standby, recommendation 8-1.

[B0105] **PER** LER 91-007 (Unit 2), "Loss of Boration Flowpath due to a Fuse Failure", this procedure is to be performed when an FBM Diesel Generator is to be taken out of service and at least once every 8 hours while it remains out of service. Removing SRW to the DG renders it inoperable.

[B0112] POSRC outstanding item 91-165-04 and network item OE-4457, DG inoperable due to low room temp. This section added to ensure minimum DG room temperature for DG operability.

[B0114] Maintain 17 ft. 4 inches in #21 FOST. Due to the fact that #11 FOST is not protected from tornadoes, sufficient fuel oil must be stored in #21 FOST to support shutdown of both units during a loss of off-site power. Reference memo from System Engineer.

[B0120] Memo from R. A. Buttner of the Design Basis Unit, DBU-92-059, subject: "Plant Operating Voltage Ranges", lists the new 13KV, 4KV, and 480V Bus voltage limits. Previous calculations did not ensure adequate voltage at load terminals.

8.0 BASES (Continued)

[B0138] NUMARC 91-06 "Guidelines for Industry Actions to Assess Shutdown Management and NRC Letter 88-17 recommended establishing communications between the SM/CRS and the System Operator-Bulk prior to removing a diesel generator from service.

[B0154] AOP/EOP cross reference per NUREG 1358:

a. EOP-7, STATION BLACKOUT, refers to this OI for restart of the 1B Diesel Generator with an auto start signal present.

b. AOP-3B, ABNORMAL SHUTDOWN COOLING CONDITIONS, refers to this OI for restart of the 1B Diesel Generator with an auto start signal present.

[B0614] SOER 99-01, Recommendation 2.c. Procedure guidance reflects the importance of timely resetting (rearming) of safety system electrical sequencing equipment following the return to grid power.

9.0 RECORDS

Records generated by this procedure shall be processed **PER** CNG-PR-3.01-1000, Records Management.

10.0 ATTACHMENTS

A. TABLE 1, SHUTDOWN SEQUENCER LOADS

B. TABLE 2, 1B DG FUEL OIL DAY TANK VOLUME

C. TABLE 3, 1B DIESEL GENERATOR OPERATING PARAMETERS

D. FIGURE 1, DIESEL GENERATOR ELECTRICAL LIMITS

E. ATTACHMENT 1A, POST MAINTENANCE 1B DIESEL GENERATOR LINEUP CHECKS

F. ATTACHMENT 1B, 1B DIESEL GENERATOR VALVE LINEUP

SHUTDOWN SEQUENCER LOADS

14 4KV BUS SHUTDOWN SEQUENCER

The following table lists loads that receive a start signal from the 14 4KV Bus Shutdown Sequencer (SDS). The SDS operates when it has a Diesel Generator breaker closed to 14 4KV Bus.

12 SWGR A/C Compr#

12 Instr Air Compr#

12 Salt Water Pump

13 Salt Water Pump*

12 Service Water Pump

13 Service Water Pump*

* 13 Salt Water Pump and 13 Service Water Pump receive a start signal from the SDS only if the associated 12 pump fails to start after receiving an SDS start signal **AND** they are aligned to 14 4KV Bus.

\# These components receive a start permissive signal from the SDS.

1B DG FUEL OIL DAY TANK VOLUME

Inches	Gallons	Inches	Gallons
2*	0	22	255.1
3	7.1	23	270.1
4	15.5	24	285.0
5	24.8	25	299.8
6	35.0	26	314.5
7	45.9	27	328.9
8	57.5	28	343.2
9	69.6	29	357.2
10	82.2	30	370.8
11	95.3	31	384.1
12	108.7	32	397.0
13	122.5	33	409.5
14	136.6	34	421.4
15	151.0	35	432.7
16	165.5	36	443.3
17	180.2	37	453.2
18	195.1	38	462.2
19	210.0	39	470.1
20	225.0	40	476.7
21	240.1	41	481.5

* - Approximately 9 gallons of unusable fuel oil remains below the 2 inch level.

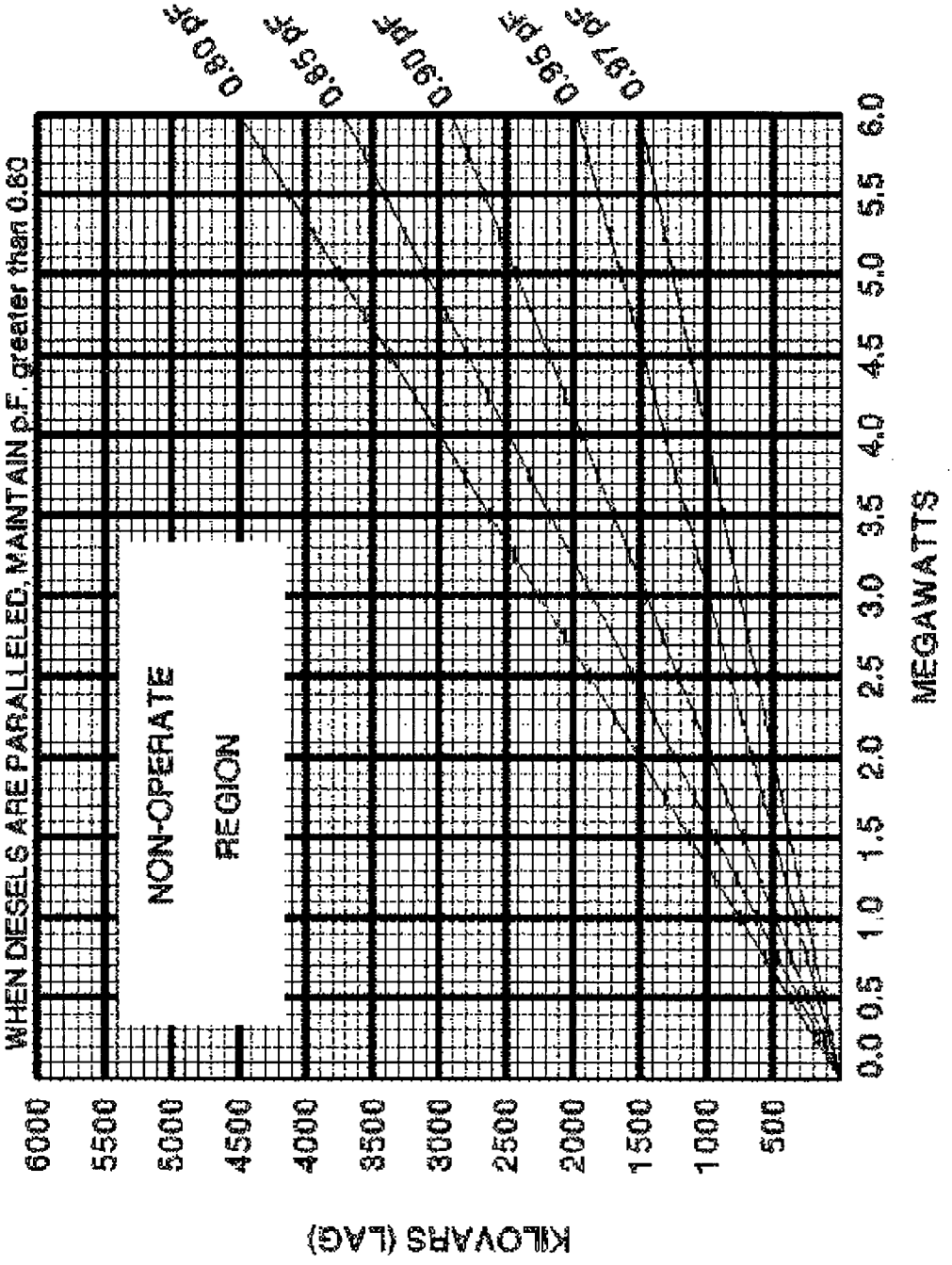
1B DIESEL GENERATOR OPERATING PARAMETERS

The following parameters apply to 1B Diesel Generator while operating. Contact the System Engineer if parameters approach OR exceed the specified values.

* Lube oil pressure to the engine	30 to 45 psig
* Lube oil temperature out of engine	170 to 195 degrees F
* Fuel oil pressure to the engine (red hand)	15 to 40 psig
* Jacket water pump discharge pressure	30 to 35 psig
* Crankcase vacuum	0.5 to 4.0 inches H2O
* Governor visible sightglass oil level (min)	1/2 full
* Jacket water engine diff temperature (max D/T) across the engine	10 degrees F
* Lube oil diff temp (max D/T)	30 degrees F
* Cylinder exhaust temp (max)	1000 degrees F
* Cylinder exhaust diff temperature (max D/T) between individual cylinders	250 degrees F
* Fuel oil filter diff press (max)	10 psid
* Lube oil filter diff press (max) with lube oil temp in operating range	18 psid
* Lube oil strainer diff press (max) with lube oil temp in operating range	12 psid

NOTE: Parameters will change due to 1B DG running time and load.

DIESEL GENERATOR ELECTRICAL LIMITS



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POST MAINTENANCE 1B DIESEL GENERATOR LINEUP CHECKS

ENSURE 1B DG Standby conditions by performing the following:

		Condition	INIT/DATE
A.	1C18B in Control Room		
1.	1B DG Unit Parallel Switch 1-CS-1404	RESET (Momentarily)	_____
2.	1B DG Volt Regulator Selector Sw, 1-HS-1423	AUTO	_____
B.	Panel 1C62B 1B DG Room		
1.	1B DG Governor Control	AUTO	_____
2.	1B DG Governor Speed Control CS/SP	OFF	_____
3.	Lockout Relay Switch 186D-1B	RESET	_____
4.	1B DG Slow Start Mode Selector 1-HS-4826	NORMAL	_____
5.	1B DG Slow Start Sequence Keyswitch 1-HS-4865	NORMAL (KEY REMOVED)	_____
6.	Slow Start Sequence Light	LIGHT OUT	_____
C.	Panel 1C62C 1B DG Room		
1.	Voltage Regulator Man/Auto Selector	AUTO	_____
2.	1B DG Contr Mode Sel Switch 1-HS-4840	AUTO-REMOTE (KEY REMOVED)	_____

POST MAINTENANCE 1B DIESEL GENERATOR LINEUP CHECKS

D.	1B Diesel Engine Control Panel		
	1. Coolant Heater 1-HS-4806	AUTO	_____
	2. Coolant Pump 1-HS-4807	AUTO	_____
	3. Lube Oil Heater 1-HS-4787	AUTO	_____
	4. Lube Oil Pump 1-HS-4786	AUTO	_____
	5. Gen Space Heaters 1-HS-4848	AUTO	_____
	6. Pre Lube Pump 1-HS-4785	AUTO	_____
	7. ESFAS Test Switch 1-HS-4816	NORMAL	_____
	8. Air Bar Switch 1-HS-4861	NORMAL	_____
E.	1B DG Governor	Condition	INIT/DATE
	1. Speed Droop Control	0	_____
	2. Speed Setting Control	21	_____
	3. Load Limit Control	MAXIMUM	_____
	4. Gov. Oil Level	3/4 FULL MIN.	_____

POST MAINTENANCE 1B DIESEL GENERATOR LINEUP CHECKS

F.	480V Diesel Gen MCC 1BG		
	1. Vent Fan 52-1BG01	ON	_____
	2. Transfer Pump 52-1BG02	ON	_____
	3. Air Compressor 52-1BG03 (N/A if Air Receivers are cross-connected)	ON	_____
	4. Engine Auxiliaries 52-1BG04	ON	_____
G.	DG Auxiliaries Breaker Panel		
	1. Coolant Heater (CB-1)	ON	_____
	2. Coolant Pump (CB-2)	ON	_____
	3. Lube Oil Heater (CB-3)	ON	_____
	4. Lube Oil Pump (CB-4)	ON	_____
	5. Pre-Lube Pump (CB-5)	ON	_____
	6. Generator Space Heater (CB-6)	ON	_____
	7. Hour Meter (CB-7)	ON	_____
H.	Miscellaneous 1B DG Switches	Condition	INIT/DATE
	1. 1B DG Fuel Oil Drip Tk Pp 1-HS-4854	AUTO	_____
	2. 1B DG Exhaust Damper 1-HS-5432	AUTO or OPEN (circle one)	_____

POST MAINTENANCE 1B DIESEL GENERATOR LINEUP CHECKS

I. Miscellaneous Checks

1.	1B DG Jacket Water Expansion Tank level	GREATER THAN 1/2 FULL	_____
2.	1B DG Fuel Oil Day Tank level	GREATER THAN 27 IN.	_____
3.	1B DG Air Compressor oil level	BETWEEN THE FULL AND ADD MARKS	_____
4.	1B DG Generator cooling air grilles (accessible)	OPEN AND NO DEBRIS	_____
5.	1B DG Generator oil level	AT THE UPPER WHITE LINE	_____
6.	1-SRW-1588-CV Clutch Handle	SHALLOW SLOT	_____
7.	1B DG Crankcase oil level	NORMAL (NEAR FULL STOP)	_____
8.	1-SRW-1588-CV	AUTO	_____
9.	1B DG Air Receiver Press East Rcvr 1-PI-4835 West Rcvr 1-PI-4834	GREATER THAN 215 PSIG AND LESS THAN 245 PSIG	_____
10.	If performing a slow start, then PRIME 1B DG Fuel System with at least 3 strokes of manual priming pump	PRESSURE DEVELOPS ON 1B DG FUEL OIL STRNR DIFF PRESS, 1-PDI-4823	_____
11.	Jacking Bar	Jacking Bar REMOVED	_____

POST MAINTENANCE 1B DIESEL GENERATOR LINEUP CHECKS

NOTE: Sections J and K may be marked N/A if 1B DG will not be paralleled **OR** declared operable.

J. 4KV Electrical Lineup	Condition	INIT/DATE
1. 1B Diesel Generator Output Breaker, 152-1403	CONNECTED AND OPEN	_____
2. 1B DG OUT BKR, 1-CS-152-1403	NORMAL	_____
3. 1B Diesel Generator Disconnect to Bus 14, 189-1403	CLOSED AND LOCKED	_____
4. 1B Diesel Generator Disconnect to Bus 14, 189-1403A	CLOSED AND LOCKED	_____

K. 1B DG Alarm Panel

1. All alarms associated with 1B DG that are not clear	EXISTING ALARMS LISTED BELOW, INITIALED BY SM THAT AUTOMATIC OPERATION OF 1B DG IS **NOT** AFFECTED	_____

ALARM	CAUSE	SM INIT/DATE
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

NOTE: It is acceptable to perform a Slow Speed Start of the Diesel with a Low Lube Oil Temperature alarm present providing the Lube Oil sump is verified greater than or equal to 100 degrees F by contact pyrometer.

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DFO-121	LOCKED SHUT	1B DG FUEL OIL SUPPLY FROM HEADER # 1 ISOLATION VALVE	1B DG RM NW CORNER		
1B-DFO-122	LOCKED OPEN	1B DG FUEL OIL SUPPLY FROM HEADER # 2 ISOLATION VALVE	1B DG RM NW CORNER		
1B-DFO-123	----	1B DG FUEL OIL SUPPLY FROM HEADER # 2 CHECK VALVE	1B DG RM NW CORNER		
1B-DFO-124	----	1B DG FUEL OIL HAND PRIMING PUMP DISCHARGE CHECK VALVE	1B DG RM BEHIND GAGE BOARD		
1B-DFO-125	----	1B DG FUEL OIL COMBINED FUEL OIL PUMP DISCH CHECK VALVE	1B DG RM BEHIND GAGE BOARD		
1B-DFO-126	LOCKED OPEN	1B DG FUEL OIL ENGINE FUEL OIL SUPPLY ISOLATION VALVE	1B DG RM SE OF DG		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DFO-127	SHUT	1B DG FUEL OIL DIRTY FUEL OIL DRAIN TANK DRAIN VALVE	1B DG RM NEXT TO DRIP TANK		
1B-DFO-136	----	1B DG FUEL OIL SUPPLY FROM HEADER # 1 CHECK VALVE	1B DG RM NW CORNER		
1B-DFO-138	LOCKED OPEN	1B DG FUEL OIL ENGINE SUPPLY FROM DAY TANK ISOLATION VALVE	1B DG RM BELOW DFO DAY TK		
1B-DFO-150	LOCKED SHUT	1B DG FUEL OIL DAY TANK DRAIN VALVE	1B DG RM BELOW DFO DAY TK		
1B-DFO-151	SHUT	1B DG FUEL OIL DAY TANK (SPRING CLOSED) BACKUP DRAIN VALVE	1B DG RM BELOW DFO DAY TK		
1B-DFO-152	SHUT	1B DG FUEL OIL TRANSFER PUMP SUCTION STRAINER FLUSH ISOLATION VALVE	1B DG RM NW WALL		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DFO-153	SHUT	1B DG FUEL OIL PUMP SUCTION STRAINER FLUSH ISOLATION VALVE	1B DG RM BELOW DFO DAY TK		
1B-DFO-154	SHUT	1B DG FUEL OIL DAY TANK VENT VALVE	1B DG RM ABOVE DFO DAY TK		
1B-DFO-155	SHUT	1B DG FUEL OIL SUPPLY HEADER TO DAY TANK DRAIN VALVE	ON FLOOR BELOW DFO DAY TK		
1B-DFO-156	SHUT	1B DG FUEL OIL SUPPLY HEADER TO DAY TANK VENT VALVE	1B DG RM ABOVE DFO DAY TK		
1B-DFO-157	SHUT	1B DG FUEL OIL DRIP PUMP DISCHARGE VENT VALVE	1B DG RM W ABOVE DFO DAY TK		
1B-DFO-158	SHUT	1B DG FUEL OIL DRIP TANK DRAIN VALVE	1B DG RM NEXT TO DRIP TK		
1B-DFO-159	LOCKED SHUT	1B DG FUEL OIL DIESEL COMPRESSOR FILL ISOLATION VALVE	1B DG RM BELOW DFO DAY TK		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DFO-160	SHUT	1B DG FUEL OIL DIESEL COMPRESSOR DAY TANK FILL ISOLATION VALVE	1B DG RM NE WALL ON TK		
1B-DFO-161	SHUT	1B DG FUEL OIL DIESEL AIR COMPR FUEL OIL SUPPLY ISOLATION VALVE	1B DG RM NE WALL BELOW TK		
1B-DFO-162	SHUT	1B DG FUEL OIL DIESEL AIR COMPR DAY TK FUEL OIL DRAIN VALVE	1B DG RM NE WALL BELOW TK		
1B-DFO-165	SHUT AND CAPPED	1B DG FUEL OIL NUMBER 1 CYLINDER TEST CONN ROOT VALVE	1B DG RM S OF CYLINDER #1		
1B-DFO-166	SHUT AND CAPPED	1B DG FUEL OIL NUMBER 2 CYLINDER TEST CONN ROOT VALVE	1B DG RM S OF CYLINDER #2		
1B-DFO-167	SHUT AND CAPPED	1B DG FUEL OIL NUMBER 3 CYLINDER TEST CONN ROOT VALVE	1B DG RM S OF CYLINDER #3		

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DFO-168	SHUT AND CAPPED	1B DG FUEL OIL NUMBER 4 CYLINDER TEST CONN ROOT VALVE	1B DG RM S OF CYLINDER #4		
1B-DFO-169	NOT IN MID POSIT	1B DG FUEL OIL SUPPLY FILTER SELECTOR TRANSFER VALVE	1B DG RM S ON DUPLEX		
1B-DFO-170	SHUT AND CAPPED	1B DG FUEL OIL NUMBER 5 CYLINDER TEST CONN ROOT VALVE	1B DG RM S OF CYLINDER #5		
1B-DFO-171	SHUT AND CAPPED	1B DG FUEL OIL NUMBER 6 CYLINDER TEST CONN ROOT VALVE	1B DG RM S OF CYLINDER #6		
1B-DFO-172	SHUT AND CAPPED	1B DG FUEL OIL NUMBER 7 CYLINDER TEST CONN ROOT VALVE	1B DG RM S OF CYLINDER #7		
1B-DFO-173	SHUT AND CAPPED	1B DG FUEL OIL NUMBER 8 CYLINDER TEST CONN ROOT VALVE	1B DG RM S OF CYLINDER #8		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DFO-174	SHUT AND CAPPED	1B DG FUEL OIL NUMBER 9 CYLINDER TEST CONN ROOT VALVE	1B DG RM S OF CYLINDER #9		
1B-DFO-175	SHUT AND CAPPED	1B DG FUEL OIL NUMBER 10 CYLINDER TEST CONN ROOT VALVE	1B DG RM S OF CYLINDER #10		
1B-DFO-176	SHUT AND CAPPED	1B DG FUEL OIL NUMBER 11 CYLINDER TEST CONN ROOT VALVE	1B DG RM S OF CYLINDER #11		
1B-DFO-177	SHUT AND CAPPED	1B DG FUEL OIL NUMBER 12 CYLINDER TEST CONN ROOT VALVE	1B DG RM S OF CYLINDER #12		
1B-DFO-179	----	1B DG FUEL OIL TRANSFER PUMP DISCHARGE CHECK VALVE	1B DG RM DISCH OF TRANS PP		
1B-DFO-180	SHUT	1B DG FUEL OIL DAY TANK LS-4819, 4820, 4821, 4822 DRAIN VALVE	1B DG RM E END OF DFO DAY TK		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DFO-1001	LOCKED OPEN	1B DG FUEL OIL DAY TANK LS-4819,4820,4821, 4822 UPPER ISOLATION VALVE	1B DG RM E TOP DFO DAY TANK		
1B-DFO-1002	SHUT	1B DG FUEL OIL DAY TANK LS-4819,4820,4821, 4822 UPPER VENT VALVE	1B DG RM TOP DFO DAY TK		
1B-DFO-1003	LOCKED OPEN	1B DG FUEL OIL DAY TANK LS-4819,4820,4821, 4822 LOWER ISOLATION VALVE	1B DG RM BOTTOM DFO DAY TANK		
1B-DFO-1004	OPEN	1B DG FUEL OIL DAY TANK LEVEL LI-4822 ROOT VALVE	1B DG RM ON DAY TANK		
1B-DFO-1005	OPEN	1B DG FUEL OIL DIRTY FUEL OIL DRAIN TK LG-4823 UPPER ISOLATION VALVE	1B DG RM NEXT TO DIRTY FO TK		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DFO-1006	OPEN	1B DG FUEL OIL DIRTY FUEL OIL DRAIN TK LG-4823 LOWER ISOLATION VALVE	1B DG RM NEXT TO DIRTY FO TK		
1B-DFO-1007	OPEN	1B DG FUEL OIL STRAINER PDI-4823 HP ROOT VALVE	1B DG RM E OF GAGE BOARD		
1B-DFO-1008	OPEN (1)	1B DG FUEL OIL STRAINER PDI-4823 HP BACKUP ROOT VALVE	1B DG RM E OF GAGE BOARD		
1B-DFO-1009	OPEN	1B DG FUEL OIL STRAINER PDI-4823 LP & PS-4823 ROOT VALVE	1B DG RM E OF GAGE BOARD		
1B-DFO-1010	OPEN (1)	1B DG FUEL OIL STRAINER PDI-4823 LP & PS-4823 BACKUP ROOT VALVE	1B DG RM E OF GAGE BOARD		

(1) THROTTLE AS NEEDED TO DAMPEN GAGE OSCILLATIONS.

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DFO-1011	OPEN	1B DG FUEL OIL DIESEL AIR COMPR DAY TK LG-4833 UPPER ISOLATION VALVE	1B DG RM NE WALL ON DAY TK		
1B-DFO-1012	OPEN	1B DG FUEL OIL DIESEL AIR COMPR DAY TK LG-4833 LOWER ISOLATION VALVE	1B DG RM NE WALL ON DAY TK		
1B-DFO-1013	OPEN	1B DG FUEL OIL DAY TANK LEVEL LI-4822 BACKUP ROOT VALVE	1B DG RM ON DAY TANK		
1B-DFO-1014	LOCKED SHUT	1B DG FUEL OIL DAY TANK LEVEL LI-4822 DRAIN VALVE	1B DG RM E ON DAY TANK		
1B-DFO-4815-RV	----	1B DG FUEL OIL TRANSFER PUMP DISCHARGE RELIEF VALVE	1B DG RM ON XFER PP		INTERNAL TO PUMP
1B-DFO-4823-RV	----	1B DG FUEL OIL COMBINED FUEL OIL PUMP DISCH RELIEF VALVE	1B DG RM AT PUMP		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
0-DSA-3	LOCKED SHUT	RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE	1B DG RM E OF RCVR		
1B-DSA-101	LOCKED OPEN	1B DG STARTING AIR AIR COMPR TO WEST RECEIVER ISOLATION VALVE	1B DG RM @ W AIR RCVR INLET		
1B-DSA-102	LOCKED OPEN	1B DG STARTING AIR AIR COMPR TO EAST RECEIVER ISOLATION VALVE	1B DG RM @ E AIR RCVR INLET		
1B-DSA-103	LOCKED OPEN	1B DG STARTING AIR LOADLESS START ISOLATION VALVE	1B DG RM IN NE CORNER		
1B-DSA-106	----	1B DG STARTING AIR WEST AIR RECEIVER INLET CHECK VALVE	1B DG RM @ W AIR RCVR INLET		
1B-DSA-107	----	1B DG STARTING AIR WEST AIR RECEIVER OUTLET CHECK VALVE	1B DG RM IN NE CORNER		
1B-DSA-108	LOCKED OPEN	1B DG STARTING AIR WEST AIR RECEIVER OUTLET ISOLATION VALVE	1B DG RM IN NE CORNER		

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DSA-109	LOCKED OPEN	1B DG STARTING AIR WEST AIR RECEIVER DRAIN VALVE	1B DG RM N OF AIR RCVR		
1B-DSA-110	----	1B DG STARTING AIR EAST AIR RECEIVER INLET CHECK VALVE	1B DG RM @ E AIR RCVR INLET		
1B-DSA-111	----	1B DG STARTING AIR EAST AIR RECEIVER OUTLET CHECK VALVE	1B DG RM IN NE CORNER		
1B-DSA-112	LOCKED OPEN	1B DG STARTING AIR EAST AIR RECEIVER OUTLET ISOLATION VALVE	1B DG RM IN NE CORNER		
1B-DSA-113	LOCKED OPEN	1B DG STARTING AIR EAST AIR RECEIVER DRAIN VALVE	1B DG RM N OF AIR RCVR		
1B-DSA-114	LOCKED OPEN	1B DG STARTING AIR TO DIESEL START SV-4834 ISOLATION VALVE	1B DG RM N END DG ON FLOOR		
1B-DSA-115	LOCKED OPEN	1B DG STARTING AIR TO DIESEL START SV-4834 BACKUP ISOLATION VALVE	1B DG RM N END DG ON FLOOR		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DSA-116	----	1B DG STARTING AIR TO DIESEL START SV-4834 CHECK VALVE	1B DG RM N END DG ON FLOOR		
1B-DSA-117	LOCKED OPEN	1B DG STARTING AIR TO DIESEL START SV-4835 ISOLATION VALVE	1B DG RM N END DG ON FLOOR		
1B-DSA-118	LOCKED OPEN	1B DG STARTING AIR TO DIESEL START SV-4835 BACKUP ISOLATION VALVE	1B DG RM N END DG ON FLOOR		
1B-DSA-119	----	1B DG STARTING AIR TO DIESEL START SV-4835 CHECK VALVE	1B DG RM N END DG ON FLOOR		
1B-DSA-120	LOCKED SHUT	1B DG STARTING AIR CHECK VALVE TEST ISOLATION VALVE	1B DG RM N END DG NEAR FLOOR		
1B-DSA-121	LOCKED SHUT	1B DG STARTING AIR AIR BAR ROOT VALVE	1B DG RM N SIDE DG NEAR FLOOR		
1B-DSA-122	LOCKED SHUT	1B DG STARTING AIR WEST RECEIVER CHECK VALVE TEST ISOLATION VALVE	1B DG RM @ W AIR RCVR INLET		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DSA-123	LOCKED SHUT	1B DG STARTING AIR EAST RECEIVER CHECK VALVE TEST ISOLATION VALVE	1B DG RM @ E AIR RCVR INLET		
1B-DSA-124	LOCKED SHUT	1B DG STARTING AIR STRAINER YS-4834 DRAIN VALVE	1B DG RM ON Y-STRAINER		
1B-DSA-125	LOCKED SHUT	1B DG STARTING AIR STRAINER YS-4835 DRAIN VALVE	1B DG RM ON Y-STRAINER		
1B-DSA-126	SHUT	DIESEL STARTING AIR COMPRESSOR VARIABLE DISCHARGE PILOT SENSING ISOLATION VALVE	1B DG RM @ DSA DIESEL COMPR		
1B-DSA-127	OPEN	1B DG STARTING AIR DIESEL AIR COMPR EXHAUST LINE DRAIN VALVE	1B DG RM ON DSA DIESEL COMPR		
1B-DSA-130	LOCKED SHUT	1B DG STARTING AIR WEST AIR RECEIVER DRAIN TRAP BYPASS VALVE	1B DG RM N OF AIR RCVR		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DSA-131	LOCKED SHUT	1B DG STARTING AIR EAST AIR RECEIVER DRAIN TRAP BYPASS VALVE	1B DG RM N OF AIR RCVR		
1B-DSA-132	LOCKED OPEN	1B DG STARTING AIR CHARGING X-CONN DRAIN TRAP ISOLATION VALVE	1B DG RM E OF AIR RCVR		
1B-DSA-133	LOCKED SHUT	1B DG STARTING AIR CHARGING X-CONN DRAIN TRAP BYPASS VALVE	1B DG RM E OF AIR RCVR		
1B-DSA-134	NOT VENTING	1B DG STARTING AIR EAST AIR RECEIVER HEADER MANUAL START VALVE	1B DG RM N END DG ON FLOOR		
1B-DSA-135	SHUT	1B DG STARTING AIR AIR BAR THROTTLE VALVE	1B DG RM N SIDE OF DG		
1B-DSA-136	SHUT	1B DG STARTING AIR AIR BAR ISOLATION VALVE	1B DG RM N SIDE OF DG		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DSA-137	SHUT	1B DG STARTING AIR AIR BAR 1-PI-4821 ISOLATION VALVE	1B DG RM N SIDE OF DG		
1B-DSA-138	OPEN	1B DG STARTING AIR #14 BEARING OIL BOOSTER ISOLATION VALVE	1B DG RM N SIDE OF DG		
1B-DSA-1002	LOCKED OPEN	1B DG STARTING AIR EAST AIR HEADER SENSING LINE ISOLATION VALVE	1B DG RM NE OF COMPRESSOR		
1B-DSA-1003	LOCKED SHUT	1B DG STARTING AIR WEST AIR HEADER SENSING LINE ISOLATION VALVE	1B DG RM NE OF COMPRESSOR		
1B-DSA-1004	LOCKED OPEN	1B DG STARTING AIR EAST AIR HEADER PI & PS-4844 ROOT VALVE	1B DG RM @ VALVE STAND		
1B-DSA-1005	LOCKED OPEN	1B DG STARTING AIR EAST AIR HEADER PI & PS-4844 BACKUP ROOT VALVE	1B DG RM @ VALVE STAND		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DSA-1006	LOCKED OPEN	1B DG STARTING AIR WEST AIR HEADER PI & PS-4843 ROOT VALVE	1B DG RM @ VALVE STAND		
1B-DSA-1007	LOCKED OPEN	1B DG STARTING AIR WEST AIR HEADER PI & PS-4843 BACKUP ROOT VALVE	1B DG RM @ VALVE STAND		
1B-DSA-1008	LOCKED OPEN	1B DG STARTING AIR WEST AIR RECEIVER PS-4833A ROOT VALVE	1B DG RM OVER W AIR RCVR		
1B-DSA-1009	LOCKED OPEN	1B DG STARTING AIR EAST AIR RECEIVER PS-4833 ROOT VALVE	1B DG RM N OF E AIR RCVR		
1B-DSA-1010	LOCKED OPEN	1B DG STARTING AIR WEST AIR RECEIVER PS-4833A BACKUP ROOT VALVE	1B DG RM NW OF W AIR RCVR		
1B-DSA-1011	LOCKED OPEN	1B DG STARTING AIR EAST AIR RECEIVER PS-4833 BACKUP ROOT VALVE	1B DG RM NW OF W AIR RCVR		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DSA-1012	LOCKED SHUT	1B DG STARTING AIR WEST AIR RECEIVER PS-4833A VENT VALVE	1B DG RM NW OF W AIR RCVR		
1B-DSA-1013	LOCKED SHUT	1B DG STARTING AIR EAST AIR RECEIVER PS-4833 VENT VALVE	1B DG RM BY W AIR RCVR		
1B-DSA-1014	OPEN	1B DG STARTING AIR WEST AIR RECEIVER PI-4834 ROOT VALVE	1B DG RM ON W AIR RCVR		
1B-DSA-1015	OPEN	1B DG STARTING AIR EAST AIR RECEIVER PI-4835 ROOT VALVE	1B DG RM ON E AIR RCVR		
1B-DSA-1016	LOCKED OPEN	1B DG STARTING AIR COMPRESSOR DISCHARGE VALVE	1B DG RM NE CORNER @ COMPR		
1B-DSA-4811-PCV	----	1B DG STARTING AIR AIR COMPRESSOR HYDRAULIC UNLOADER VALVE	1B DG RM ON COMPRESSOR		
1B-DSA-4824-PCV	----	1B DG STARTING AIR #14 BEARING OIL BOOSTER PCV	1B DG RM N SIDE OF DG		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DSA-4833-RV	----	1B DG STARTING AIR COMPRESSOR DISCHARGE RELIEF VALVE	1B DG RM W OF COMPRESSOR		
1B-DSA-4834-CV	----	1B DG STARTING AIR DIESEL AIR START CONTROL VALVE	1B DG RM N DG NEAR FLOOR		
1B-DSA-4834-RV	----	1B DG STARTING AIR WEST AIR RECEIVER RELIEF VALVE	1B DG RM ON W AIR RCVR		
1B-DSA-4834-SV	----	1B DG STARTING AIR DIESEL AIR START SOLENOID VALVE	1B DG RM N DG NEAR FLOOR		
1B-DSA-4835-CV	----	1B DG STARTING AIR DIESEL AIR START CONTROL VALVE	1B DG RM N DG NEAR FLOOR		
1B-DSA-4835-RV	----	1B DG STARTING AIR EAST AIR RECEIVER RELIEF VALVE	1B DG RM ON E AIR RCVR		
1B-DSA-4835-SV	----	1B DG STARTING AIR DIESEL AIR START SOLENOID VALVE	1B DG RM N DG NEAR FLOOR		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DSA-4836-SV	----	1B DG STARTING AIR DIESEL AIR START HEADER SOLENOID VENT VALVE	1B DG RM N DG NEAR FLOOR		
1B-SCA-1001	OPEN	1B DG SCAVENGING AIR PRESSURE PI-4773 ROOT VALVE	1B DG RM NEAR GAGE BOARD		
1B-SCA-1002	OPEN	1B DG SCAVENGING AIR PRESSURE PI-4773 BACKUP ROOT VALVE	1B DG RM VALVE STAND		
1B-DLO-100	LOCKED SHUT	1B DG LUBE OIL DAY TANK DRAIN VALVE	1B DG RM UNDER DLO DAY TK		
1B-DLO-101	LOCKED OPEN	1B DG LUBE OIL DAY TANK TO ENGINE SUMP ISOLATION VALVE	1B DG RM S DG ON FLOOR		
1B-DLO-102	LOCKED SHUT	1B DG LUBE OIL FILTER TO ENGINE SUMP DRAIN VALVE	1B DG RM E OF LO FILT		
1B-DLO-103	LOCKED SHUT	1B DG LUBE OIL COOLER TO ENGINE SUMP DRAIN VALVE	1B DG RM N & UNDER LO CLR		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DLO-104	LOCKED SHUT	1B DG LUBE OIL STRAINER DRAIN VALVE	1B DG RM ON STRAINER		
1B-DLO-105	LOCKED SHUT	1B DG LUBE OIL STRAINER TO ENGINE SUMP DRAIN VALVE	1B DG RM ON STRAINER		
1B-DLO-106	----	1B DG PRELUBE PUMP OUTLET CHECK VALVE	1B DG RM E OF LO HTR		
1B-DLO-107	LOCKED SHUT	1B DG ENGINE SUMP DRAIN VALVE	1B DG RM N DG NEAR FLOOR		
1B-DLO-108	LOCKED OPEN	1B DG ELECTRIC STANDBY LUBE OIL CIRCULATING PUMP SUCTION VALVE	1B DG RM SE ENG SUMP		
1B-DLO-109	(2)	1B DG ELECTRIC STANDBY LUBE OIL CIRCULATING PUMP OUTLET 3-WAY VALVE	1B DG RM S DG ON FLOOR		
1B-DLO-110	LOCKED SHUT	1B DG ELECTRIC STANDBY LUBE OIL CIRCULATING PUMP OUTLET DRAIN VALVE	1B DG RM S DG ON FLOOR		

(2) 3-WAY VALVE NORMALLY LINED UP TO PASS OIL FROM STANDBY CIRC PUMP TO LO HEATER.

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DLO-111	----	1B DG LUBE OIL HEATER OUTLET CHECK VALVE	1B DG RM ON LO HTR		
1B-DLO-112	OPEN	1B DG PRELUBE PUMP SUCTION VALVE	1B DG RM UNDER LUBE OIL HTR		
1B-DLO-113	SHUT	1B DG LUBE OIL DAY TANK FILL ISOLATION VALVE	1B DG RM NE CORNER		
1B-DLO-114	LOCKED OPEN	1B DG LUBE OIL DAY TANK TO ENGINE SUMP ISOLATION VALVE	1B DG RM UNDER DLO DAY TK		
1B-DLO-115	LOCKED SHUT	1B DG LUBE OIL FILTER DRAIN VALVE	1B DG RM ON LO FILT		
1B-DLO-116	LOCKED SHUT	1B DG LUBE OIL DAY TANK SAMPLE ISOLATION VALVE	1B DG RM S DG ON FLOOR		
1B-DLO-117	SHUT	1B DG LUBE OIL FILL SAMPLE ISOLATION VALVE	1B DG RM NE CORNER		
1B-DLO-118	----	1B DG LUBE OIL TO TURBOCHARGER CHECK VALVE	1B DG RM UNDER N TURBOCHARGER		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DLO-120	LOCKED SHUT	1B DG LUBE OIL COOLER OUTLET TEST CONN ISOLATION VALVE	1B DG RM SW CRNR OF DG		
1B-DLO-1001	OPEN	1B DG LUBE OIL DAY TANK HIGH LS-4788, 4789 UPPER ISOLATION VALVE	1B DG RM W DLO DAY TK		
1B-DLO-1002	SHUT	1B DG LUBE OIL DAY TANK LS-4788, 4789 VENT VALVE	1B DG RM W DLO DAY TK		
1B-DLO-1003	OPEN	1B DG LUBE OIL DAY TANK LOW LS-4788, 4789 LOWER ISOLATION VALVE	1B DG RM BOTTOM DLO DAY TK		
1B-DLO-1004	LOCKED OPEN	1B DG LUBE OIL PI-4788 & PS-4787,4788,4789, 4790 ROOT VALVE	1B DG RM VALVE STAND		
1B-DLO-1005	LOCKED OPEN	1B DG LUBE OIL PI-4788 & PS-4787,4788,4789, 4790 BACKUP ROOT VALVE	1B DG RM VALVE STAND		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DLO-1006	OPEN	1B DG LUBE OIL FILTER PDI-4786 LP ROOT VALVE	1B DG RM ON FILT		
1B-DLO-1007	OPEN	1B DG LUBE OIL STRAINER PDI-4787 LP ROOT VALVE	1B DG RM ON STRN		
1B-DLO-1008	LOCKED OPEN	1B DG CRANKCASE PRESSURE TRIP PS-4791 ROOT VALVE	1B DG RM NE DG		
1B-DLO-1009	LOCKED OPEN	1B DG CRANKCASE PRESSURE TRIP PS-4792 ROOT VALVE	1B DG RM NE DG		
1B-DLO-1010	LOCKED OPEN	1B DG CRANKCASE PRESSURE TRIP PS-4793 ROOT VALVE	1B DG RM NE DG		
1B-DLO-1011	LOCKED OPEN TO CRANKCASE	1B DG CRANKCASE PRESSURE SELECTOR ISOLATION VALVE	1B DG RM NE DG		THIS SELECTOR VALVE IS NOT TO BE USED FOR ISOLATION
1B-DLO-1012	OPEN	1B DG CRANKCASE VACUUM PI-4798 ROOT VALVE	1B DG RM VALVE STAND		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DLO-1013	OPEN	1B DG CRANKCASE VACUUM PI-4798 BACKUP ROOT VALVE	1B DG RM VALVE STAND		
1B-DLO-1014	SHUT	1B DG LUBE OIL DAY TANK LS-4788, 4789 DRAIN VALVE	1B DG RM W DLO DAY TK		
1B-DLO-1015	OPEN	1B DG LUBE OIL FILTER PDI-4786 HP ROOT VALVE	1B DG RM ON DLO FILT		
1B-DLO-1016	OPEN	1B DG LUBE OIL STRAINER PDI-4787 HP ROOT VALVE	1B DG RM ON STRN		
1B-DLO-4776-RV	----	1B DG LUBE OIL SUPPLY TO TURBOCHARGER RELIEF VALVE	1B DG RM UNDER N TURBO		
1B-DLO-4786-TCV	----	1B DG LUBE OIL COOLER TEMPERATURE CONTROL VALVE	1B DG RM W OF CLR		
1B-DLO-4787-RV	----	1B DG ELECTRIC MOTOR DRIVEN PRELUBE PUMP RELIEF VALVE	1B DG RM ON PRELUBE PP		INTERNAL TO PUMP

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DLO-4788-LCV	----	1B DG ENGINE SUMP LEVEL CONTROL VALVE	1B DG RM S SIDE DG SUMP		
1B-DLO-4788-RV	----	1B DG STANDBY LUBE OIL CIRCULATING PUMP RELIEF VALVE	1B DG RM ON TOP OF PUMP		
1B-DCW-101	SHUT	1B DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE	1B DG RM S OF EXP TK		
1B-DCW-102	LOCKED SHUT	1B DG JACKET WATER COOLING EXPANSION TANK DRAIN VALVE	1B DG RM UNDER EXP TK		
1B-DCW-103	SHUT	1B DG JACKET WATER COOLING TEMPERATURE CONTROL VLV 4806 BYPASS VALVE	1B DG RM NW OF 4806-TCV		
1B-DCW-104	LOCKED SHUT	1B DG JACKET WATER COOLING JACKET WATER COOLER DRAIN VALVE	1B DG RM N UNDER JACKET CLR		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DCW-105	SHUT	1B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE	1B DG RM S ON COOLER		
1B-DCW-106	----	1B DG JACKET WATER COOLING JACKET WATER COOLER OUTLET CHECK VALVE	1B DG RM BEHIND DLO CLR		
1B-DCW-107	LOCKED SHUT	1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE	1B DG RM E OF DLO CLR		
1B-DCW-108	LOCKED OPEN	1B DG JACKET WATER COOLING ELECTRIC JACKET COOLING PUMP SUCTION VALVE	1B DG RM SW OF DG		
1B-DCW-109	LOCKED OPEN	1B DG JACKET WATER COOLING ELECTRIC JACKET COOLING PUMP DISCHARGE VALVE	1B DG RM SW OF DG		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DCW-110	LOCKED OPEN	1B DG JACKET WATER COOLING HEATED WATER SUPPLY TO AIR CLR ISOLATION VALVE	1B DG RM RIGHT OF LO BSK STRN		
1B-DCW-111	SHUT	1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE	1B DG RM NW LEFT OF DRIP TK		
1B-DCW-112	----	1B DG JACKET WATER COOLING AIR CLG HEAT EXCHANGER OUTLET CHECK VALVE	1B DG RM RIGHT OF DLO STRN		
1B-DCW-113	LOCKED SHUT	1B DG JACKET WATER COOLING AIR COOLING SYSTEM DRAIN VALVE	1B DG RM RIGHT OF AIR CLR		
1B-DCW-114	LOCKED SHUT	1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER DRAIN VALVE	1B DG RM RIGHT OF AIR CLR		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DCW-115	SHUT	1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE	1B DG RM S TOP OF AIR CLR		
1B-DCW-116	LOCKED SHUT	1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE	1B DG RM RIGHT OF AIR CLR		
1B-DCW-117	LOCKED SHUT	1B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE	1B DG RM SW OF DG		
1B-DCW-120	LOCKED OPEN	1B DG JACKET WATER COOLING JACKET WATER RET FROM TURBO ISOLATION VALVE	1B DG RM W OF DG		
1B-DCW-121	LOCKED SHUT	1B DG JACKET WATER COOLING JACKET WTR CLR OUTLET TEST CONN ISOLATION VALVE	1B DG RM NW CORNER OF DG		

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DCW-122	LOCKED SHUT	1B DG JACKET WATER COOLING AIR COOLER HX OUTLET TEST CONN ISOLATION VALVE	1B DG RM NW CORNER OF DG		
1B-DCW-123	----	1B DG JACKET WATER COOLING AIR COOLER HX OUTLET CHECK VALVE	1B DG RM NW CORNER OF DG		
1B-DCW-1001	LOCKED OPEN	1B DG JACKET WATER COOLING LOW PRESS TRIP PS-4806, 4807 & 4808 ROOT VALVE	1B DG RM RIGHT OF GAGE BOARD		
1B-DCW-1002	LOCKED OPEN	1B DG JACKET WATER COOLING LOW PRESS TRIP PS-4806, 4807 & 4808 BACKUP ROOT VALVE	1B DG RM RIGHT OF GAGE BOARD		
1B-DCW-1003	LOCKED SHUT	1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER DRAIN VALVE	1B DG RM UNDER CLR S END		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DCW-1004	LOCKED OPEN	1B DG JACKET WATER COOLING AIR COOLING HX PS-4776 ROOT VALVE	1B DG RM UNDER CLR NW END		
1B-DCW-1005	OPEN	1B DG JACKET WATER COOLING ENGINE DRIVEN PUMP PI-4806 ROOT VALVE	1B DG RM RIGHT OF GAGE BOARD		
1B-DCW-1006	OPEN	1B DG JACKET WATER COOLING ENGINE DRIVEN PUMP PI-4806 BACKUP ROOT VALVE	1B DG RM RIGHT OF GAGE BOARD		
1B-DCW-1007	OPEN	1B DG JACKET WATER COOLING EXPANSION TANK LI-4806 LOWER ISOLATION VALVE	1B DG RM S OF EXP TK		
1B-DCW-1008	OPEN	1B DG JACKET WATER COOLING EXPANSION TANK LI-4806 UPPER ISOLATION VALVE	1B DG RM S OF EXP TK		

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DCW-1009	OPEN	1B DG JACKET WATER COOLING INTERCOOLER AIR COOLANT PI-4776 ROOT VALVE	1B DG RM RT OF DLO STRN		
1B-DCW-1010	LOCKED OPEN	1B DG JACKET WATER COOLING LOW COOLANT PRESS TRIP PS-4806 ISOLATION VALVE	1B DG RM INSIDE GAGE BOARD		
1B-DCW-1011	LOCKED OPEN	1B DG JACKET WATER COOLING LOW COOLANT PRESS TRIP PS-4807 ISOLATION VALVE	1B DG RM INSIDE GAGE BOARD		
1B-DCW-1012	LOCKED OPEN	1B DG JACKET WATER COOLING LOW COOLANT PRESS TRIP PS-4808 ISOLATION VALVE	1B DG RM INSIDE GAGE BOARD		
1B-DCW-1013	OPEN	1B DG JACKET WATER COOLING INTERCOOLER AIR COOLANT PI-4776 BACKUP ROOT VALVE	1B DG RM RIGHT OF DLO STRN		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1B-DCW-4776-TCV	----	1B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER TEMPERATURE CONTROL VALVE	1B DG RM E OF AIR COOLER		
1B-DCW-4806-TCV	----	1B DG JACKET WATER COOLING JACKET WATER COOLER TEMPERATURE CONTROL VALVE	1B DG RM ABOVE COOLER		
1-HVAC-5431-PO	----	1B DIESEL GENERATOR ROOM VENTILATION EXHAUST DAMPER	1B DIESEL GEN RM OVER DOOR		
1-HVAC-5431-SV	----	1B DIESEL GENERATOR ROOM VENTILATION EXHAUST DAMPER SOLENOID VALVE	1B DIESEL GEN RM W WALL		
1-HVAC-5432-PO	----	1B DIESEL GENERATOR ROOM VENTILATION FAN RECIRC DAMPER	1B DIESEL GEN RM OVHD		

ATTACHMENT 1B
1B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1-HVAC-5432A-PO	----	1B DIESEL GENERATOR ROOM VENTILATION FAN SUPPLY DAMPER	1B DIESEL GEN RM OVHD		
1-HVAC-5432-SV	----	1B DIESEL GENERATOR ROOM VENT FAN SUPPLY/RECIRC DAMPER SOLENOID VALVE	1B DIESEL GEN RM W WALL		

CALVERT CLIFFS NUCLEAR POWER PLANT

UNIT TWO

OI-21B

2B DIESEL GENERATOR

REVISION 19

SAFETY RELATED

CONTINUOUS USE

Approval Authority: Tim Riti

Effective Date: 1/15/2008

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1.0 PURPOSE

This procedure provides the prerequisites, precautions, and instructions for the starting, loading, and shutdown operation of 2B Diesel Generator and associated auxiliary systems.

2.0 APPLICABILITY/SCOPE

A. This procedure provides specific instructions for operation of 2B Diesel Generator.

B. This procedure provides specific instructions for operation of 2B Diesel Generator auxiliary and support systems.

C. Conditional steps may be marked N/A if the condition does not exist or apply.

D. Signature blocks are provided for placekeeping in the slow start section. Steps shall be initialed immediately upon completion.

3.0 REFERENCES AND DEFINITIONS

3.1 DEVELOPMENTAL REFERENCES

A. P&ID

1. OM-79 (60-736-E), Fuel Oil Storage System

2. OM-69 Sh. 3 (60-727-E, Sh. 3), Diesel Generator Cooling Water, Starting Air, Fuel, & Lube Oil Diesel Generator No. 2B

3.2 PERFORMANCE REFERENCES

A. MN-1-110, Procedure Controlled Activities

B. MN-1-106, Temporary Storage Of Equipment And Material

C. NO-1-205, Locked Valves

D. OI-15, Service Water System

E. OI-21D, Fuel Oil Storage And Supply

F. OI-26A, 125 Volt Vital DC

G. OI-27B, 13.8 KV System

H. OI-27C, 4.16 KV System

I. OI-27D, Station Power 480 Volt System

J. OI-49, Operability Verification

K. EDG-10, Woodward Governor Oil Change

3.2 PERFORMANCE REFERENCES (Continued)

L. EDG-20, Emergency Diesel Generator Inspection

M. STP O-8B-2, Test of 2B DG And 24 4KV Bus LOCI Sequencer

N. STP O-90-2, AC Sources And On Site Power Distribution Systems 7 Day Operability Verification

O. CNG-HU-1.01-1001, Human Performance Tools and Verification Practices.

3.3 DEFINITIONS

A. FBM - Fairbanks Morse diesel generators

B. Elective maintenance - any activity to repair or maintain equipment where the equipment is operable/fully functional prior to performing the activity. Surveillance testing is **NOT** considered maintenance for this purpose.

C. **[PC]**: Symbol preceding a Critical Step which requires a Peer Check Verification Practice **PER** CNG-HU-1.01-1001, HUMAN PERFORMANCE TOOLS AND VERIFICATION PRACTICES.

4.0 PREREQUISITES

Prerequisites will vary depending on which section of the procedure is being performed. Prerequisites for each section will be listed as Initial Conditions at the beginning of the applicable section.

5.0 PRECAUTIONS

A. The Overspeed Trip Mechanism must be latched any time 2B DG is considered operable. Whenever the fuel rack is tripped **AND** reset, 2B DG shall be started **AND** loaded for at least 1 hour.

B. Underfrequency/reverse power protection/loss of field (194 Device) is bypassed when 2B DG CONTR MODE SEL SW, 2-HS-4841, is in the LOCAL position.

C. In the event 2B DG fails to start on an automatic or manual start signal **OR** has a load demand failure, submit a Condition Report to document the failure.

D. Stop the engine if severe vibration **OR** unusual noises occur.

E. 2B DG should be shutdown as soon as possible if the 2B DG room ventilation system fails to maintain 2B DG room temperature less than or equal to 120° F.

5.0 PRECAUTIONS (Continued)

F. 2B DG shall be considered inoperable for any of the following:

- 2B DG Voltage Regulator is selected to MANUAL. **[B0024][B0110]**
- The 2B DG Room Ventilation Fan is inoperable.
- 2-SRW-1587-PDIC is **NOT** in AUTOMATIC or 2-SRW-1587-CV Manual Handwheel is engaged.
- 2B DG Fuel Oil Transfer Pump is inoperable.
- 2B DG Jacket Water System temperature is less than 90° F. **[B0022]**

G. An operability verification of all redundant systems, **PER** OI-49, Operability Verification, **AND** STP O-90-2, AC Sources And On Site Power Distribution Systems 7 Day Operability Verification, must be performed as listed below **AND** once every 8 hours while 2B DG remains inoperable (STP 0-90 is **NOT** required in Modes 5, 6, or defueled): **[B0105]**

- Prior to removing 2B DG from operable status for planned maintenance or testing

OR

- Within one hour of discovery if 2B DG malfunctions **OR** is found to be inoperable

H. Notify the Shift Manager if an oil spill occurs anywhere on company property. This limit applies to ALL spills, even if contained.

I. Locked valves are controlled by NO-1-205.

J. Minimize the time 2B DG air compressor is operated with the aftercooler out of service.

K. If a Safety Injection Actuation Signal (SIAS) has started 2B DG automatically, **OR** if both the NORMAL and the ALTERNATE feeder breakers to 24 4KV Bus are open, then the Jacket Coolant Temperature and Pressure Trips and Crankcase Pressure Trips are bypassed. Close attention to these parameters in this condition is necessary.

5.0 PRECAUTIONS (Continued)

L. Prior to taking 2B DG out of service, EXCEPT for short periods such as for barring over 2B DG, the CRS or Shift Manager must perform the following actions: **[B0138]** (Basis INPO SER 10-91 Loss of Offsite Power due to Switchyard Testing)

- Contact the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts.
- Determine whether other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).
- **IF** 2B DG will be out of service at the same time reliability of the offsite power supplies is reduced,
  THEN the Shift Manager will determine how to minimize both the time 2B DG is out of service **AND** the time that offsite power supplies are at reduced reliability.

M. In Modes 1, 2, 3, and 4, to ensure defense in depth, the following actions should be performed anytime 2B DG is out of service for greater than 72 hours, **AND SHALL** be performed prior to removing 2B DG from service for elective maintenance greater than 72 hours. **[B0906]**

NOTE

Patuxent River Naval Air Station is the preferred source for the weather report. However, any government sponsored weather agency may be used.

- Weather conditions will be evaluated within 12 hours prior to removing 2B DG from service. 2B DG will **NOT** be removed from service if official weather forecasts are predicting severe conditions for CCNPP or any of the 500 KV transmission lines rights of way.
  - Severe Thunderstorm
  - Gale/High Wind - greater than 50 mph
  - Tornado
  - Hurricane
  - Blizzard
  - Ice Storm

5.0.M PRECAUTIONS (Continued)

- The ESOP Outage Scheduler or SO-TSO will be contacted within 12 hours prior to removing 2B DG from service and after it has been returned to service.

  1. Ensure 2B DG will **NOT** be out of service when grid stress conditions are considered "high".

     - 5051, 5052 and 5072 circuits are in service
     - PJM is **NOT** in a Warning or implementing an Emergency Action for capacity shortages.
       - Primary Reserve - Warning
       - Voltage Reduction - Warning or Action
       - Manual Load Dump - Warning or Action
       - Maximum Emergency Generation - Action
     - PJM is **NOT** in Conservative Operations.
       - Thunderstorms
       - Solar Magnetic Disturbances
       - Crisis Response
       - Heavy Load, Low Voltage - Warning or Action
       - Post Contingency Local Load Relief Warning that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard
     - **NO** other known condition exists on the PJM or BGE system at this time that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard.

  2. Determine that **NO** other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

- **NO** elective maintenance will be performed in the switchyard, on the 4 KV Distribution System, or on the 13 KV Distribution System.

5.0.M PRECAUTIONS (Continued)

NOTE
The Unit-2 AFW system includes 13 AFW pump and its cross-tie.

- Planned maintenance or testing will **NOT** be performed on the Unit-2 AFW System.
- **NO** maintenance or testing that affects the reliability of Unit-2 A train will be scheduled. If testing or maintenance activities must be performed, a Risk Assessment Evaluation will be performed according to NO-1-117, INTEGRATED RISK MANAGEMENT.
- Elective maintenance will **NOT** be performed on 0C DG. Personnel will be made aware of the dedication of 0C DG to 24 4KV Bus.
- The operations crews will be briefed concerning the unit activities, including compensatory measures established and the importance of promptly starting and aligning the 0C DG.
- The on-shift operations crew will discuss and review the appropriate normal and emergency operating procedures within 24 hours prior to or shortly after assuming the watch for the first time after having scheduled days off while 2B DG is out of service.
  - AOP-7I, LOSS OF 4KV, 480 VOLT OR 208/120 VOLT INSTRUMENT BUS POWER
  - EOP-0, POST-TRIP IMMEDIATE ACTIONS
  - EOP-2, LOSS OF OFFSITE POWER/LOSS OF FORCED CIRCULATION
  - EOP-7, STATION BLACKOUT
  - AOP-3F, LOSS OF OFFSITE POWER WHILE IN MODES 3, 4, 5 OR 6

N. Fouling of fuel oil filters, lube oil filters, **OR** lube oil strainers is **NOT** normal. Due to minimal DG operating hours and the PM program, DG filters and strainers should **NOT** foul unless abnormal conditions exist. If the fuel oil filter fouls, a clean filter should be placed in service. No backup is readily available for the lube oil filters or strainers. **IF** any dp limit is reached in the procedure, the cause of the filter or strainer fouling should be immediately determined to ensure the filter or strainer will support extended operation (safety function).

5.0 PRECAUTIONS (Continued)

O. This procedure contains step(s) that require Risk Based Verification Practices:

1. ALL manipulations on the Main Control Board require mandatory Peer Checks, so they are not marked with a symbol UNLESS a Concurrent Verification or an Independent Verification is required

2. Pre-screened steps that require the use of a Verification Practice are identified by a symbol preceding the step.

3. The SM, CRS or any other person involved with the task may designate additional steps requiring the use of Verification Practices

4. The SM or CRS may waive the use of a Peer Check during emergency conditions or when an entry into a high radiation area is required.

6.0 PERFORMANCE

6.1 2B DG NORMAL STANDBY

A. Initial Conditions

1. 2B DG valve alignments have been verified by completion of ATTACHMENT 1B, 2B DIESEL GENERATOR VALVE LINEUP.
2. The Service Water System is aligned for 2B DG operation (OI-15).
3. The Fuel Oil System is aligned for 2B DG operation (OI-21D).
4. The 125 VDC System is aligned for 2B DG operation (OI-26A).
5. The 4.16KV System is aligned for 2B DG operation (OI-27C).
6. The 480V System is aligned for 2B DG operation (OI-27D).
7. The Saltwater System is aligned for 2B DG operation (OI-29).

B. Procedure

1. **IF** 2B DG is being returned to service following maintenance, **THEN PERFORM** ATTACHMENT 1A, POST MAINTENANCE 2B DIESEL GENERATOR LINEUP CHECKS.

CAUTION
Minimum room temperature is 60° F.

2. **IF** desired to operate the 2B DG room ventilation, **THEN PERFORM** the following:
   a. **PLACE** 2B DG EXHAUST DAMPER, 2-HS-5438, to OPEN.
   b. **IF** desired, **START** 2B DG VENT FAN by momentarily placing 2-HS-5437, to START.
   c. **WHEN** desired, **STOP** 2B DG VENT FAN by momentarily placing 2-HS-5437 , to STOP.
   d. **WHEN** desired, **PLACE** 2B DG EXHAUST DAMPER, 2-HS-5438, to AUTO.

****** END ******

6.2 2B DG NON-EMERGENCY FAST START

A. Initial Conditions

1. 2B DG is in Standby **PER** Section 6.1, 2B DG NORMAL STANDBY.
2. A calibrated electric timer is available. (NA if not used)
3. 2B Diesel Generator (DG) should be prelubed prior to any non-emergency start, except when engine has been run **OR** prelubed within the last two hours. **[B0027] [B0048]**
4. 2B DG should be run within 30 minutes after prelubing to prevent the oil trapped above the upper pistons from leaking past the rings into the combustion space.
5. Whenever 2B DG is started during non-emergency conditions, it should be loaded within one hour in incremental steps **PER** Section 6.6, PARALLEL 2B DIESEL GENERATOR. Unloaded operation beyond one hour shall be minimized and approved by the Shift Manager. **[B0027]**

B. Procedure

NOTE

The Load Shed Relay Position Verification light indicates that the 24 4KV bus feeder breaker indication switch is functioning properly. The light should be on when either bus feeder breaker is closed.

CAUTION

Damage to 2B DG may occur if a 24 4KV bus feeder breaker is closed **AND** the Load Shed Relay Position Verification light is **NOT** lit. Under this condition 2B DG may attempt to automatically load on 24 4KV bus.

1. **CHECK** the Load Shed Relay Position Verification light is illuminated on the 24 4KV Bus Auxiliary Cabinet.
2. **CHECK** the following 2B DG annunciators are clear:
   - "JACKET COOLANT LEVEL LOW IN EXPANSION TANK"
   - "FUEL OIL LEVEL LOW IN DAY TANK"
3. **ENSURE** a minimum of 215 PSIG in the air receivers (2C61D):
   - West RCVR - 2-PI-4845
   - East RCVR - 2-PI-4846
4. **IF** desired for data collection,
   THEN ADJUST the 2B DG starting air pressure gauges minimal pressure arm(s) on 2-PI-4845 and 2-PI-4846 to the current indicated pressure.

6.2.B Procedure (Continued)

5. **ENSURE** the 2B DG Lube Oil Sump level is near FULL STOP on the dipstick.

6. **ENSURE** the visible portion of the sightglass for the governor oil level is at least 3/4 full.

NOTE
The System Engineer recommends obtaining 2B DG start time for each fast start.

7. **IF** obtaining 2B DG start time,
THEN PREPARE the electric timer as follows:

   a. **RECORD** timer serial number in the Unit 2 Control Room Log.

   b. **RECORD** timer cal due date in the Unit 2 Control Room Log

   c. **PLUG** the electric timer into the 2B DG Speed/Voltage TIMER JACK in 2B DG room panel 2C61B.

   d. **PLUG** the electric timer into a 120 VAC outlet.

   e. **TURN** the electric timer ON **AND RESET** the indicators to zero (0).

8. **ESTABLISH** communications between the Control Room and 2B DG Room.

6.2.B Procedure (Continued)

9. **IF** 2B DG has **NOT** been run **OR** prelubed within the last two hours, **THEN PERFORM** the following:

   a. **PLACE AND HOLD** PRELUBE PUMP, 2-HS-4793, to MAN. **[B0048]**

NOTE

2B DG should be started while prelubing the engine; however, **IF** it is **NOT** possible **OR** conditions do **NOT** support maintaining the prelube pump running while starting 2B DG, **THEN** 2B DG may be started without the prelube pump running as long as it is started within two hours. **[B0027]**

   b. **MAINTAIN** PRELUBE PUMP, 2-HS-4793, at MAN **AND NOTIFY** the Control Room when the prelube pump has run at least 3 minutes but **NOT** greater than 5 minutes.

   c. **START** 2B DG by depressing 2B DG START, 2-HS-2424, pushbutton, on 1C20B.

   d. **WHEN** any of the following criteria are met:

      - 2B DG starts
      - 2B DG fails to start
      - The Prelube Pump has operated for five minutes

      THEN PLACE PRELUBE PUMP, 2-HS-4793, to AUTO.

   e. **PROCEED** to Step 11.

10. **START** 2B DG by depressing 2B DG START, 2-HS-2424, pushbutton, on 1C20B. **[B0027]**

11. **IF** 2B DG fails to start **AND** plant conditions permit, **THEN CONSIDER** barring over 2B DG **PER** Section 6.9, MANUALLY BAR-OVER 2B DIESEL GENERATOR, **OR** Section 6.24, ROTATING 2B DIESEL GENERATOR WITH COMPRESSED AIR, within three hours.

12. **CHECK** the following parameters:

    - 2B DG VOLTS, 2-EI-2422: 4.16 KV (4.1 to 4.35 KV)
    - 2B DG FREQUENCY, 2-SI-2401: 60 Hz (58.8 to 61.2 Hz)

13. **RECORD** the electric timer readings in the Unit 2 Control Room Log.

    - Time (seconds) to RPM
    - Time (seconds) to voltage

6.2.B Procedure (Continued)

14. **TURN** the electric timer OFF.

15. **REMOVE** the electric timer as follows:

    - **UNPLUG** the electric timer from the 120 VAC outlet.
    - **UNPLUG** the electric timer from the 2B DG Speed/Voltage TIMER JACK in 2B DG room panel 2C61B.
    - **RETURN** the electric timer to its storage location.

16. **MONITOR** 2B DG parameters **PER** TABLE 3, 2B DIESEL GENERATOR OPERATING PARAMETERS.

    a. **IF** Jacket Water Pump discharge pressure drops more than 3 PSIG from the initial value,
    THEN VENT the Jacket Water Heat Exchanger **AND** the Air Cooler Heat Exchanger as follows:

        (1) **CRACK OPEN** the following vent valves:

            - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
            - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

        (2) **WHEN** a continuous stream of water is observed from the Heat Exchanger Vents,
        THEN SHUT the following valves:

            - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
            - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

        (3) **LOG** the time **AND** duration of the vent on the Outside Operator Log.

        (4) **NOTIFY** the System Engineer.

6.2.B.16 **Procedure (Continued)**

NOTE

Fouling of fuel oil filters, lube oil filters, **OR** lube oil strainers is **NOT** normal. Due to minimal DG operating hours and the PM program, DG filters and strainers should **NOT** foul unless abnormal conditions exist. If the fuel oil filter fouls, a clean filter should be placed in service. No backup is readily available for the lube oil filters or strainers. **IF** any dp limit is reached in the procedure, the cause of the filter or strainer fouling should be immediately determined to ensure the filter or strainer will support extended operation (safety function).

b. **IF** filter **OR** strainer differential pressures exceed the following values, **THEN PERFORM** the following:

- **IF** Fuel Oil Filter differential pressure exceeds 10 PSID, **THEN PLACE** the alternate filter in service **AND SUBMIT** a CR to have the dirty filter replaced.
- **IF** Lube Oil Filter differential pressure exceeds 10 PSID, **THEN SUBMIT** a CR to replace the cartridges **AND PERFORM** an operability determination.
- **IF** Lube Oil Strainer differential pressure exceeds 5 PSID, **THEN SUBMIT** a CR to clean the strainer **AND PERFORM** an operability determination.

NOTE

2B DG should be loaded as soon as practicable but at least within one hour after starting. **[B0027]**

17. **GO TO** the desired procedure section:

- Section 6.6, PARALLEL 2B DIESEL GENERATOR

OR

- Section 6.8, 2B DG SHUTDOWN

****** END ******

6.3 2B DG SLOW SPEED START

A. Initial Conditions

1. 2B DG is in Standby **PER** Section 6.1, 2B DG NORMAL STANDBY.

2. **IF** 2B DG is currently operable,
   THEN an operability verification of Unit 2 ZA train components must be performed **PER** OI-49, Operability Verification, prior to 2B DG slow start.

3. The key for 2B DG SLOW START SEQUENCE KEY SW, 2-HS-4866, is available.

4. 2B Diesel Generator (DG) should be prelubed prior to any non-emergency start, except when engine has been run **OR** prelubed within the last two hours. **[B0027] [B0048]**

5. 2B DG should be run within 30 minutes after prelubing to prevent the oil trapped above the upper pistons from leaking past the rings into the combustion space.

6. Whenever 2B DG is started during non-emergency conditions, it should be loaded within one hour in incremental steps **PER** Section 6.6, PARALLEL 2B DIESEL GENERATOR. Unloaded operation beyond one hour shall be minimized and approved by the Shift Manager. **[B0027]**

7. Signature blocks shall be completed in this section.

B. Procedure

INITIALS

NOTE

- 2B DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.
- The Load Shed Relay Position Verification light indicates the 24 4KV Bus feeder breaker indication switch is functioning properly. The light should be illuminated when either bus feeder breaker is closed.

CAUTION

Damage to 2B DG may occur if the 24 4KV Bus feeder breaker is closed **AND** the Load Shed Relay Position Verification light is **NOT** lit. Under this condition 2B DG may attempt to automatically load on 24 4KV bus.

1. **CHECK** the Load Shed Relay Position Verification light is illuminated on the 24 4KV Bus Auxiliary Cabinet. ____

2. **IF** desired for data collection,
   THEN ADJUST the 2B DG starting air pressure gauges minimal pressure arm(s) on 2-PI-4845 and 2-PI-4846 to the current indicated pressure. ____

6.3.B Procedure (Continued) **INITIALS**

3. **VERIFY** PRELUBE PUMP, 2-HS-4793, is in AUTO. **[B0048]** ____

NOTE
Placing 2B Slow Start Mode Selector switch, 2-HS-4827, to Normal will cancel Slow Start sequence.

4. **[PC] PLACE** 2B DG SLOW START MODE SELECTOR SW, 2-HS-4827, in ENABLE. ____

NOTE
- Placing the keyswitch to Start will automatically start the Prelube pump and ramp down the controller speed setpoint to 300 rpm. After 3 minutes the DG will start and run at approximately 300 rpm.
- Failure to receive the "2B DG • ENGINE • EXCTR SHUTDOWN" alarm may indicate a problem with the Exciter Shutdown circuit **AND** that the exciter is still active.

5. **[PC] MOMENTARILY PLACE** 2B DG SLOW START SEQUENCE KEYSWITCH, 2-HS-4866, to START position, **THEN** release the switch. ____

6. **CHECK** that the SLOW START SEQUENCE light illuminates on 2C61B. ____

NOTE
Prelube pump will stop after running for 4 minutes.

7. **VERIFY** that the Prelube Pump starts. ____

8. **CHECK** 2B DG ENGINE EXCTR SHUTDOWN alarm on 1C20B annunciates. ____

9. **IF** the above expected results are **NOT** met **OR** it is desired to cancel the Auto Start Sequence, **THEN RETURN** the SLOW START MODE SELECTOR HANDSWITCH, 2-HS-4827, to NORMAL. (N/A if not desired) ____

NOTE
Generator damage may occur if voltage builds up when generator is running at less than rated speed.

10. **IF** generator voltage is indicated when 2B DG is started, **THEN IMMEDIATELY NOTIFY** Control Room to stop 2B DG using Control Room Stop button at 1C20B to shutdown 2B DG. ____

6.3.B Procedure (Continued) **INITIALS**

11. **CHECK** 2B DG starts **AND** reaches approximately 300 RPM on 2C61B indication 2-SI-4857. ____

12. **IF** 2B DG fails to start **AND** plant conditions permit, **THEN CONSIDER** barring over 2B DG **PER** Section 6.9, MANUALLY BAR-OVER 2B DIESEL GENERATOR, **OR** Section 6.24, ROTATING 2B DIESEL GENERATOR WITH COMPRESSED AIR, within three hours. ____

13. **IF** 2B DG was started for Maintenance **AND** an overspeed test is being performed, **THEN GO TO** Section 6.11, 2B DG MECHANICAL GOVERNOR ADJUSTMENT AND OVERSPEED TEST. ____

NOTE
The operator has local control of the DG speed unless a SIAS or UV signal is received **OR** the operator places 2-HS-4827 to NORMAL.

14. **RAISE** 2B DG speed as follows:

    a. **MONITOR** DG speed at 2B DG SPEED INDICATOR, 2-SI-4857. ____

NOTE
The 2B DG governor Speed may be adjusted to raise **OR** lower as directed by the System Engineer to support maintenance.

    b. **GRADUALLY RAISE** the 2B DG GOVERNOR SPEED CONTROL CS/SP at 2C61B to approximately 900 rpm over a three to five minute time period. ____

NOTE
The following step will allow the field to flash and reset the slow start circuit, placing the DG in the AUTO/REMOTE control mode.

    c. **[PC] WHEN** the 2B DG is at 900 rpm, **THEN PLACE** 2B DG SLOW START MODE SEL SW, 2-HS-4827, to NORMAL. ____

    d. **CHECK** the following:

    - Generator voltage is 4.16KV (4.1 to 4.35KV) ____
    - Generator frequency is 60Hz (58.8 to 61.2Hz) ____
    - Generator undervoltage annunciator clears ____

6.3.B.14 **Procedure (Continued)** **INITIALS**

e. **CHECK** "2B DG • ENGINE • EXCTR SHUTDOWN" annunciator is clear. ____

15. **MONITOR** 2B DG parameters **PER** TABLE 3, 2B DIESEL GENERATOR OPERATING PARAMETERS. ____

a. **IF** Jacket Water Pump discharge pressure drops more than 3 PSIG from the initial value,
THEN VENT the Jacket Water Heat Exchanger **AND** the Air Cooler Heat Exchanger as follows:

(1) **CRACK OPEN** the following vent valves:

- 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105 ____
- 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115 ____

(2) **WHEN** a continuous stream of water is observed from the Heat Exchanger Vents,
THEN SHUT the following valves:

- 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105 ____
- 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115 ____

(3) **LOG** the time **AND** duration of the vent on the Outside Operator Log. ____

(4) **NOTIFY** the System Engineer. ____

6.3.B.15 Procedure (Continued) **INITIALS**

NOTE
Fouling of fuel oil filters, lube oil filters, **OR** lube oil strainers is **NOT** normal. Due to minimal DG operating hours and the PM program, DG filters and strainers should **NOT** foul unless abnormal conditions exist. If the fuel oil filter fouls, a clean filter should be placed in service. No backup is readily available for the lube oil filters or strainers. **IF** any dp limit is reached in the procedure, the cause of the filter or strainer fouling should be immediately determined to ensure the filter or strainer will support extended operation (safety function).

b. **IF** filter **OR** strainer differential pressures exceed the following values,
THEN PERFORM the following:

- **IF** Fuel Oil Filter differential pressure exceeds 10 PSID, **THEN PLACE** the alternate filter in service **AND SUBMIT** a CR to have the dirty filter replaced. ____
- **IF** Lube Oil Filter differential pressure exceeds 10 PSID, **THEN SUBMIT** a CR to replace the cartridges **AND PERFORM** an operability determination. ____
- **IF** Lube Oil Strainer differential pressure exceeds 5 PSID, **THEN** SUBMIT a CR to clean the strainer **AND PERFORM** an operability determination. ____

NOTE
2B DG should be loaded as soon as practicable but at least within one hour after starting. **[B0027]**

16. **GO TO** the desired procedure section: ____

- Section 6.6, PARALLEL 2B DIESEL GENERATOR

OR

- Section 6.8, 2B DG SHUTDOWN

****** END ******

6.4 2B DG AUTOMATIC START

A. Initial Conditions

1. An automatic start signal has been generated that started 2B DG.

2. If a Safety Injection Actuation Signal (SIAS) has started 2B DG automatically, **OR** if both the NORMAL and the ALTERNATE feeder breakers to 24 4KV Bus are open, then the Jacket Coolant Temperature and Pressure Trips and Crankcase Pressure Trips are bypassed. Close attention to these parameters in this condition is necessary.

3. Under normal conditions, do **NOT** exceed 3.0 MW load on 2B DG unless specified by an approved Test Procedure **OR** by the General Supervisor-Nuclear Operations. During accident conditions loads of up to 3.3 MW are acceptable.

4. 2B DG load should be limited to 1.9 MW when the following conditions exist:

   - The 24 4KV Bus Normal **AND** Alternate feeder breakers are open
   - 2B DG is powering 24 4KV Bus
   - A SIAS does **NOT** exist

B. Procedure

NOTE

- 2B DG starts automatically due to any of the following:
  - A SIAS B-10 signal
  - A 24 4KV Bus undervoltage signal (U/V B-4)
  - The glass cover is broken at the local break glass station
- When 2B DG is up to frequency and voltage, 2B DG OUT BKR, 152-2403, will close automatically if 24 4KV Bus is de-energized. If 24 4KV Bus is energized from another source, 2B DG may be manually paralleled **PER** Section 6.6, PARALLEL 2B DIESEL GENERATOR.
- If the engine was **NOT** prelubed, 2B DG should be operated a minimum of 4 hours, 3 hours at greater than 1.5 MW, plus one hour at 2.7 to 3.0 MW.

1. **IF** 2B DG is powering 24 4KV Bus **AND** a SIAS does **NOT** exist, **THEN LIMIT** 2B DG to 1.9 MW.

2. **IF** 24 4KV Bus is energized from off-site power, **THEN LOAD** 2B DG **PER** Section 6.6, PARALLEL 2B DIESEL GENERATOR, as soon as practicable but at least within one hour after starting. **[B0027]**

6.4.B Procedure (Continued)

3. **IF** possible,
THEN MONITOR 2B DG parameters **PER** TABLE 3, 2B DIESEL GENERATOR OPERATING PARAMETERS.

   a. **IF** Jacket Water Pump discharge pressure drops more than 3 PSIG from the initial value,
   THEN VENT the Jacket Water Heat Exchanger **AND** the Air Cooler Heat Exchanger as follows:

      (1) **CRACK OPEN** the following valves:

      - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
      - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

      (2) **WHEN** a continuous stream of water is observed from the Heat Exchanger Vents,
      THEN SHUT the following valves:

      - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
      - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

      (3) **LOG** the time **AND** duration of the vent on the Outside Operator Log.

      (4) **NOTIFY** the System Engineer.

6.4.B.3 Procedure (Continued)

NOTE

Fouling of fuel oil filters, lube oil filters, **OR** lube oil strainers is **NOT** normal. Due to minimal DG operating hours and the PM program, DG filters and strainers should **NOT** foul unless abnormal conditions exist. If the fuel oil filter fouls, a clean filter should be placed in service. No backup is readily available for the lube oil filters or strainers. **IF** any dp limit is reached in the procedure, the cause of the filter or strainer fouling should be immediately determined to ensure the filter or strainer will support extended operation (safety function).

b. **IF** filter **OR** strainer differential pressures exceed the following values, **THEN PERFORM** the following:

- **IF** Fuel Oil Filter differential pressure exceeds 10 PSID, **THEN PLACE** the alternate filter in service **AND SUBMIT** a CR to have the dirty filter replaced.

- **IF** Lube Oil Filter differential pressure exceeds 10 PSID, **THEN SUBMIT** a CR to replace the cartridges **AND PERFORM** an operability determination.

- **IF** Lube Oil Strainer differential pressure exceeds 5 PSID, **THEN** SUBMIT a CR to clean the strainer **AND PERFORM** an operability determination.

****** END ******

6.5 RESTART OF 2B DG WITH AN AUTOMATIC START SIGNAL PRESENT [B0154]

A. Initial Conditions

1. 2B DG has failed to start with automatic start signal **OR** has experienced a trip after an automatic start.
2. The cause of the start failure **OR** automatic trip has been found **AND** corrected.
3. A SIAS **OR** 24 4KV Bus U/V signal is present.

B. Procedure

1. **IF** an overspeed trip occurred,
   THEN ENSURE the fuel rack lever is RESET.

NOTE

- 60 seconds after depressing the Local Alarm Reset Pushbutton, the stop relay timer will de-energize **AND** 2B DG will attempt to start.
- When 2B DG is up to frequency and voltage, 2B DG OUT BKR, 152-2403, will close automatically if 24 4KV Bus is de-energized. If 24 4KV Bus is energized from another source, 2B DG may be manually paralleled **PER** Section 6.6, PARALLEL 2B DIESEL GENERATOR.
- If the engine was **NOT** prelubed, 2B DG should be operated a minimum of 4 hours, 3 hours at greater than 1.5 MW, plus one hour at 2.7 to 3.0 MW.

CAUTION

Jacket Cooling Water High Temperature, Jacket Cooling Water Low Pressure and Crankcase High Pressure Trips are bypassed if a SIAS exists or both the NORMAL and ALTERNATE feeder breakers to the 24 4KV Bus are open.

2. **MOMENTARILY DEPRESS** the 2B DG Local Alarm Reset Pushbutton.

6.5.B Procedure (Continued)

3. IF 2B DG starts,
   THEN **PERFORM** the following:

   a. IF 2B DG is powering 24 4KV Bus **AND** a SIAS does **NOT** exist,
      THEN **LIMIT** 2B DG to 1.9 MW.

   b. IF 24 4KV Bus is energized from off-site power,
      THEN **PARALLEL AND LOAD** 2B DG **PER** Section 6.6, PARALLEL 2B DIESEL GENERATOR, as soon as practicable but at least within one hour after starting. **[B0027]**

   c. **MONITOR** 2B DG parameters **PER** TABLE 3, 2B DIESEL GENERATOR OPERATING PARAMETERS.

      (1) IF Jacket Water Pump discharge pressure drops more than 3 PSIG from the initial value,
      THEN **VENT** the Jacket Water Heat Exchanger **AND** the Air Cooler Heat Exchanger as follows:

         (a) **CRACK OPEN** the following vent valves:

            - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
            - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

         (b) **WHEN** a continuous stream of water is observed from the heat exchanger vents,
         THEN SHUT the following valves:

            - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
            - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

         (c) **LOG** the time **AND** duration of the vent on the Outside Operator's Log.

         (d) **NOTIFY** the System Engineer.

6.5.B.3.c **Procedure (Continued)**

NOTE

Fouling of fuel oil filters, lube oil filters, **OR** lube oil strainers is **NOT** normal. Due to minimal DG operating hours and the PM program, DG filters and strainers should **NOT** foul unless abnormal conditions exist. If the fuel oil filter fouls, a clean filter should be placed in service. No backup is readily available for the lube oil filters or strainers. **IF** any dp limit is reached in the procedure, the cause of the filter or strainer fouling should be immediately determined to ensure the filter or strainer will support extended operation (safety function).

(2) **IF** filter **OR** strainer differential pressures exceed the following values, **THEN PERFORM** the following:

- **IF** Fuel Oil Filter differential pressure exceeds 10 PSID, **THEN PLACE** the alternate filter in service **AND SUBMIT** a CR to have the dirty filter replaced.
- **IF** Lube Oil Filter differential pressure exceeds 10 PSID, **THEN SUBMIT** a CR to replace the cartridges **AND PERFORM** an operability determination.
- **IF** Lube Oil Strainer differential pressure exceeds 5 PSID, **THEN** SUBMIT a CR to clean the strainer **AND PERFORM** an operability determination.

4. **IF** 2B DG does **NOT** start, **THEN INFORM** the Control Room.

****** END ******

6.6 PARALLEL 2B DIESEL GENERATOR

A. Initial Conditions

1. DC control power is available to 2B DG OUT BKR, 152-2403, as observed by a handswitch position indicating light being lit.
2. 2B DG is running unloaded.
3. 0C DG is **NOT** connected to 24 4KV Bus.
4. 24 4KV Bus is being supplied from offsite power.
5. If the engine is prelubed, 2B DG should be loaded at 2.7 to 3.0 MW for a minimum of 1 hour. If the engine is **NOT** prelubed, 2B DG should be loaded for a minimum of 4 hours, 3 hours at greater than 1.5 MW, plus one hour at 2.7 to 3.0 MW.
6. Under normal conditions, do **NOT** exceed 3.0 MW load on 2B DG unless specified by an approved Test Procedure **OR** by the General Supervisor-Nuclear Operations. During accident conditions loads of up to 3.3 MW are acceptable.
7. Normally, 2B DG should **NOT** be operated with lead KVARS. 2B DG Output Breaker, 152-2403, will automatically trip open at approximately 1000 LEADING KVARS.

NOTE

2B DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.

B. Procedure

CAUTION

When the DG is paralleled to the bus, the shutdown sequencer will start 11 and 12 Post-LOCI Filter fans and stop the Kitchen/Toilet Exhaust fan.

1. **IF** desired, **ALIGN** the control Room HVAC as follows:
   a. **VERIFY** 1C22, 0-RI-5350 "CONTR RM VENT" is clear.
   b. **ENSURE** the Kitchen/Toilet Exhaust fan handswitch, 0-HS-5359, is OFF.
   c. **START** the Post-LOCI Filter fans by placing the handswitches to START **AND LOG** the starting time in the Charcoal Filter Log
      - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352
      - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353

6.6.B.1 Procedure (Continued)

d. Control Room HVAC Units in the following alignment:

- PREFERRED ALIGNMENT - 11 CR HVAC in operation.

OR

- 12 CR HVAC in operation with the Control Room Chiller Unit secured.

2. **ENSURE** the CPS Generation Dispatcher is notified of the impending 2B Diesel parallel.

3. **MOMENTARILY PLACE** 2B DG UNIT PARALLEL, 2-CS-2404, to PARA.

NOTE
Failure to place 2-CS-2404 to PARA **OR** failure of the paralleling circuit to energize will prevent manual frequency control.

4. **ENSURE** proper operation of 2B DG frequency control by performing the following:

   a. **RAISE AND LOWER** 2B DG frequency between 59.0 and 61.0 Hz using 2B DG SPEED CONTR, 2-CS-2403.

   b. **ADJUST** 2B DG frequency to approximately 60 Hz using 2B DG SPEED CONTR, 2-CS-2403.

5. **ENSURE** 2B DG VOLT REGULATOR SEL, 2-HS-2423, is positioned to AUTO.

6. **ENSURE** the following annunciators for 2B DG are clear:

   - "GENERATOR UNDERVOLTAGE"
   - "2B DG • POT VOLT • FREQ LO"

7. **RAISE AND LOWER** 2B DG voltage between 4.1KV and 4.35KV using 2B DG AUTO VOLT CONTR, 2-CS-2402.

8. **INSERT** the Sync Stick at 2B DG OUT BKR, 2-CS-152-2403.

9. **ADJUST** 2B DG AUTO VOLT CONTR, 2-CS-2402, to match voltages on the following meters:

   - INCOMING VOLTS, 2-EI-4001A
   - RUNNING VOLTS, 2-EI-4001B

6.6.B Procedure (Continued)

CAUTION

Excessive force may be applied to 2B DG shaft keys due to instantaneous engine slowdown during paralleling if 2B DG frequency is significantly higher than 24 4KV Bus frequency.

10. **ADJUST** 2B DG frequency so the Synchroscope is rotating slowly in the FAST (clockwise) direction using 2B DG SPEED CONTR, 2-CS-2403.

NOTE

Table 1 identifies equipment that receives an auto-start signal from the Shutdown Sequencer.

11. **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position,
THEN PERFORM the following:

    a. **PLACE** 2B DG OUT BKR, 2-CS-152-2403, to CLOSE.

    b. **VERIFY** 2B DG loads to approximately 0.5 MW.

    c. **IF** needed to raise load to 0.5 MW,
    THEN ADJUST 2B DG SPEED CONTR, 2-CS-2403.

12. **CHECK** 2C08 annunciator "SEQUENCER INITIATED" alarms.

13. **CHECK** 1C17 annunciator "RAD MON PANEL 1C22" alarms. (N/A if 0-RI-5350 is bypassed)

NOTE

The Control Room Vent RMS alarm, 0-RI-5350, may **NOT** be lit.

- **BYPASS** 1C22, 0-RI-5350 "CONTR RM VENT"

14. **REMOVE** the Sync Stick **AND RETURN** to Home Base.

6.6.B Procedure (Continued)

NOTE

- The "2B DG • POT VOLT • FREQ LO" annunciator may alarm during parallel operation.
- Whenever 2B DG is started, it should be loaded from 2.7 to 3.0 MW for at least one hour.

CAUTION

- Do **NOT** allow power factor to be below 0.80.
- Do **NOT** exceed 3.0 MW, 500 KVARs, and 422 amps unless directed to do so by the GS-NPO or by approved procedures.

15. **RAISE** MW **AND** KVAR loads concurrently to the desired levels **PER** the following:

    a. **HOLD** at approximately 0.5 MW for at least one minute.

    b. **MAINTAIN** 0 to 500 KVARs using 2B DG AUTO VOLT CONTR, 2-CS-2402, **AND** FIGURE 1, DIESEL GENERATOR ELECTRICAL LIMITS.

    c. **RAISE** 2B DG load in 0.3 to 0.4 MW steps at one to two minute intervals to the desired test load.

    d. **MONITOR** 24 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**

16. **RECORD** equipment operating data 15 minutes after reaching the desired load **AND** at 60 minute intervals thereafter on the 2B Diesel Generator Logsheet.

17. **WHEN** 2B DG shutdown is desired,
    THEN GO TO to Section 6.8, 2B DG SHUTDOWN.

****** END ******

6.7 TRANSFER 24 4KV BUS LOADS FROM 2B DG TO OFFSITE POWER SOURCE [B0614]

A. Initial Conditions

1. 2B DG is powering 24 4KV Bus equipment.
2. The 24 4KV Bus Normal **AND** Alternate feeder breakers are OPEN.
3. SIAS **AND** 24 4KV Bus U/V signals are RESET.
4. One of the offsite power supplies is available to the Normal or Alternate feeder breaker.
5. DC control power is available to the selected Normal **OR** Alternate feeder breaker as observed by a handswitch position indicating light being lit.
6. All 2B DG Non-Essential Trips, (Jacket Cooling Water High Temperature, Jacket Cooling Water Low Pressure and Crankcase High Pressure) are reset.

B. Procedure

NOTE

- 2B DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.
- Two Operators may be utilized to perform the transfer. One to operate 2B DG on 1C20B **AND** one to synchronize to 24 4KV Bus.

1. **MOMENTARILY PLACE** 2B DG UNIT PARALLEL, 2-CS-2404, to PARA.
2. **ADJUST** 2B DG frequency to approximately 60 Hz using 2B DG SPEED, 2-CS-2403.
3. **INSERT** the Sync Stick for the 24 4KV Bus Normal **OR** Alternate Feeder breaker handswitch:

HANDSWITCH
24 4KV BUS NORMAL FDR, 2-CS-152-2401 OR 24 4KV BUS ALT FDR, 2-CS-152-2414

4. **CHECK** the Synchroscope **AND** Sync Lights are operating.

6.7.B Procedure (Continued)

NOTE
Offsite power voltage indication will be on the INCOMING voltmeter.

5. **ADJUST** RUNNING VOLTS equal to INCOMING VOLTS using 2B DG AUTO VOLT CONTR, 2-CS-2402.

NOTE
The Synchroscope works in the opposite direction when 2B DG is the RUNNING power source.

6. **ADJUST** 2B DG frequency so the Synchroscope pointer is rotating slowly in the FAST (clockwise) direction using 2B DG SPEED CONTR, 2-CS-2403.

CAUTION
To avoid improper paralleling, do **NOT** start **OR** stop any large loads on 24 4KV Bus.

7. **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position,
THEN CLOSE the 24 4KV Bus Normal **OR** Alternate Feeder breaker:

HANDSWITCH
24 4KV BUS NORMAL FDR, 2-CS-152-2401 OR 24 4KV BUS ALT FDR, 2-CS-152-2414

8. **REMOVE** the Sync Stick **AND RETURN** to Home Base.

NOTE
2B DG should **NOT** be operated with LEAD KVARs under normal conditions. 2B DG Output Breaker will automatically trip open at approximately 1000 LEADING KVARs.

9. **MONITOR** 24 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**

10. **IF** continued operation of 2B DG in parallel with 24 4KV Bus is desired,
THEN GO TO Section 6.6, PARALLEL 2B DIESEL GENERATOR, Step B.13.

6.7.B Procedure (Continued)

11. **IF** 2B DG is to be stopped,
THEN GO TO Section 6.8, 2B DG SHUTDOWN.

****** END ******

6.8 2B DG SHUTDOWN

A. Initial Conditions

NOTE
If the engine was **NOT** prelubed, the 2B DG should be operated a minimum of 4 hours, 3 hours at greater than 1.5 MW, plus one hour at 2.7 to 3.0 MW.

1. 2B Diesel Generator is running.
2. Stopping 2B DG energizes the 2B DG Stopping Relay Timer and prevents all 2B DG starts for one minute.
3. Do **NOT** stop two DGs at the same time. **[B0614]**

NOTE
2B DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.

B. Procedure

1. **IF** 2B DG started due to a SIAS signal,
   THEN ENSURE actuation modules are reset locally (at the ESFAS cabinets) prior to 2B DG shutdown.
2. **IF** 2B DG is in parallel operation with 24 4KV Bus,
   THEN REMOVE 2B DG load by performing the following:
   a. **LOWER** MW **AND** KVAR loads concurrently to below 0.5 MW **AND** zero KVARs **PER** the following:
      - **LOWER** MW load in increments of 0.3 to 0.4 MW at one to two minute intervals using 2B DG SPEED CONTR, 2-CS-2403.
      - **MAINTAIN** 0 to 500 KVARs using 2B DG AUTO VOLT CONTR, 2-CS-2402, **AND** FIGURE 1, DIESEL GENERATOR ELECTRICAL LIMITS.
      - **MONITOR** 24 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**

   b. **WHEN** 2B DG load is less than 0.5 MW,
      THEN PLACE 2B DG OUT BKR, 2-CS-152-2403, to TRIP.

6.8.B Procedure (Continued)

CAUTION
Any time 2B DG is started, it must be allowed to run for a minimum of one minute before it is shutdown **OR** a Start Failure will result.

3. **IF** shutdown from the Control Room is desired,
   THEN PERFORM the following:

   a. **MOMENTARILY PLACE** 2B DG UNIT PARALLEL, 2-CS-2404, to RESET.

   b. **CHECK** 2B DG frequency is 60 Hz (58.8 to 61.2 Hz).

      - 2B DG FREQUENCY, 2-SI-2401

   c. **ADJUST** 2B DG voltage to greater than 4.16 KV (4.16 to 4.30 KV) using 2B DG VOLT AUTO CONTR, 2-CS-2402.

      - 2B DG VOLTS, 2-EI-2422

   d. **CHECK** annunciator "2B DG • POT VOLT • FREQ LO" is clear.

   e. **DEPRESS** 2B DG STOP, 2-HS-2425, pushbutton, to shutdown the engine.

4. **IF** Local shutdown is desired,
   THEN PERFORM the following:

   a. **DECLARE** 2B DG inoperable.

   b. **PLACE** 2B DG CONTR MODE SEL SW, 2-HS-4841, is in LOCAL.

   c. **DEPRESS** both local Engine Stop pushbuttons.

   d. **IF** desired,
      THEN PLACE 2B DG CONTR MODE SEL SW, 2-HS-4841, to AUTO-REMOTE **AND REMOVE** the key.

5. **ENSURE** SLOW START MODE SELECTOR, 2-HS-4827, is in the NORMAL position. **[B0048]**

6. **ENSURE** Prelube Pump is **NOT** running.

7. **ENSURE** the following pumps are operating:

   - Coolant Pump

   - Lube Oil Pump

8. **ENSURE** the CPS Generation Dispatcher is notified that the 2B Diesel is no longer paralleled.

6.8.B Procedure (Continued)

CAUTION
DO **NOT** allow the 2B DG room temperature to fall below 60° F.

9. **IF** desired,
THEN STOP the 2B DG Room Ventilation Fan by momentarily placing its handswitch to the STOP position.

NOTE
- 2B DG may remain in the Action Statement of T.S. 3.8.1 **OR** 3.8.2 until engine barring is complete.
- If barring is **NOT** performed within three hours of shutdown, its effectiveness is minimal. Therefore, barring is **NOT** required if conditions prohibit barring within three hours of engine shutdown.

10. **IF** 2B DG is **NOT** scheduled to be manually restarted within three hours, **THEN CONSIDER** barring over 2B DG **PER** Section 6.9, MANUALLY BAR-OVER 2B DIESEL GENERATOR, **OR** Section 6.24, ROTATING 2B DIESEL GENERATOR WITH COMPRESSED AIR. **[B0048]**

11. NOTIFY Plant Chemistry of the following:
    - 2B DG is shutdown
    - Jacket Water Cooling System makeup or venting performed during operation

6.8.B Procedure (Continued)

12. **IF** the 2B DG was paralleled to 24 4 KV bus,
THEN ALIGN the Control room HVAC as follows:

- **IF** 12 CR HVAC was in operation,
THEN RESTORE the Control Room Chiller **PER** OI-22F. (N/A if 11 CR HVAC was in operation)

- **UNBYPASS** the Control Room Vent RMS, 0-RI-5350.

- **STOP** the Post-LOCI Filter Fans by placing the handswitches to STOP **AND LOG** the stopping time in the Charcoal Filter Log.

  - 11 Post-LOCI Filter Fan handswitch, 0-HS-5352

  - 12 Post-LOCI Filter Fan handswitch, 0-HS-5353

- **IF** desired,
THEN PLACE the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to ON.

****** END ******

6.9 MANUALLY BAR-OVER 2B DIESEL GENERATOR

A. Initial Conditions

1. 2B DG has been prelubed **OR** run **AND** requires Barring-over.
2. Technical Specification 3.8.1 or 3.8.2 has been reviewed to determine Diesel Generator operability requirements.
3. 2B DG has been shutdown more than 20 minutes but less than three hours.

B. Procedure

1. **IF** 2B DG is operable,
   THEN ENSURE Unit 2 ZA train equipment is operable **PER** OI-49, Operability Verification, prior to barring over the engine.
2. **PLACE** 2B DG OUT BKR, 2-CS-152-2403, in PULL-TO-LOCK.
3. **UNLOCK AND SHUT** the following 2B DG Air Start Header isolation valves:
   - 2B DG STARTING AIR TO DIESEL START SV-4838 ISOLATION VALVE, 2B-DSA-114
   - 2B DG STARTING AIR TO DIESEL START SV-4839 ISOLATION VALVE, 2B-DSA-117
4. **REMOVE** the pipe caps from the following 2B DG Air Start Header drain valves:
   - 2B DG STARTING AIR STRAINER YS-4838 DRAIN VALVE, 2B-DSA-124
   - 2B DG STARTING AIR STRAINER YS-4839 DRAIN VALVE, 2B-DSA-125

WARNING
Hearing Protection is required while bleeding down the Air Headers.

5. **UNLOCK AND OPEN** the following 2B DG Air Start Header drain valves:
   - 2B DG STARTING AIR STRAINER YS-4838 DRAIN VALVE, 2B-DSA-124
   - 2B DG STARTING AIR STRAINER YS-4839 DRAIN VALVE, 2B-DSA-125
6. **STATION** a Safety Watch to **INDEPENDENTLY VERIFY** that the air start valves remain shut **AND** the header drains remain open.
7. **REMOVE** one of the coupling guard access screens between the Engine **AND** the Generator.
8. **INSERT** the Jacking Bar into the access **AND SLIP** the Jacking Bar onto the pivot pin located above the flywheel.
9. **ADJUST** the Jacking Bar Anti-Slip Bolt to prevent accidental disengagement.

6.9.B Procedure (Continued)

10. **LOWER OR RAISE** the Jacking Bar, whichever is easiest, to engage the pawl into the flywheel teeth.

11. **ROTATE** the flywheel one revolution.

12. **REMOVE** the Jacking Bar **AND REPLACE** the coupling guard access screen.

13. **IF** returning 2B DG to service,
THEN PERFORM the following:

    a. **SHUT AND LOCK** the following 2B DG Air Start Header drain valves:

    - 2B DG STARTING AIR STRAINER YS-4838 DRAIN VALVE, 2B-DSA-124
    - 2B DG STARTING AIR STRAINER YS-4839 DRAIN VALVE, 2B-DSA-125

    b. **REPLACE** the pipe caps on the following 2B DG Air Start Header drain valves:

    - 2B DG STARTING AIR STRAINER YS-4838 DRAIN VALVE, 2B-DSA-124
    - 2B DG STARTING AIR STRAINER YS-4839 DRAIN VALVE, 2B-DSA-125

    c. **OPEN AND LOCK** the following 2B DG Air Start Header isolation valves:

    - 2B DG STARTING AIR TO DIESEL START SV-4838 ISOLATION VALVE, 2B-DSA-114
    - 2B DG STARTING AIR TO DIESEL START SV-4839 ISOLATION VALVE, 2B-DSA-117

    d. **ACKNOWLEDGE AND RESET** the local annunciator panel.

    e. **ENSURE** annunciator "STARTING AIR PRESSURE LOW" clears.

    f. **NOTIFY** the Control Room of the following: **[B0048]**

    - 2B Diesel Generator bar over is complete.
    - To place 2B Diesel Generator Outlet Bkr, 2-CS-152-2403, in Normal.

    g. **PLACE** 2B DG OUT BKR, 2-CS-152-2403, in NORMAL.

6.9.B.13 Procedure (Continued)

NOTE
To accurately track DG unavailability, it is necessary to document manual bar over of DG.

h. **LOG** in the CRO logs that the bar over is complete **PER** Section 6.9, OI-21B-2.

****** END ******

6.10 REMOVE AND RESTORE 2B DG TO/FROM SERVICE

A. Initial Conditions

1. 2B DG is shutdown **AND** 2B DG OUT BKR, 152-2403, is OPEN.

2. Technical Specification 3.8.1 or 3.8.2 has been reviewed to determine Diesel Generator operability requirements.

B. Procedure

NOTE
These actions are required to be performed prior to removing 2B DG from service for elective maintenance greater than 72 hours. For assurance, these actions should be performed every time elective maintenance is performed.

CAUTION
After 2B DG has been removed from service, changes in weather conditions or grid stability should be evaluated for compensatory action.

1. **IF** entering Tech Spec 3.8.1 B for elective maintenance,
THEN PERFORM the following prior to taking the 2B DG out of service:
[B0906]
(N/A if administrative controls are in place to ensure 2B DG returned to service within 72 hours.)

NOTE
Steps 1.a through 1.e may be performed in any order.

a. **VERIFY** the following:

- **NO** elective maintenance will be performed in the switchyard, on the 4 kV Distribution System, or on the 13 KV Distribution System.

6.10.B.1 Procedure (Continued)

NOTE
The Unit-2 AFW system includes 13 AFW pump and its cross-tie.

- **NO** planned maintenance or testing will be performed on the Unit-2 AFW System.
- **NO** maintenance or testing that affects the reliability of Unit-2 A train will be scheduled. If testing or maintenance activities must be performed, a Risk Assessment Evaluation will be performed according to NO-1-117, INTEGRATED RISK MANAGEMENT.
- **NO** elective maintenance will be performed on 0C DG.
- Personnel are aware of the dedication of 0C DG to 24 4KV Bus.
  - Flag-Off 0C DG using green chain barricades.
  - Update OWC Status Board.

NOTE
Patuxent River Naval Air Station is the preferred source for the weather report. However, any government sponsored weather agency may be used.

b. Within 12 hours prior to removing 2B DG from service, **EVALUATE** that **NO** severe weather conditions are forecast for CCNPP or any of the 500 KV transmission lines rights of way.

- Severe Thunderstorm
- Gale/High Wind - greater than 50 mph
- Tornado
- Hurricane
- Blizzard
- Ice Storm

6.10.B.1 Procedure (Continued)

c. Within 12 hours prior to removing 2B DG from service, **REQUEST** the CRS **OR** Shift Manager perform the following notification. **[B0138]**

(1) **CONTACT** the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts.

(2) **ENSURE** grid stress conditions are **NOT** considered "high":

- 5051, 5052 and 5072 circuits are in service
- PJM is **NOT** in a Warning or implementing an Emergency Action for the following:
  - Primary Reserve - Warning
  - Voltage Reduction - Warning or Action
  - Manual Load Dump - Warning or Action
  - Maximum Emergency Generation - Action
- PJM is **NOT** in Conservative Operations for the following:
  - Thunderstorms
  - Solar Magnetic Disturbances
  - Crisis Response
  - Heavy Load, Low Voltage - Warning or Action
  - Post Contingency Local Load Relief Warning that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard
- **NO** other known condition exists on the PJM or BGE system at this time that could impact the offsite power delivery to the Calvert Cliffs 500 KV switchyard.

(3) **DETERMINE** that **NO** other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

d. **BRIEF** the operations crews concerning the unit activities, including compensatory measures established and the importance of promptly starting and aligning the 0C DG.

6.10.B.1 Procedure (Continued)

e. **ENSURE** the on-shift operations crew has discussed and reviewed the appropriate normal and emergency operating procedures.

- **PLACE** a note on the Shift Turnover Sheet for oncoming crews to discuss and review the appropriate normal and emergency operating procedures within 24 hours prior to or shortly after assuming the watch for the first time after having scheduled days off.

- **REVIEW** the following procedures as appropriate:

  - AOP-7I, LOSS OF 4KV, 480 VOLT OR 208/120 VOLT INSTRUMENT BUS POWER
  - EOP-0, POST-TRIP IMMEDIATE ACTIONS
  - EOP-2, LOSS OF OFFSITE POWER/LOSS OF FORCED CIRCULATION
  - EOP-7, STATION BLACKOUT
  - AOP-3F, LOSS OF OFFSITE POWER WHILE IN MODES 3, 4, 5 OR 6

6.10.B Procedure (Continued)

2. **REMOVE** 2B DG from service as follows:

   a. **PERFORM** the following prior to taking 2B DG out of service:

   - **IF** 2B DG is operable,
     THEN ENSURE Unit 2 ZA train equipment is operable **PER** OI-49, Operability Verification, every eight hours while 2B DG is out of service.

   - **REQUEST** the CRS **OR** Shift Manager perform the following notification. **[B0138]**
     (N/A if Step 1.c performed)

     - **CONTACT** the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts.

     - **DETERMINE** whether other maintenance is in progress or is planned that will reduce the reliability of the offsite power supplies (5051, 5052 and 5072 circuits).

     - **IF** 2B DG will be out of service at the same time reliability of the offsite power supplies is reduced,
       THEN HAVE the Shift Manager determine how to minimize both the time 2B DG is out of service **AND** the time that offsite power supplies are at reduced reliability.

   - **IF** in Lower Mode Operation,
     THEN ENSURE the requirements of the applicable Minimum Essential Equipment section of NO-1-103, Conduct of Lower Mode Operations, are satisfied. **[B0138]**

6.10.B.2 Procedure (Continued)

CAUTION
0C DG Commitments only allow one (1) 0C DG Disconnect to be closed at a time.

b. **IF** the 0C DG is available,
THEN CLOSE the 0C DG 24 4KV Bus Disconnect 189-2406, to prealign the 0C DG to 24 4KV Bus by PERFORMING the following:

(1) **PLACE** the 0C DG 24 4KV BUS FDR , 2-CS-152-2406, in PTL.

NOTE
Kirk keys 11898, 11899, 11901 and 14259 are required.

(2) **[PC] LOCK** the 0C DG 24 4KV Bus DISC, 189-2406, in the CLOSE position.

(3) **PLACE** the 0C DG 24 4KV BUS FDR 2-CS-152-2406, in the NORMAL position.

(4) **PLACE** the following handswitches in PTL with OFF NORMAL COMPONENT tags:

- 0C DG 11 4KV BUS FDR, 1-CS-152-1106
- 0C DG 14 4KV BUS FDR, 1-CS-152-1406
- 0C DG 21 4KV BUS FDR, 2-CS-152-2106

(5) **PLACE** an OFF NORMAL COMPONENT tag on control room indication for DISC 189-2406.

c. **PLACE** 2B DG OUT BKR, 2-CS-152-2403, in PULL-TO-LOCK.

d. **UNLOCK AND SHUT** the following 2B DG Air Start Header isolation valves:

- 2B DG STARTING AIR TO DIESEL START SV-4838 ISOLATION VALVE, 2B-DSA-114
- 2B DG STARTING AIR TO DIESEL START SV-4839 ISOLATION VALVE, 2B-DSA-117

e. **REMOVE** the pipe caps from the following 2B DG Air Start Header drain valves:

- 2B DG STARTING AIR STRAINER YS-4838 DRAIN VALVE, 2B-DSA-124
- 2B DG STARTING AIR STRAINER YS-4839 DRAIN VALVE, 2B-DSA-125

6.10.B.2 **Procedure (Continued)**

WARNING
Hearing Protection is required while bleeding down the Air Headers.

f. **UNLOCK AND OPEN** the following 2B DG Air Start Header drain valves:

- 2B DG STARTING AIR STRAINER YS-4838 DRAIN VALVE, 2B-DSA-124
- 2B DG STARTING AIR STRAINER YS-4839 DRAIN VALVE, 2B-DSA-125

3. **WHEN** desired,
THEN RETURN 2B DG to service as follows:

a. **SHUT AND LOCK** the following 2B DG Air Start Header drain valves:

- 2B DG STARTING AIR STRAINER YS-4838 DRAIN VALVE, 2B-DSA-124
- 2B DG STARTING AIR STRAINER YS-4839 DRAIN VALVE, 2B-DSA-125

b. **REPLACE** the pipe caps on the following 2B DG Air Start Header drain valves:

- 2B DG STARTING AIR STRAINER YS-4838 DRAIN VALVE, 2B-DSA-124
- 2B DG STARTING AIR STRAINER YS-4839 DRAIN VALVE, 2B-DSA-125

c. **OPEN AND LOCK** the following 2B DG Air Start Header isolation valves:

- 2B DG STARTING AIR TO DIESEL START SV-4838 ISOLATION VALVE, 2B-DSA-114
- 2B DG STARTING AIR TO DIESEL START SV-4839 ISOLATION VALVE, 2B-DSA-117

d. **ENSURE** annunciator "STARTING AIR PRESSURE LOW" clears.

e. **PLACE** 2B DG OUT BKR, 2-CS-152-2403, to NORMAL.

6.10.B.3 Procedure (Continued)

f. **IF** required,
THEN PERFORM ONE of the following to return 2B DG to service:

NOTE
2B DG should be run at least 1 hour.

- **PERFORM** STP O-8B-2, Test of 2B DG and 24 4KV Bus LOCI Sequencer, to declare 2B DG operable.

OR

- **PERFORM** the following sections to restore 2B DG operation:

  (1) Section 6.3, 2B DG SLOW SPEED START

  (2) Section 6.6, PARALLEL 2B DIESEL GENERATOR

  (3) **WHEN** 2B DG has been loaded for at least one hour,
  THEN STOP 2B DG **PER** Section 6.8, 2B DG SHUTDOWN.

NOTE
The OC DG should normally remain prealigned to 24 4kv bus until the 2B EDG is returned to Operable status.

g. **IF** 0C DG was prealigned to 24 4KV Bus,
THEN OPEN the 0C DG 24 4KV Bus Disconnect 189-2406, by PERFORMING the following:

(1) **PLACE** the 0C DG 24 4KV BUS FDR handswitch, 2-CS-152-2406 in PTL.

(2) **[PC] LOCK** the 0C DG 24 4KV Bus DISC, 189-2406 in the OPEN position.

(3) **PLACE** the 0C DG 24 4KV BUS FDR handswitch 2-CS-152-2406 in the NORMAL position.

(4) **PLACE** the following handswitches in NORMAL **AND REMOVE** the OFF NORMAL COMPONENT tags:

- 0C DG 11 4KV BUS FDR, 1-CS-152-1106
- 0C DG 14 4KV BUS FDR, 1-CS-152-1406
- 0C DG 21 4KV BUS FDR, 2-CS-152-2106

6.10.B.3.g **Procedure (Continued)**

(5) **REMOVE** the OFF NORMAL COMPONENT tag from the control room indication for DISC 189-2406.

h. **REQUEST** the CRS **OR** Shift Manager inform the ESOP Outage Scheduler at 597-7227/7228 during normal working hours (0800-1630) or the SO-TSO at 597-7047 during weekends or backshifts that the 2B DG has been returned to service. **[B0138] [B0906]**

i. **IF** used,
THEN REMOVE 0C DG barricades.

****** END ******

6.11 2B DG MECHANICAL GOVERNOR ADJUSTMENT AND OVERSPEED TEST

A. Initial Conditions

1. A calibrated speed measuring device (Laser Tach or equivalent) is installed.
2. 2B DG is out of service.
3. Mechanical Maintenance is performing EDG-20, Emergency Diesel Generator Inspection, on 2B DG **OR** as requested by the System Engineer.

B. Procedure

1. **PERFORM** a Slow Speed Start **PER** Section 6.3, 2B DG SLOW SPEED START.
2. **MONITOR** 2B DG speed using the speed measuring device.

6.11.B Procedure (Continued)

NOTE

- The 2B DG Speed may be adjusted to raise or lower speed as directed by the System Engineer to support maintenance.
- 2B DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.

CAUTION

Only one DG shall be tested at any one time. 2B DG is considered inoperable.

3. **GRADUALLY RAISE** the 2B DG GOVERNOR SPEED CONTROL CS/SP at 2C61B **AND HOLD** at the following speeds during the ramp:

RPM	Approx. DURATION (Minutes)
500 (475 - 525)	10
600 (575 - 625)	5
700 (675 - 725)	5
800 (775 - 825)	5
900 (875 - 925)	5

4. **WHEN** the 2B DG speed ramp is complete,
THEN ADJUST the 2B DG GOVERNOR SPEED CONTROL CS/SP at 2C61B to 900 RPM.

5. **IF** 2B DG speed control is erratic,
THEN NOTIFY Mechanical Maintenance to tune the mechanical governor **PER** EDG-10, EDG Woodward Governor Oil Change.

6.11.B Procedure (Continued)

NOTE
The Overspeed Trip Setpoint is 1035 to 1053 RPM.

- Trips between 1008 **AND** 1035 RPM do **NOT** warrant an operability concern.
- Trips between 1053 **AND** 1085 do **NOT** warrant an equipment damage concern. However, actions should be taken to restore the trip setting to between 1035 **AND** 1053 RPM at the next convenient opportunity.

CAUTION
- 2B DG should **NOT** be run at speeds greater than 960 RPM for longer than absolutely necessary.
- Do **NOT** exceed 1085 RPM.

6. **DETERMINE** 2B DG Overspeed trip setpoint by PERFORMING the following:

   a. **RAISE** 2B DG speed by slowly raising 2B DG GOVERNOR SPEED CONTROL CS/SP at 2C61B until 2B DG trips on overspeed or maximum HS Limit is achieved.

   b. **IF** overspeed setting has not been achieved using the Speed Control Handswitch,
   THEN HAVE Mechanical Maintenance **SLOWLY RAISE** the Governor linkage arm to increase diesel speed until the trip setpoint is reached.

7. **CHECK** the 2C61A annunciator "ENGINE OVERSPEED" alarms.

8. **RECORD** the results in EDG-20, Emergency Diesel Generator Inspection, for 2B DG.

9. **RESET** the 2B DG fuel racks.

10. **[PC] PLACE** 2B DG SLOW START MODE SELECTOR SW, 2-HS-4827, to NORMAL.

11. **DEPRESS** the Local Alarm Reset Pushbutton on the 2B Diesel Generator Control Panel **AND CHECK** the 2C61A annunciator "ENGINE OVERSPEED" clears.

CAUTION
DO **NOT** allow the 2B DG room temperature to fall below 60° F.

12. **IF** desired,
THEN STOP the 2B DG Room Ventilation Fan by momentarily placing its handswitch to the STOP position.

6.11.B Procedure (Continued)

NOTE
2B DG shall be run at least 4 hours following EDG-20.

13. **IF** returning 2B DG to service,
THEN PERFORM applicable sections of STP O-8B-2, Test of 2B DG and 24 4KV Bus LOCI Sequencer, to declare 2B DG operable.

14. **IF** 2B DG is **NOT** scheduled to be manually restarted within three hours,
THEN CONSIDER barring over 2B DG **PER** Section 6.9, MANUALLY BAR-OVER 2B DIESEL GENERATOR, **OR** Section 6.24, ROTATING 2B DIESEL GENERATOR WITH COMPRESSED AIR. **[B0048]**

****** END ******

6.12 MAKEUP TO THE 2B DG JACKET COOLING WATER EXPANSION TANK

A. Initial Conditions

1. Service Water is available to the 2B DG Air Compressor Aftercooler.

B. Procedure

1. **OPEN** 2B DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 2B-DCW-101.

2. **WHEN** the Expansion Tank has reached the desired level,
   THEN SHUT 2B DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 2B-DCW-101.

3. **NOTIFY** Plant Chemistry that makeup water has been added to the system.

****** END ******

6.13 FILL THE 2B DG JACKET WATER AND AIR COOLING SYSTEMS AFTER MAINTENANCE

A. Initial Conditions

1. The 2B DG Jacket Water Cooling System **OR** Air Cooling System has been drained for maintenance.

2. Maintenance on the affected Cooling System has been completed **AND** the systems are mechanically intact.

3. Service Water is aligned to 2B DG.

B. Procedure

1. **INSTALL** vent rigs on the following 2B DG Jacket Water Cooling System valves:

   - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105

   - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

2. **ENSURE** 2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2B-DCW-111, is SHUT.

3. **UNLOCK AND OPEN** 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER DRAIN VALVE, 2B-DCW-1003.

4. **UNLOCK AND OPEN** 2B DG JACKET WATER COOLING JACKET WATER COOLER DRAIN VALVE, 2B-DCW-104, to start filling from the SRW System.

5. **UNLOCK AND OPEN** 2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2B-DCW-107.

6. **OPEN** 2B DG JACKET WATER COOLING TEMPERATURE CONTROL VLV 4810 BYPASS VALVE, 2B-DCW-103.

7. **MONITOR** the 2B DG Jacket Water Expansion Tank level.

8. **WHEN** the 2B DG Jacket Water Expansion Tank level is approximately 3/4 full, **THEN SHUT AND LOCK** 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER DRAIN VALVE, 2B-DCW-1003.

9. **CRACK OPEN** the following vent valves:

   - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105

   - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

6.13.B Procedure (Continued)

10. **WHEN** a continuous stream of water is observed from a heat exchanger vent, **THEN SHUT** the associated valve:

    - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
    - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

11. **SHUT AND LOCK** 2B DG JACKET WATER COOLING JACKET WATER COOLER DRAIN VALVE, 2B-DCW-104.

12. **SHUT AND LOCK** 2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2B-DCW-107.

13. **IF** necessary, **FILL** the Expansion Tank **PER** 6.12, MAKEUP TO THE 2B DG JACKET COOLING WATER EXPANSION TANK.

14. **[PC] CLOSE** the circuit breakers for the 2B DG electric Jacket Cooling Pump **AND** the Jacket Coolant Heater.

15. **ENSURE** the COOLANT PUMP handswitch, 2-HS-4811, is in AUTO.

16. **WHEN** the 2B DG electric Jacket Cooling Pump has run for at least 10 minutes, **THEN PERFORM** the following:

    a. **CRACK OPEN** the following valves:

       - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
       - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

    b. **WHEN** a continuous stream of water is observed from a heat exchanger vent,
       THEN SHUT the associated valve:

       - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
       - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

17. **REMOVE** the vent rigs on the following 2B DG Jacket Water Cooling System valves:

    - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
    - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

6.13.B Procedure (Continued)

18. **[PC] SHUT** 2B DG JACKET WATER COOLING TEMPERATURE CONTROL VLV 4810 BYPASS VALVE, 2B-DCW-103.

19. **ENSURE** the COOLANT HEATER handswitch, 2-HS-4810, is in AUTO.

20. **REQUEST** Plant Chemistry obtain a 2B DG Jacket Water sample **AND CHECK** the coolant is within Chemistry specifications.

****** END ******

6.14 FILL THE 2B DG JACKET WATER AND AIR COOLING SYSTEMS WITH DI WATER AFTER MAINTENANCE

A. Initial Conditions

1. The 2B DG Jacket Water Cooling System **OR** Air Cooling System has been drained for maintenance.

2. Maintenance on the affected Cooling System has been completed **AND** the systems are mechanically intact.

B. Procedure

1. **INSTALL** vent rigs on the following 2B DG Jacket Water Cooling System valves:

   - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
   - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

2. **ENSURE** the following valves are SHUT:

   - 2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2B-DCW-111
   - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER DRAIN VALVE, 2B-DCW-1003

NOTE

The DI water connection on the 45 foot Aux BLDG Truck Bay is the normal source of makeup water.

3. **CONNECT** a hose to a DI water source.

4. **FLUSH** the hose with DI water until Chemistry determines the water is of proper quality.

5. **CONNECT** the hose to 2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2B-DCW-117.

6. **ENSURE OPEN** the DI water source isolation valve.

7. **UNLOCK AND THROTTLE OPEN** 2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2B-DCW-117, to begin filling.

8. **OPEN** 2B DG JACKET WATER COOLING TEMPERATURE CONTROL VLV 4810 BYPASS VALVE, 2B-DCW-103.

9. **MONITOR** the 2B DG Jacket Water Expansion Tank level.

6.14.B Procedure (Continued)

10. **WHEN** the 2B DG Jacket Water Expansion Tank level is approximately 3/4 full, **THEN SHUT** 2B DG JACKET WATER COOLING JACKET COOLING DRAIN VALVE, 2B-DCW-117.

11. **CRACK OPEN** the following vent valves:

    - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
    - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

12. **WHEN** a continuous stream of water is observed from a heat exchanger vent, **THEN SHUT** the associated valve:

    - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
    - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

13. **IF** necessary, **THROTTLE OPEN** 2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2B-DCW-117, to restore 2B DG Jacket Water Expansion Tank level to between 1/2 and 3/4 full.

14. **CLOSE** the circuit breakers for the 2B DG electric Jacket Cooling Pump **AND** the Jacket Coolant Heater.

15. **ENSURE** the COOLANT PUMP handswitch, 2-HS-4811, is in AUTO.

16. **WHEN** the 2B DG electric Jacket Cooling Pump has run for at least 10 minutes, **THEN PERFORM** the following:

    a. **CRACK OPEN** the following valves:

       - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
       - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

    b. **WHEN** a continuous stream of water is observed from a heat exchanger vent,
       THEN SHUT the associated valve:

       - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
       - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

6.14.B Procedure (Continued)

17. IF necessary, **THROTTLE OPEN** 2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2B-DCW-117, to restore 2B DG Jacket Water Expansion Tank level to between 1/2 and 3/4 full.

18. **LOCK SHUT** 2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2B-DCW-117.

19. **SHUT** the DI water source isolation valve.

20. **REMOVE** the vent rigs on the following 2B DG Jacket Water Cooling System valves:

    - 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105
    - 2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE, 2B-DCW-115

21. **[PC] SHUT** 2B DG JACKET WATER COOLING TEMPERATURE CONTROL VLV 4810 BYPASS VALVE, 2B-DCW-103.

22. **ENSURE** the COOLANT HEATER handswitch, 2-HS-4810, is in AUTO.

23. **REMOVE** the hose between the DI water source **AND** 2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2B-DCW-117.

24. **NOTIFY** Plant Chemistry that DI water was used to fill the Jacket Water Cooling system, **AND** to **ADJUST** Chemistry as required.

****** END ******

6.15 FEED AND BLEED 2B DG JACKET WATER AND AIR COOLING SYSTEMS

A. Initial Conditions

1. The 2B DG electric Jacket Cooling Pump is in service.
2. Service Water is available to 2B DG.
3. An operator is available to maintain a continuous feed and bleed operation.

B. Procedure

1. **CONNECT** a hose or sleeving from 2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2B-DCW-117, to the nearest floor drain.

CAUTION

- **IF** 2B DG must remain operable during feed and bleed operation, **THEN** an operator must be continuously present to ensure the 2B DG Jacket Water Expansion Tank level stays above the low level alarm **AND** JCW temperature remains above 90° F. **[B0022]**
- During colder periods care must be taken to slowly initiate and control the feed and bleed in order to allow the JCW heaters to keep temperature greater than 90° F.

2. **NOTIFY** the Control Room that a feed and bleed to the 2B DG Jacket Water Expansion Tank is to be started.
3. **THROTTLE OPEN** 2B DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 2B-DCW-101.
4. **UNLOCK AND THROTTLE OPEN** 2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2B-DCW-117.
5. **ENSURE** adequate suction for the 2B DG electric Jacket Coolant Pump is maintained.

CAUTION

2B DG shall be considered out of service if JCW temperature drops below 90° F.

6. **IF** any of the following occur, **THEN LOWER** the drain rate:
   - 2B DG Jacket Water Expansion Tank level approaches the Low Level Alarm
   - The 2B DG electric Jacket Cooling Pump cavitates
   - Jacket Cooling System temperature is near 90° F **AND** decreasing

6.15.B Procedure (Continued)

7. **IF** the 2B DG Jacket Water Expansion Tank level can **NOT** be maintained, **THEN STOP** the feed and bleed as follows:

   - **SHUT AND LOCK** 2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2B-DCW-117.

   - **SHUT** 2B DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 2B-DCW-101.

NOTE
DG Room Waste Oil Collection Tank level should **NOT** rise.

8. **PERIODICALLY MONITOR** the DG Room Waste Oil Collection Tank level to ensure proper operation of the interceptor.

9. **WHEN** approximately 5 volume changes have taken place (1000 gallons **OR** 3 hours),
   THEN STOP the feed and bleed as follows:

   - **SHUT AND LOCK** 2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2B-DCW-117.

   - **ENSURE** JCW Expansion Tank level is greater than 1/2 full,
     THEN SHUT 2B DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 2B-DCW-101.

10. **DISCONNECT** the hose or sleeving from 2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE, 2B-DCW-117.

11. **VENT** the Jacket Cooling Heat Exchanger as follows:

    a. **CRACK OPEN** 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105.

    b. **WHEN** a steady stream of water is observed,
       THEN SHUT 2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE, 2B-DCW-105.

12. **INFORM** the Control Room that feed and bleed operations are complete. **[B0048]**

13. **REQUEST** Plant Chemistry obtain a 2B DG Jacket Water sample **AND CHECK** the coolant is within Chemistry specifications.

****** END ******

6.16 CONTROLLED FILL OF 2B DG SRW HEADER AFTER MAINTENANCE

A. Initial Conditions

1. 2B DG is tagged out.
2. Service Water is isolated to 2B DG.
3. Vent rigs **AND** a safety ladder are available for venting the 2B DG SRW Header.
4. SRW valves for 2B DG are lined up **PER** Attachments 1 **AND** 2 of OI-15, Service Water System, except 2B DG SRW Supply **AND** Return valves are SHUT:
   - 22 SERVICE WATER HEADER SUPPLY TO 2B DIESEL GENERATOR ISOLATION VALVE, 2-SRW-169
   - 2B DIESEL GENERATOR RETURN TO 22 SERVICE WATER HEADER ISOLATION VALVE, 2-SRW-171

B. Procedure

1. **REMOVE** the caps **AND INSTALL** vent rigs on the following 2B DG SRW valves:
   - 2B DIESEL GENERATOR SRW 2-PDIC-1587 HP SIDE DRAIN VALVE, 2-SRW-1004
   - 2B DIESEL GENERATOR SRW 2-PDIC-1587 LP SIDE DRAIN VALVE, 2-SRW-1005
   - 2B DIESEL GENERATOR SRW SUPPLY HEADER VENT VALVE, 2-SRW-1185
   - 2B DIESEL GENERATOR SRW RETURN HEADER VENT VALVE, 2-SRW-1186
2. **ENSURE** 2B DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE, 2B-DCW-101, is SHUT.
3. **ENSURE** 2B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1587-CV, IS SHUT.
4. **ENSURE** 2B DG DSA Compressor After Cooler valves are LOCKED OPEN:
   - 2B DIESEL GENERATOR STARTING AIR COMPRESSOR AIR COOLER INLET ISOLATION VALVE, 2-SRW-506
   - 2B DIESEL GENERATOR STARTING AIR COMPRESSOR AIR COOLER OUTLET ISOLATION VALVE, 2-SRW-507

6.16.B Procedure (Continued)

NOTE
This step causes 2B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1587-CV, to fail open.

5. **SLOWLY ROTATE** the handle on INSTRUMENT AIR TO 2B DG SRW INLET 2-CV-1587 AUTO / VENT SELECTOR VALVE, 2-IA-1587-HV, 180° to the MANUAL position.

6. **WHEN** filling is ready to begin,
THEN INFORM the Control Room to monitor SRW Head Tank level **AND** SRW Header pressure.

7. **SLOWLY OPEN AND LOCK** OPEN, 2B DIESEL GENERATOR RETURN TO 22 SERVICE WATER HEADER ISOLATION VALVE, 2-SRW-171.

8. **CRACK OPEN** 2B DG SRW Header vent valves:

   - 2B DIESEL GENERATOR SRW SUPPLY HEADER VENT VALVE, 2-SRW-1185
   - 2B DIESEL GENERATOR SRW RETURN HEADER VENT VALVE, 2-SRW-1186

9. **WHEN** a steady stream of water is observed from a header vent,
THEN SHUT the associated vent valve:

   - 2B DIESEL GENERATOR SRW SUPPLY HEADER VENT VALVE, 2-SRW-1185
   - 2B DIESEL GENERATOR SRW RETURN HEADER VENT VALVE, 2-SRW-1186

10. **VENT** 2-SRW-1587-PDIC as follows:

    a. **OPEN** 2B DIESEL GENERATOR SRW 2-PDIC-1587 EQUALIZING VALVE, 2-SRW-1003.

    b. **OPEN** 2B DIESEL GENERATOR SRW 2-PDIC-1587 HP SIDE DRAIN VALVE, 2-SRW-1004.

    c. **OPEN** 2B DIESEL GENERATOR SRW 2-PDIC-1587 LP SIDE DRAIN VALVE, 2-SRW-1005.

6.16.B Procedure (Continued)

NOTE
Initially, a solid stream of water issues from the drain valve due to water trapped in the line.

11. **WHEN** a steady stream of water issues from the drain valves, **THEN STOP** venting as follows:

    a. **SHUT** 2B DIESEL GENERATOR SRW 2-PDIC-1587 HP SIDE DRAIN VALVE, 2-SRW-1004.

    b. **SHUT** 2B DIESEL GENERATOR SRW 2-PDIC-1587 LP SIDE DRAIN VALVE, 2-SRW-1005.

    c. **[PC] SHUT** 2B DIESEL GENERATOR SRW 2-PDIC-1587 EQUALIZING VALVE, 2-SRW-1003.

NOTE
This step causes 2B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1587-CV, to shut.

12. **[PC] SLOWLY ROTATE** the handle on INSTRUMENT AIR TO 2B DG SRW INLET 2-CV-1587 AUTO / VENT SELECTOR VALVE, 2-IA-1587-HV, 180° to the AUTO position.

13. **CHECK** 2B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1587-CV, is shut.

14. **SLOWLY OPEN AND LOCK OPEN** 22 SERVICE WATER HEADER SUPPLY TO 2B DIESEL GENERATOR ISOLATION VALVE, 2-SRW-169.

15. **REMOVE** vent rigs **AND INSTALL** caps on the following 2B DG SRW valves:

    - 2B DIESEL GENERATOR SRW 2-PDIC-1587 HP SIDE DRAIN VALVE, 2-SRW-1004
    - 2B DIESEL GENERATOR SRW 2-PDIC-1587 LP SIDE DRAIN VALVE, 2-SRW-1005
    - 2B DIESEL GENERATOR SRW SUPPLY HEADER VENT VALVE, 2-SRW-1185
    - 2B DIESEL GENERATOR SRW RETURN HEADER VENT VALVE, 2-SRW-1186

6.16.B Procedure (Continued)

16. **INDEPENDENTLY VERIFY** the following:

    - 2B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1587-CV, is SHUT.

    - INSTRUMENT AIR TO 2B DG SRW INLET 2-CV-1587 AUTO / VENT SELECTOR VALVE, 2-IA-1587-HV, is in the AUTO position.

****** END ******

6.17 SHIFT 2B DG SRW FLOW CONTROLLER, 2-SRW-1587-PDIC, AUTO/MANUAL CONTROL

A. Initial Conditions

1. The Shift Manager has approved changing 2-SRW-1587-PDIC mode of operation.
2. 2B DG is operating.
3. Instrument Air is available.

B. Procedure

CAUTION
2B DG is considered inoperable if 2-SRW-1587-CV is **NOT** in Automatic Control.

1. **SHIFT** 2B DG SRW FLOW CONTROLLER, 2-SRW-1587-PDIC, from automatic to manual control as follows:
   a. Carefully **PULL** out the Regulator knob to unlock the regulator.

NOTE
The regulator knob should be turned in the direction that the Balance Indicator Ball needs to move.

   b. Slowly **TURN** the Regulator knob to move the Balance Indicator Ball to the middle of the Balance Indicator Tube.
   c. **PLACE** the MAN/AUTO selector in M (MAN).

NOTE
2B DG SRW FLOW CONTROLLER, 2-SRW-1587-PDIC, setpoint is 8.5 PSID.

CAUTION
Long term operation with excess flow through the coolers can cause vibrations affecting expansion joint reliability.

   d. **CONTROL** 2B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1587-CV, with the Regulator knob.

6.17.B Procedure (Continued)

2. **[PC] WHEN** desired,
THEN SHIFT 2B DG SRW FLOW CONTROLLER, 2-SRW-1587-PDIC, from manual to automatic control as follows:

   a. Slowly **TURN** the Setpoint knob to move the Balance Indicator Ball to the middle of the Balance Indicator Tube.

   b. **PLACE** the MAN/AUTO selector in A (AUTO).

   c. **IF** necessary, **ADJUST** the 2B DG SRW FLOW CONTROLLER, 2-SRW-1587-PDIC, to 8.5 PSID, using the Setpoint knob.

   d. **ENSURE** the regulator is LOCKED by pushing in on the Regulator knob.

****** END ******

6.18 MANUAL HANDWHEEL OPERATION OF 2-SRW-1587-CV

A. Initial Conditions

1. Operation of 2B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1587-CV, without using the Air Supply is desired.

B. Procedure

CAUTION
2B DG is considered inoperable if 2-SRW-1587-CV is **NOT** in Automatic Control.

1. **ENGAGE** the handwheel as follows:

   a. **INFORM** the Control Room that failing open 2B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1587-CV, may affect the SRW head tank levels.

NOTE
This step causes 2B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1587-CV, to fail open.

   b. **ROTATE** the handle on INSTRUMENT AIR TO 2B DG SRW INLET 2-CV-1587 AUTO / VENT SELECTOR VALVE, 2-IA-1587-HV, 180° to the MANUAL position.

NOTE
The handwheel must be in the open position to ensure full range of valve travel.

   c. **ROTATE** the handwheel counterclockwise to the full OPEN position.

CAUTION
Attempting to operate the valve with air supplied to the actuator **AND** the handwheel engaged may result in damage to the actuator.

   d. **LIFT OUT AND ROTATE** the clutch handle (the flat rectangular plate in the center of the Position Indicator on the valve body) 90°, allowing it to fully seat in the indicator's deep slot to engage the handwheel mechanism.

   e. **SLOWLY ROTATE** the handwheel in either direction until the spring loaded center pin on the flat rectangular plate falls into the slot.

6.18.B.1 **Procedure (Continued)**

CAUTION
Long term operation with excess flow through the coolers can cause vibrations affecting expansion joint reliability.

f. **TURN** the handwheel in the desired direction as indicated on the valve handwheel.

2. **WHEN** desired,
THEN DISENGAGE the handwheel as follows:

a. **INFORM** the Control Room that manual operation of 2B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1587-CV, may affect the SRW head tank levels.

b. **ROTATE** the handwheel until the valve is in the FULL OPEN position, at which point little resistance should be felt.

NOTE
It will be difficult to pull out the clutch handle if the handwheel mechanism is transmitting torque.

c. **LIFT** the clutch handle out of the deep slot, rotate it 90° , **AND SEAT** it in the indicator shallow slot to disengage the handwheel mechanism.

d. **LOCK** the clutch handle in the shallow slot.

e. **ROTATE** the handle on INSTRUMENT AIR TO 2B DG SRW INLET 2-CV-1587 AUTO / VENT SELECTOR VALVE, 2-IA-1587-HV, 180° to the AUTO position.

f. **CHECK** 2B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1587-CV, shuts.

3. **ENSURE** INSTRUMENT AIR SUPPLY TO 2B DG SRW INLET 2-SRW-1587-CV ISOLATION VALVE, 2-IA-702, is OPEN.

4. **INFORM** the Control Room that 2B DIESEL GENERATOR SERVICE WATER SUPPLY CONTROL VALVE, 2-SRW-1587-CV, is back in AUTO.

****** END ******

6.19 BLOW DOWN 2B DG DIESEL AIR START MOISTURE TRAPS

A. Initial Conditions

1. 2B DG Starting Air System is aligned **PER** ATTACHMENT 1B, 2B DIESEL GENERATOR VALVE LINEUP.

B. Procedure

1. **BLOWDOWN** the moisture traps as follows:

   a. **UNLOCK AND SLOWLY CRACK OPEN** the selected moisture trap bypass valve:

   - 2B DG STARTING AIR WEST AIR RECEIVER DRAIN TRAP BYPASS VALVE, 2B-DSA-130
   - 2B DG STARTING AIR EAST AIR RECEIVER DRAIN TRAP BYPASS VALVE, 2B-DSA-131

   b. **WHEN** the trap is free of moisture,
   THEN SHUT AND LOCK the selected moisture trap bypass valve: **[B0048]**

   - 2B DG STARTING AIR WEST AIR RECEIVER DRAIN TRAP BYPASS VALVE, 2B-DSA-130
   - 2B DG STARTING AIR EAST AIR RECEIVER DRAIN TRAP BYPASS VALVE, 2B-DSA-131

2. **IF** excessive moisture is noted,
   THEN SUBMIT a CR to have the affected trap cleaned **AND** inspected.

****** END ******

6.20 ADD LUBE OIL TO THE 2B DG LUBE OIL DAY TANK

A. Initial Conditions

1. 2B DG Lube Oil System valves are in the NORMAL alignment **PER** ATTACHMENT 1B, 2B DIESEL GENERATOR VALVE LINEUP.

B. Procedure

1. **VERIFY** lube oil type in the 55 gallon drums with the Oil Control Manual.
2. **CHECK** each 55 gallon drum of lube oil is sealed with a factory seal **OR** has a custody seal.
3. **IF** the quality of the lube oil is questioned,
   THEN PERFORM the following:
   a. **REJECT** the drum.
   b. **RETURN** the drum to the warehouse.
   c. **INITIATE** a Condition Report for the rejected drum.
4. **WHEN** lube oil is ready to be transferred,
   THEN MOVE the drum(s) to the 2B DG Room.
5. **ENSURE** drip pans are placed under hose connections.
6. **ENSURE** the temporary transfer hose is clean.
7. **CONNECT** a temporary transfer hose to the pipe stub of the hand-operated pump **OR** 2B DG LUBE OIL FILL SAMPLE ISOLATION VALVE, 2B-DLO-117.
8. **PERFORM** the following for each lube oil drum:
   a. **INSERT** the temporary transfer hose into the drum.
   b. **OPEN** 2B DG LUBE OIL DAY TANK FILL ISOLATION VALVE, 2B-DLO-113.
   c. **TRANSFER** the lube oil drum contents to the 2B DG Lube Oil Day Tank using a hand-operated **OR** electric transfer pump.
   d. **SHUT** 2B DG LUBE OIL DAY TANK FILL ISOLATION VALVE, 2B-DLO-113.
   e. **REMOVE** the temporary transfer hose from the drum.

NOTE
Excess oil addition will cause a 2B DG Lube Oil Day Tank High Level Alarm.

9. **WHEN** the desired level in the 2B DG Lube Oil Day Tank has been obtained,
   THEN STOP pumping.

6.20.B Procedure (Continued)

10. **IF** the entire contents of the drum were **NOT** transferred to the 2B DG Lube Oil Day Tank,
THEN INSTALL an appropriate locking device on the drum.

11. **REMOVE** the temporary transfer hose from the pipe stub of the hand-operated pump **OR** 2B DG LUBE OIL FILL SAMPLE ISOLATION VALVE, 2B-DLO-117.

12. **DRAIN** any waste from the drip pans **AND DISPOSE** of **PER** CH-1-101, Hazardous Waste Management.

13. **REMOVE** the drum(s) from the 2B Diesel Generator Room.

14. **LOG** the amount of lube oil added **AND** information from the drum custody or factory seals in the Safety Related Consumables Log in the Control Room.

****** END ******

6.21 2B DG STARTING AIR COMPRESSOR OPERATION

A. Initial Conditions

1. 2B DG Starting Air System is aligned **PER** ATTACHMENT 1B, 2B DIESEL GENERATOR VALVE LINEUP.

B. Procedure

1. **IF** manual operation is desired,
   THEN PERFORM the following:

   a. **ENSURE** adequate oil level in the air compressor.

   b. **PLACE AND HOLD** 2B DG AIR COMPRESSOR, 2-HS-4837, to START.

   c. **WHEN** air compressor shutdown is desired,
   THEN RELEASE 2B DG AIR COMPRESSOR, 2-HS-4837.

2. **IF** automatic operation is desired,
   THEN PERFORM the following:

   a. **ENSURE** adequate oil level in the air compressor.

   b. **ENSURE** MCC 2BG breaker Air Compressor, 52-2BG03, is ON.

3. **IF** operation of the 6 HP diesel engine Starting Air Compressor is desired,
   THEN GO TO the applicable section of Unit 1 OI-21B, 1B Diesel Generator.

****** END ******

6.22 REMOVE AND RESTORE 2B DG STARTING AIR COMPRESSOR FOR SERVICE

A. Initial Conditions

1. At least one other DG Starting Air Compressor is in service and lined up for automatic operation.

B. Procedure

CAUTION
Cross-connecting Air Receivers may allow receivers on the isolated compressor to drop below normal operating pressure. The air receivers should be checked frequently for proper pressure while cross-connected.

1. **REMOVE** 2B DG Air Compressor from service as follows:

   a. **ENSURE** 2B DG STARTING AIR AIR COMPR TO WEST RECEIVER ISOLATION VALVE, 2B-DSA-101, is LOCKED OPEN.

   b. **ENSURE** 2B DG STARTING AIR AIR COMPR TO EAST RECEIVER ISOLATION VALVE, 2B-DSA-102, is LOCKED OPEN.

   c. **UNLOCK AND OPEN** RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-2.

   d. **UNLOCK AND OPEN** the selected cross connect valve:

      - RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-1

      OR

      - RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-3

   e. **[PC] OPEN** MCC 2BG breaker Air Compressor, 52-2BG03.

   f. **UNLOCK AND SHUT** 2B DG STARTING AIR COMPRESSOR DISCHARGE VALVE, 2B-DSA-1016.

6.22.B Procedure (Continued)

2. **WHEN** desired,
THEN RESTORE 2B DG Air Compressor to normal as follows: **[B0048]**

   a. **ENSURE** adequate oil level in the air compressor.

   b. **LOCK OPEN** 2B DG STARTING AIR COMPRESSOR DISCHARGE VALVE, 2B-DSA-1016.

   c. **[PC] CLOSE** MCC 2BG breaker Air Compressor, 52-2BG03.

   d. **SHUT AND LOCK** RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-2.

   e. **SHUT AND LOCK** the selected cross connect valve:

      - RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-1

      OR

      - RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE, 0-DSA-3

****** END ******

6.23 COLD WEATHER OPERATIONS [B0112]

A. Initial Conditions

1. 2B Diesel Generator room temperature is less than **OR** equal to 65° F.

B. Procedure

1. **ADJUST** the 2B Diesel Generator room thermostat setting to raise room temperature.

2. **IF** raising the thermostat setting fails to maintain room temperature, **THEN PERFORM** the following:

   a. **ENSURE** MN-1-110, Procedure Controlled Activities, is filled out for installation of a portable electric heater(s).

   b. **INSTALL** a portable electric heater(s) **PER** the following guidance:

      - **POSITION** the heater(s) facing West **AND NOT** facing the Control Panel.
      - Securely **FASTEN** the portable electric heater(s) to preclude any damage to other equipment due to a seismic event **PER** MN-1-106, Temporary Storage Of Equipment And Material.

   c. **INDEPENDENTLY VERIFY** the portable electric heater(s) has been installed correctly.

3. **IF** the portable electric heater(s) fails to maintain room temperature greater than 60° F,
   THEN PERFORM the following:

   a. **START AND LOAD** 2B Diesel Generator **PER** the following sections:

      (1) Section 6.2, 2B DG NON-EMERGENCY FAST START

      (2) Section 6.6, PARALLEL 2B DIESEL GENERATOR

NOTE
Turning off the 2B DG Ventilation Fan after 2B Diesel Generator has been shutdown will help to maintain a higher room temperature.

   b. **WHEN** 2B Diesel Generator has run for at least an hour, **THEN STOP** 2B DG **PER** Section 6.8, 2B DG SHUTDOWN.

   c. **STOP** the 2B DG Room Ventilation Fan by momentarily placing its handswitch to the STOP position.

6.23.B Procedure (Continued)

4. **WHEN** the portable electric heater(s) is **NOT** needed,
   THEN PERFORM the following:

   a. **REMOVE** the portable electric heater(s).

   b. **INDEPENDENTLY VERIFY** that the portable electric heater(s) has been removed.

   c. **ENSURE** MN-1-110, Procedure Controlled Activities, is completed for removal of the portable electric heater(s).

****** END ******

6.24 ROTATING 2B DIESEL GENERATOR WITH COMPRESSED AIR

A. Initial Conditions

1. 2B Diesel Generator has been prelubed **OR** run **AND** requires barring-over.
2. Technical Specification 3.8.1 or 3.8.2 has been reviewed to determine Diesel Generator operability requirements.
3. 2B Diesel Generator has been shutdown more than 20 minutes and less than three hours.

B. Procedure

1. **IF** during the performance of this section, operation of the DG is needed (i.e. loss of Offsite Power),
   THEN return the DG to operation by performing the following:
   a. **ENSURE SHUT** 2B DG STARTING AIR AIR BAR THROTTLE VALVE, 2B-DSA-135.

> **NOTE**
> DG will start if Auto Start signal is present.

   b. **ENSURE** 2B DIESEL GENERATOR CONTROL MODE SELECTOR SWITCH, 2-HS-4841, in AUTO/REMOTE
   c. **WHEN** DG is operating,
      THEN restore DG to normal by ensuring Steps 11 through 17 are complete. 01903
2. **IF** 2B DG is operable,
   THEN ENSURE that Unit 2 ZA train equipment is operable **PER** OI-49, Operability Verification, prior to barring over the engine.

> **NOTE**
> 2B DG is INOPERABLE when 2-HS-4841 is in LOCAL.

3. **[PC] ENSURE** 2B DG CONTROL MODE SELECTOR SWITCH, 2-HS 4841, in LOCAL.
4. **PLACE** 2B DG AIR BAR SWITCH, 2-HS-4862, in AIR BAR.
5. **SHUT** the 2B DG STARTING AIR #14 LOWER BEARING OIL BOOSTER ISOLATION VALVE, 2B-DSA-138.
6. **OPEN** 2B DG STARTING AIR AIR BAR 2-PI-4822 ISOLATION, 2B-DSA-137.
7. **UNLOCK AND OPEN** 2B DG STARTING AIR AIR BAR ROOT VALVE, 2B-DSA-121.

6.24.B Procedure (Continued)

8. **OPEN** 2B DG STARTING AIR AIR BAR ISOLATION VALVE, 2B-DSA-136.

CAUTION
During AIR-BAR, all DG East Air Receivers will supply air to 2B DG.

NOTE
The Air Bar valve must be opened quickly to prevent the DG from stalling.

9. **OPEN** 2B DG STARTING AIR AIR BAR THROTTLE VALVE, 2B-DSA-135, as needed to rotate the Diesel Engine at least one revolution,
THEN SHUT 2B DG STARTING AIR AIR BAR THROTTLE VALVE, 2B-DSA-135.

10. **WHEN** 2B DG has been rotated at least one revolution,
THEN PERFORM steps 11 through 18.

11. **SHUT** 2B DG STARTING AIR AIR BAR ISOLATION VALVE, 2B-DSA-136.

12. **SHUT AND LOCK** 2B DG STARTING AIR AIR BAR ROOT VALVE, 2B-DSA-121.

13. **SHUT** 2B DG STARTING AIR AIR BAR 2-PI-4822 ISOLATION, 2B-DSA-137.

14. **[PC] OPEN** 2B DG STARTING AIR #14 LOWER BEARING OIL BOOSTER ISOLATION VALVE, 2B-DSA-138.

15. **PLACE** the AIR BAR HANDSWITCH, 2-HS-4862, in NORMAL.

16. **PLACE** the 2B DG CONTROL MODE SELECTOR SWITCH, 2-HS-4841 in AUTO/REMOTE **AND REMOVE** the key.

17. **INDEPENDENTLY VERIFY** that:

    a. The 2B DG AIR BAR HANDSWITCH, 2-HS-4862, is in NORMAL.

    b. The 2B DG CONTROL MODE SELECTOR SWITCH, 2-HS-4841, is in AUTO/REMOTE.

    c. 2B DG STARTING AIR AIR BAR ROOT VALVE, 2B-DSA-121 is LOCKED SHUT.

18. **NOTIFY** The Control Room that the 2B DG-bar over is complete.

****** END ******

6.25 RAPID SHUTDOWN OF THE 2B DIESEL

A. Initial Conditions

1. 2B DG is operating in parallel operation with 24 4KV Bus Bus **OR** unloaded **AND** a condition exists that requires a rapid shutdown.
2. Stopping 2B DG energizes the 2B DG Stopping Relay Timer and prevents all 2B DG starts for one minute.
3. Do **NOT** stop two DGs at the same time. **[B0614]**
4. The 2B DG is **NOT** in Local.

B. Procedure

NOTE
Steps 1 and 2 may be worked in parallel

1. **IF** 2B DG is running with a SIAS signal present,
   THEN ENSURE actuation modules are reset locally (at the ESFAS cabinets) prior to 2B DG shutdown.

NOTE
2B DG Speed/Load controls are more responsive to Speed/Load adjustment due to the new governor controls.

2. **IF** 2B DG is in parallel operation with 24 4KV Bus,
   THEN REMOVE 2B DG load by performing the following:

   a. **LOWER** MW **AND** KVAR loads concurrently to below 0.5 MW **AND** zero KVARs **PER** the following:

NOTE
Load may be lowered as rapidly as necessary.

- **LOWER** MW load using 2B DG SPEED CONTR, 2-CS-2403.
- **MAINTAIN** 0 to 500 KVARs using 2B DG AUTO VOLT CONTR, 2-CS-2402, **AND** FIGURE 1, DIESEL GENERATOR ELECTRICAL LIMITS.
- **MONITOR** 24 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**

   b. **WHEN** 2B DG load is less than 0.5 MW,
   THEN PLACE 2B DG OUT BKR, 2-CS-152-2403, to TRIP.

3. **MOMENTARILY PLACE** 2B DG UNIT PARALLEL, 2-CS-2404, to RESET.

6.25.B Procedure (Continued)

4. **CHECK** 2B DG frequency is 60 Hz (58.8 to 61.2 Hz).
   - 2B DG FREQUENCY, 2-SI-2401
5. **ADJUST** 2B DG voltage to greater than 4.16 KV (4.16 to 4.30 KV) using 2B DG VOLT AUTO CONTR, 2-CS-2402.
   - 2B DG VOLTS, 2-EI-2422
6. **CHECK** annunciator "2B DG • POT VOLT • FREQ LO" is clear.
7. **ENSURE** 2B DG ESFAS TEST SWITCH, 2-HS-4817, on DG local control/gage panel, in NORMAL.
8. **DEPRESS** 2B DG STOP pushbutton, 2-HS-2425, to shutdown the engine.
9. **ENSURE** SLOW START MODE SELECTOR, 2-HS-4827, in NORMAL. **[B0048]**
10. **ENSURE** Prelube Pump is **NOT** running.
11. **ENSURE** the following pumps are operating:
    - Coolant Pump
    - Lube Oil Pump
12. **IF** 2B DG was in parallel operation with 24 4KV Bus,
    THEN ENSURE the CPS Generation Dispatcher is notified that the 2B Diesel is no longer paralleled.

CAUTION
DO **NOT** allow the 2B DG room temperature to fall below 60° F.

13. **IF** desired,
    THEN STOP the 2B DG Room Ventilation Fan by momentarily placing its handswitch to the STOP position.

6.25.B Procedure (Continued)

NOTE

- 2B DG may remain in the Action Statement of T.S. 3.8.1 **OR** 3.8.2 until engine barring is complete.
- If barring is **NOT** performed within three hours of shutdown, its effectiveness is minimal. Therefore, barring is **NOT** required if conditions prohibit barring within three hours of engine shutdown.

14. **IF** 2B DG is **NOT** scheduled to be manually restarted within three hours, **THEN CONSIDER** barring over 2B DG **PER** Section 6.9, MANUALLY BAR-OVER 2B DIESEL GENERATOR, **OR** Section 6.24, ROTATING 2B DIESEL GENERATOR WITH COMPRESSED AIR. **[B0048]**

15. **NOTIFY** Plant Chemistry of the following:

    - 2B DG is shutdown
    - Jacket Water Cooling System makeup or venting performed during operation

16. **IF** the 2B DG was paralleled to 24 4 KV bus, **THEN ALIGN** the Control room HVAC as follows:

    - **IF** 12 CR HVAC was in operation, **THEN RESTORE** the Control Room Chiller **PER** OI-22F. (N/A if 11 CR HVAC was in operation)
    - **UNBYPASS** the Control Room Vent RMS, 0-RI-5350.
    - **STOP** the Post-LOCI Filter Fans by placing the handswitches to STOP **AND LOG** the stopping time in the Charcoal Filter Log.
        - 11 Post-LOCI Filter Fan handswitch, 0-HS-5352
        - 12 Post-LOCI Filter Fan handswitch, 0-HS-5353
    - **IF** desired, **THEN PLACE** the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to ON.

****** END ******

7.0 POST-PERFORMANCE ACTIVITIES

Upon completion of this procedure, forward the original(s) to the Operations Senior Administrative Assistant for retention **PER** CNG-PR-3.01-1000, Records Management.

8.0 BASES

[B0022] Letter to J. Lohr from B. Lang, dated 12/19/89; describing why the DGs should be considered inoperable at a jacket coolant temperature of less than or equal to 90° F.

[B0024] [B0110] Corrective action for LER 92-005 required modifying the affected procedure to state that the Diesel Generator is OOS when its voltage regulator is in MANUAL.

[B0027] Memo to L. G. Getz from T. M. Delaney, dated 12/4/95; No prelube required if engine has been run or prelubed in the last 2 hours since excessive prelube conflicts with efforts to reduce exhaust system oil related fires. Unloaded operation should be minimized, especially beyond one hour. Loading DG slowly in increments reduces thermal stresses, protects against rapid loading of DG, and is recommended by the vendor.

[B0036] **PER** Maintenance and Surveillance Test Performances Manual 12310-168, Part 1, Tab 3, Pg. 2. Provide time interval for increasing the governor speed control knob.

[B0048] SOER 83-01 recommends prelubing engines prior to any start, recommendation 5-2; also, listing actions required to return DG to standby, recommendation 8-1.

[B0105] **PER** LER 91-007 (Unit 2), "Loss of Boration Flowpath due to a Fuse Failure", this procedure is to be performed when an FBM Diesel Generator is to be taken out of service and at least once every 8 hours while it remains out of service. Removing SRW to the DG renders it inoperable.

[B0112] POSRC outstanding item 91-165-04 and network item OE-4457, DG inoperable due to low room temp. This section added to ensure minimum DG room temperature for DG operability.

[B0114] Maintain 17 ft. 4 inches in #21 FOST. Due to the fact that #11 FOST is not protected from tornadoes, sufficient fuel oil must be stored in #21 FOST to support shutdown of both units during a loss of off-site power. Reference memo from System Engineer.

[B0120] Memo from R. A. Buttner of the Design Basis Unit, DBU-92-059, subject: "Plant Operating Voltage Ranges", lists the new 13KV, 4KV, and 480V Bus voltage limits. Previous calculations did not ensure adequate voltage at load terminals.

8.0 BASES (Continued)

[B0138] NUMARC 91-06 "Guidelines for Industry Actions to Assess Shutdown Management and NRC Letter 88-17 recommended establishing communications between the SM/CRS and the System Operator-Bulk prior to removing a diesel generator from service.

[B0154] AOP/EOP cross reference per NUREG 1358:

a. EOP-7, STATION BLACKOUT, refers to this OI for the restart of the 2B Diesel Generator with an auto start signal present.

b. AOP-3B, ABNORMAL SHUTDOWN COOLING CONDITIONS, refers to this OI for the restart of the 2B Diesel Generator with an auto start signal present.

[B0614] SOER 99-01, Recommendation 2.c. Procedure guidance reflects the importance of timely resetting (rearming) of safety system electrical sequencing equipment following the return to grid power.

9.0 RECORDS

Records generated by this procedure shall be processed **PER** CNG-PR-3.01-1000, Records Management.

10.0 ATTACHMENTS

A. TABLE 1, SHUTDOWN SEQUENCER LOADS

B. TABLE 2, 2B DG FUEL OIL DAY TANK VOLUME

C. TABLE 3, 2B DIESEL GENERATOR OPERATING PARAMETERS

D. FIGURE 1, DIESEL GENERATOR ELECTRICAL LIMITS

E. ATTACHMENT 1A, POST MAINTENANCE 2B DIESEL GENERATOR LINEUP CHECKS

F. ATTACHMENT 1B, 2B DIESEL GENERATOR VALVE LINEUP

SHUTDOWN SEQUENCER LOADS

24 4KV BUS SHUTDOWN SEQUENCER

The following table lists loads that receive a start signal from the 24 4KV Bus Shutdown Sequencer (SDS). The SDS operates when it has a Diesel Generator breaker closed to 24 4KV Bus.
11 HVAC ESFAS TIMER light illuminates (1C34)

11 CONTR RM FRESH AIR damper, 0-HVAC-5350, shuts

12 CONTR RM FRESH AIR damper, 0-HVAC-5351, shuts

12 Control Room A/C Compr**

11 & 12 Post-LOCI filter Fans

22 SWGR A/C Compr#

22 Instr Air Compr#

22 Salt Water Pump

23 Salt Water Pump*

22 Service Water Pump

23 Service Water Pump*

23 Aux Feedwater Pump#

Control Room Kitchen/Toilet Exhaust Fan will STOP

* 23 Salt Water Pump and 23 Service Water Pump receive a start signal from the SDS only if the associated 22 pump fails to start after receiving an SDS start signal AND they are aligned to 24 4KV Bus.

\# These components receive a start permissive signal from the SDS.

** 12 Control Room HVAC receives a start signal from the SDS only if its associated supply fan is running.

2B DG FUEL OIL DAY TANK VOLUME

Inches	Gallons	Inches	Gallons
2*	0	22	255.1
3	7.1	23	270.1
4	15.5	24	285.0
5	24.8	25	299.8
6	35.0	26	314.5
7	45.9	27	328.9
8	57.5	28	343.2
9	69.6	29	357.2
10	82.2	30	370.8
11	95.3	31	384.1
12	108.7	32	397.0
13	122.5	33	409.5
14	136.6	34	421.4
15	151.0	35	432.7
16	165.5	36	443.3
17	180.2	37	453.2
18	195.1	38	462.2
19	210.0	39	470.1
20	225.0	40	476.7
21	240.1	41	481.5

* - Approximately 9 gallons of unusable fuel oil remains below the 2 inch level.

2B DIESEL GENERATOR OPERATING PARAMETERS

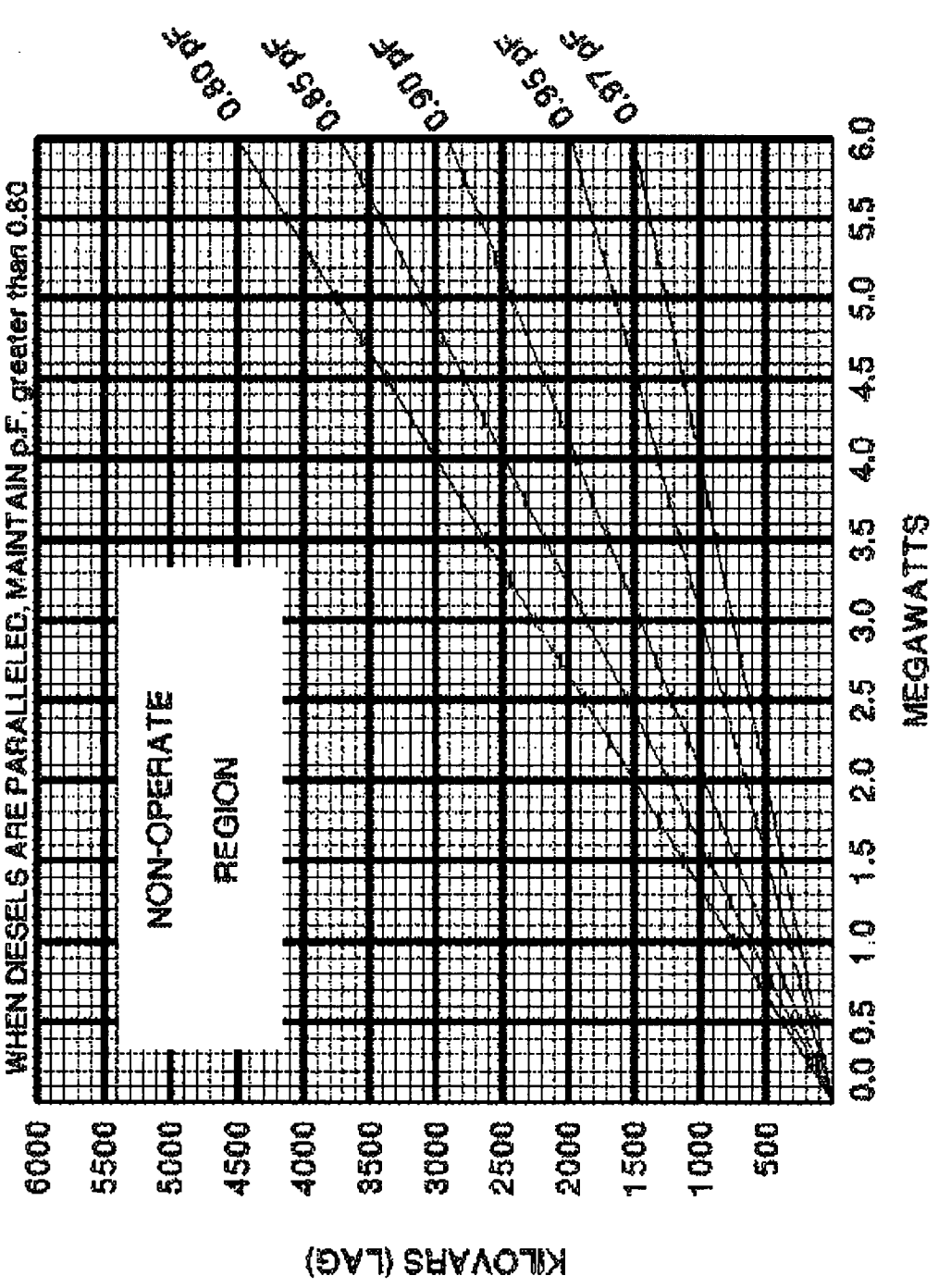
The following parameters apply to 2B Diesel Generator while operating. Contact the System Engineer if parameters approach OR exceed the specified values.

* Lube oil pressure to the engine	30 to 45 psig
* Lube oil temperature out of engine	170 to 195 degrees F
* Fuel oil pressure to the engine (red hand)	15 to 40 psig
* Jacket water pump discharge pressure	30 to 35 psig
* Crankcase vacuum	0.5 to 4.0 inches H2O
* Governor visible sightglass oil level (min)	1/2 full
* Jacket water engine diff temperature (max D/T) across the engine	10 degrees F
* Lube oil diff temp (max D/T)	30 degrees F
* Cylinder exhaust temp (max)	1000 degrees F
* Cylinder exhaust diff temperature (max D/T) between individual cylinders	250 degrees F
* Fuel oil filter diff press (max)	10 psid
* Lube oil filter diff press (max) with lube oil temp in operating range	18 psid
* Lube oil strainer diff press (max) with lube oil temp in operating range	12 psid

NOTE: Parameters will change due to 2B DG running time and load.

2B DIESEL GENERATOR

DIESEL GENERATOR ELECTRICAL LIMITS



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POST MAINTENANCE 2B DIESEL GENERATOR LINEUP CHECKS

ENSURE 2B DG Standby conditions by performing the following:

		Condition	INIT/DATE
A.	1C20B in Control Room		
1.	2B DG Unit Parallel Switch 2-CS-2404	RESET (Momentarily)	_____
2.	2B DG Volt Regulator Selector Sw. 2-HS-2423	AUTO	_____
B.	Panel 2C61B 2B DG Room		
1.	2B DG Governor Control	AUTO	_____
2.	2B DG Governor Speed Control CS/SP	OFF	_____
3.	Lockout Relay Switch 186D-2B	RESET	_____
4.	2B DG Slow Start Mode Selector 2-HS-4827	NORMAL	_____
5.	2B DG Slow Start Sequence Keyswitch 2-HS-4866	NORMAL (KEY REMOVED)	_____
6.	Slow Start Sequence Light	LIGHT OUT	_____
C.	Panel 2C61C 2B DG Room		
1.	Voltage Regulator Man/Auto Selector	AUTO	_____
2.	2B DG Contr Mode Sel Switch, 2-HS-4841	AUTO-REMOTE (KEY REMOVED)	_____

POST MAINTENANCE 2B DIESEL GENERATOR LINEUP CHECKS

D.	2B Diesel Engine Control Panel		
	1. Coolant Heater 2-HS-4810	AUTO	_____
	2. Coolant Pump 2-HS-4811	AUTO	_____
	3. Lube Oil Heater 2-HS-4795	AUTO	_____
	4. Lube Oil Pump 2-HS-4794	AUTO	_____
	5. Gen Space Heaters 2-HS-4849	AUTO	_____
	6. Pre Lube Pump 2-HS-4793	AUTO	_____
	7. ESFAS Test Switch 2-HS-4817	NORMAL	_____
	8. Air Bar Switch, 2-HS-4862	NORMAL	_____
E.	2B DG Governor	Condition	INIT/DATE
	1. Speed Droop Control	0	_____
	2. Speed Setting Control	21	_____
	3. Load Limit Control	MAXIMUM	_____
	4. Gov. Oil Level	3/4 FULL MIN.	_____
F.	480V Diesel Gen 2B MCC 2BG		
	1. Vent Fan 52-2BG01	ON	_____
	2. Transfer Pump 52-2BG02	ON	_____
	3. Air Compressor 52-2BG03 (N/A if Air Receivers are cross-connected)	ON	_____
	4. Engine Auxiliaries 52-2BG04	ON	_____

POST MAINTENANCE 2B DIESEL GENERATOR LINEUP CHECKS

G.	DG Auxiliaries Breaker Panel		
	1. Coolant Heater (CB-1)	ON	_____
	2. Coolant Pump (CB-2)	ON	_____
	3. Lube Oil Heater (CB-3)	ON	_____
	4. Lube Oil Pump (CB-4)	ON	_____
	5. Pre-Lube Pump (CB-5)	ON	_____
	6. Generator Space Heater (CB-6)	ON	_____
	7. Hour Meter (CB-7)	ON	_____
H.	Miscellaneous 2B DG Switches	Condition	INIT/DATE
	1. 2B DG Fuel Oil Drip Tk Pp 2-HS-4855	AUTO	_____
	2. 2B DG Exhaust Damper 2-HS-5438	AUTO or OPEN (circle one)	_____

POST MAINTENANCE 2B DIESEL GENERATOR LINEUP CHECKS

I. Miscellaneous Checks

1.	2B DG Jacket Water Expansion Tank level	GREATER THAN 1/2 FULL	_____
2.	2B DG Fuel Oil Day Tank level	GREATER THAN 27 INCHES	_____
3.	2B DG Air Compressor oil level	BETWEEN THE FULL AND ADD MARKS	_____
4.	2B DG Generator cooling air grilles (accessible)	OPEN AND NO DEBRIS	_____
5.	2B DG Generator oil level	AT THE UPPER WHITE LINE	_____
6.	2-SRW-1587-CV Clutch Handle	SHALLOW SLOT	_____
7.	2B DG Crankcase oil level	NORMAL (NEAR FULL STOP)	_____
8.	2-SRW-1587-CV	AUTO	_____
9.	2B DG Air Receiver Press East Rcvr 2-PI-4839 West Rcvr 2-PI-4838	GREATER THAN 215 PSIG AND LESS THAN 245 PSIG	_____
10.	If performing a slow start, then PRIME 2B DG Fuel System with at least 3 strokes of manual priming pump	PRESSURE DEVELOPS ON 2B DG FUEL OIL STRNR DIFF PRESS, 2-PDI-4828	_____
11.	Jacking Bar	Jacking Bar REMOVED	_____

POST MAINTENANCE 2B DIESEL GENERATOR LINEUP CHECKS

NOTE: Sections J and K may be marked N/A if 2B DG will not be paralleled OR declared operable.

J. 4KV Electrical Lineup	Condition	INIT/DATE
1. 2B Diesel Generator Output Breaker, 152-2403	CONNECTED AND OPEN	_____
2. 2B DG OUT BKR, 2-CS-152-2403	NORMAL	_____
3. 2B Diesel Generator Disconnect to Bus 24, 189-2403	CLOSED AND LOCKED	_____

K. 2B DG Alarm Panel		
1. All alarms associated with 2B DG that are not clear	EXISTING ALARMS LISTED BELOW, INITIALED BY SM THAT AUTOMATIC OPERATION OF 2B DG IS **NOT** AFFECTED	_____

ALARM	CAUSE	SM INIT/DATE
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

NOTE: It is acceptable to perform a Slow Speed Start of the Diesel with a Low Lube Oil Temperature alarm present providing the Lube Oil sump is verified greater than or equal to 100 degrees F by contact pyrometer.

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DFO-121	LOCKED SHUT	2B DG FUEL OIL SUPPLY FROM HEADER #1 ISOLATION VALVE	2B DG RM IN NW CORNER		
2B-DFO-122	LOCKED OPEN	2B DG FUEL OIL SUPPLY FROM HEADER #2 ISOLATION VALVE	2B DG RM IN NW CORNER		
2B-DFO-123	----	2B DG FUEL OIL SUPPLY FROM HEADER #2 CHECK VALVE	2B DG RM IN NW CORNER		
2B-DFO-124	----	2B DG FUEL OIL HAND PRIMING PUMP DISCHARGE CHECK VALVE	2B DG RM W OF FUEL PP		
2B-DFO-125	----	2B DG FUEL OIL COMBINED FUEL OIL PUMP DISCH CHECK VALVE	2B DG RM N OF FUEL PP		
2B-DFO-126	LOCKED OPEN	2B DG FUEL OIL ENGINE FUEL OIL SUPPLY ISOLATION VALVE	2B DG RM SE OF DG		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DFO-127	SHUT	2B DG FUEL OIL DIRTY FUEL OIL DRAIN TANK DRAIN VALVE	2B DG RM NEXT TO DRIP TANK		
2B-DFO-136	----	2B DG FUEL OIL SUPPLY FROM HEADER #1 CHECK VALVE	2B DG RM IN NW CORNER		
2B-DFO-138	LOCKED OPEN	2B DG FUEL OIL ENGINE SUPPLY FROM DAY TANK ISOLATION VALVE	2B DG RM BELOW DFO DAY TK		
2B-DFO-150	LOCKED SHUT	2B DG FUEL OIL DAY TANK DRAIN VALVE	2B DG RM BELOW DFO DAY TK		
2B-DFO-151	SHUT	2B DG FUEL OIL DAY TANK (SPRING CLOSED) BACKUP DRAIN VALVE	2B DG RM BELOW DFO DAY TK		
2B-DFO-152	SHUT	2B DG FUEL OIL TRANSFER PUMP SUCTION STRAINER FLUSH ISOLATION VALVE	2B DG RM W OF TRANSFER PP		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DFO-153	SHUT	2B DG FUEL OIL PUMP SUCTION STRAINER FLUSH ISOLATION VALVE	2B DG RM BELOW DFO DAY TANK		
2B-DFO-154	SHUT	2B DG FUEL OIL DAY TANK VENT VALVE	2B DG RM NEXT TO DFO DAY TK		
2B-DFO-155	SHUT	2B DG FUEL OIL SUPPLY HEADER TO DAY TANK DRAIN VALVE	2B DG RM E OF DFO DAY TK		
2B-DFO-156	SHUT	2B DG FUEL OIL SUPPLY HEADER TO DAY TANK VENT VALVE	2B DG RM E ABOVE DFO DAY TK		
2B-DFO-157	SHUT	2B DG FUEL OIL DRIP PUMP DISCHARGE VENT VALVE	2B DG RM W BY DFO DAY TK		
2B-DFO-158	SHUT	2B DG FUEL OIL DRIP TANK DRAIN VALVE	2B DG RM BY DRIP TANK PUMP		
2B-DFO-165	SHUT AND CAPPED	2B DG FUEL OIL NUMBER 1 CYLINDER TEST CONN ROOT VALVE	2B DG RM S OF CYLINDER #1		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DFO-166	SHUT AND CAPPED	2B DG FUEL OIL NUMBER 2 CYLINDER TEST CONN ROOT VALVE	2B DG RM S OF CYLINDER #2		
2B-DFO-167	SHUT AND CAPPED	2B DG FUEL OIL NUMBER 3 CYLINDER TEST CONN ROOT VALVE	2B DG RM S OF CYLINDER #3		
2B-DFO-168	SHUT AND CAPPED	2B DG FUEL OIL NUMBER 4 CYLINDER TEST CONN ROOT VALVE	2B DG RM S OF CYLINDER #4		
2B-DFO-169	NOT IN MID POSIT	2B DG FUEL OIL SUPPLY FILTER SELECTOR TRANSFER VALVE	2B DG RM SE ON DUPLEX STRN		
2B-DFO-170	SHUT AND CAPPED	2B DG FUEL OIL NUMBER 5 CYLINDER TEST CONN ROOT VALVE	2B DG RM S OF CYLINDER #5		
2B-DFO-171	SHUT AND CAPPED	2B DG FUEL OIL NUMBER 6 CYLINDER TEST CONN ROOT VALVE	2B DG RM S OF CYLINDER #6		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DFO-172	SHUT AND CAPPED	2B DG FUEL OIL NUMBER 7 CYLINDER TEST CONN ROOT VALVE	2B DG RM S OF CYLINDER #7		
2B-DFO-173	SHUT AND CAPPED	2B DG FUEL OIL NUMBER 8 CYLINDER TEST CONN ROOT VALVE	2B DG RM S OF CYLINDER #8		
2B-DFO-174	SHUT AND CAPPED	2B DG FUEL OIL NUMBER 9 CYLINDER TEST CONN ROOT VALVE	2B DG RM S OF CYLINDER #9		
2B-DFO-175	SHUT AND CAPPED	2B DG FUEL OIL NUMBER 10 CYLINDER TEST CONN ROOT VALVE	2B DG RM S OF CYLINDER #10		
2B-DFO-176	SHUT AND CAPPED	2B DG FUEL OIL NUMBER 11 CYLINDER TEST CONN ROOT VALVE	2B DG RM S OF CYLINDER #11		
2B-DFO-177	SHUT AND CAPPED	2B DG FUEL OIL NUMBER 12 CYLINDER TEST CONN ROOT VALVE	2B DG RM S OF CYLINDER #12		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DFO-179	----	2B DG FUEL OIL TRANSFER PUMP DISCHARGE CHECK VALVE	2B DG RM E OF TRANSFER PUMP		
2B-DFO-180	SHUT	2B DG FUEL OIL DAY TANK LS-4824, 4825, 4826, 4827 DRAIN VALVE	2B DG RM E OF DFO DAY TK		
2B-DFO-1001	LOCKED OPEN	2B DG FUEL OIL DAY TANK LS-4824,4825,4826, 4827 UPPER ISOLATION VALVE	2B DG RM E OF DFO DAY TK		
2B-DFO-1002	SHUT	2B DG FUEL OIL DAY TANK LS-4824,4825,4826, 4827 UPPER VENT VALVE	2B DG RM E OF DFO DAY TK		
2B-DFO-1003	LOCKED OPEN	2B DG FUEL OIL DAY TANK LS-4824,4825,4826, 4827 LOWER ISOLATION VALVE	2B DG RM E OF DFO DAY TK		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DFO-1004	OPEN	2B DG FUEL OIL DAY TANK LEVEL 2-LI-4828 ROOT VALVE	2B DG RM E SIDE OF DFO DAY TK		
2B-DFO-1005	OPEN	2B DG FUEL OIL DIRTY FUEL OIL DRAIN TK LG-4828 UPPER ISOLATION VALVE	2B DG RM E OF DIRTY FO TK		
2B-DFO-1006	OPEN	2B DG FUEL OIL DIRTY FUEL OIL DRAIN TK LG-4828 LOWER ISOLATION VALVE	2B DG RM E OF DIRTY FO TK		
2B-DFO-1007	OPEN	2B DG FUEL OIL STRAINER PDI-4828 HP ROOT VALVE	2B DG RM AT VALVE STAND		
2B-DFO-1008	OPEN (1)	2B DG FUEL OIL STRAINER PDI-4828 HP BACKUP ROOT VALVE	2B DG RM AT VALVE STAND		

(1) THROTTLE AS NEEDED TO DAMPEN GAGE OSCILLATIONS.

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DFO-1009	OPEN	2B DG FUEL OIL STRAINER PDI-4828 LP & PS-4828 ROOT VALVE	2B DG RM AT VALVE STAND		
2B-DFO-1010	OPEN (1)	2B DG FUEL OIL STRAINER PDI-4828 LP & PS-4828 BACKUP ROOT VALVE	2B DG RM AT VALVE STAND		
2B-DFO-1013	OPEN	2B DG FUEL OIL DAY TANK LEVEL 2-LI-4828 BACKUP ROOT VALVE	2B DG RM E SIDE OF DFO DAY TANK		
2B-DFO-1014	LOCKED SHUT	2B DG FUEL OIL DAY TANK LEVEL 2-LI-4828 DRAIN VALVE	2B DG RM E SIDE OF DFO DAY TANK		
2B-DFO-4824-RV	----	2B DG FUEL OIL TRANSFER PUMP DISCHARGE RELIEF VALVE	2B DG RM ON TRANSFER PUMP		
2B-DFO-4828-RV	----	2B DG FUEL OIL COMBINED FUEL OIL PUMP DISCH RELIEF VALVE	2B DG RM W OF FUEL OIL PUMP		

(1) THROTTLE AS NEEDED TO DAMPEN GAGE OSCILLATIONS.

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
0-DSA-2	LOCKED SHUT	RECEIVER CHARGING LINE CROSS CONNECT ISOLATION VALVE	2B DG RM E OF AIR RCVR		
0-DSA-128	LOCKED SHUT	DIESEL STARTING AIR HEADER DRAIN VALVE	AB 5' HALL U-2 DEGAS RM OVHD		
0-DSA-129	LOCKED SHUT	DIESEL STARTING AIR HEADER DRAIN VALVE	AB 5' HALL U-2 DEGAS RM OVHD		
2B-DSA-101	LOCKED OPEN	2B DG STARTING AIR AIR COMPR TO WEST RECEIVER ISOLATION VALVE	2B DG RM @ W AIR RCVR INLET		
2B-DSA-102	LOCKED OPEN	2B DG STARTING AIR AIR COMPR TO EAST RECEIVER ISOLATION VALVE	2B DG RM @ E AIR RCVR INLET		
2B-DSA-103	LOCKED OPEN	2B DG STARTING AIR LOADLESS START ISOLATION VALVE	2B DG RM N OF COMPRESSOR		
2B-DSA-106	----	2B DG STARTING AIR WEST AIR RECEIVER INLET CHECK VALVE	2B DG RM @ W AIR RCVR INLET		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DSA-107	----	2B DG STARTING AIR WEST AIR RECEIVER OUTLET CHECK VALVE	2B DG RM N OF AIR COMPRESSOR		
2B-DSA-108	LOCKED OPEN	2B DG STARTING AIR WEST AIR RECEIVER OUTLET ISOLATION VALVE	2B DG RM E OF AIR COMPRESSOR		
2B-DSA-109	LOCKED OPEN	2B DG STARTING AIR WEST AIR RECEIVER DRAIN VALVE	2B DG RM N OF AIR RECEIVER		
2B-DSA-110	----	2B DG STARTING AIR EAST AIR RECEIVER INLET CHECK VALVE	2B DG RM @ E AIR RCVR INLET		
2B-DSA-111	----	2B DG STARTING AIR EAST AIR RECEIVER OUTLET CHECK VALVE	2B DG RM N OF AIR COMPRESSOR		
2B-DSA-112	LOCKED OPEN	2B DG STARTING AIR EAST AIR RECEIVER OUTLET ISOLATION VALVE	2B DG RM E OF AIR COMPRESSOR		
2B-DSA-113	LOCKED OPEN	2B DG STARTING AIR EAST AIR RECEIVER DRAIN VALVE	2B DG RM N OF E AIR RCVR		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DSA-114	LOCKED OPEN	2B DG STARTING AIR TO DIESEL START SV-4838 ISOLATION VALVE	2B DG RM N OF DG ON FLOOR		
2B-DSA-115	LOCKED OPEN	2B DG STARTING AIR TO DIESEL START SV-4838 BACKUP ISOLATION VALVE	2B DG RM N OF DG ON FLOOR		
2B-DSA-116	----	2B DG STARTING AIR TO DIESEL START SV-4838 CHECK VALVE	2B DG RM N OF DG ON FLOOR		
2B-DSA-117	LOCKED OPEN	2B DG STARTING AIR TO DIESEL START SV-4839 ISOLATION VALVE	2B DG RM N OF DG ON FLOOR		
2B-DSA-118	LOCKED OPEN	2B DG STARTING AIR TO DIESEL START SV-4839 BACKUP ISOLATION VALVE	2B DG RM N OF DG ON FLOOR		
2B-DSA-119	----	2B DG STARTING AIR TO DIESEL START SV-4839 CHECK VALVE	2B DG RM N OF DG ON FLOOR		

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DSA-120	LOCKED SHUT	2B DG STARTING AIR CHECK VALVE TEST ISOLATION VALVE	2B DG RM N OF DG ON FLOOR		
2B-DSA-121	LOCKED SHUT	2B DG STARTING AIR AIR BAR ROOT VALVE	2B DG RM N OF DG ON FLOOR		
2B-DSA-122	LOCKED SHUT	2B DG STARTING AIR WEST RECEIVER CHECK VALVE TEST ISOLATION VALVE	2B DG RM @ W AIR RCVR INLET		
2B-DSA-123	LOCKED SHUT	2B DG STARTING AIR EAST RECEIVER CHECK VALVE TEST ISOLATION VALVE	2B DG RM @ E AIR RCVR INLET		
2B-DSA-124	LOCKED SHUT	2B DG STARTING AIR STRAINER YS-4838 DRAIN VALVE	2B DG RM N OF DG ON FLOOR		
2B-DSA-125	LOCKED SHUT	2B DG STARTING AIR STRAINER YS-4839 DRAIN VALVE	2B DG RM N OF DG ON FLOOR		
2B-DSA-130	LOCKED SHUT	2B DG STARTING AIR WEST AIR RECEIVER DRAIN TRAP BYPASS VALVE	2B DG RM N OF AIR RCVR		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DSA-131	LOCKED SHUT	2B DG STARTING AIR EAST AIR RECEIVER DRAIN TRAP BYPASS VALVE	2B DG RM N OF E AIR RCVR		
2B-DSA-132	LOCKED OPEN	2B DG STARTING AIR CHARGING X-CONN DRAIN TRAP ISOLATION VALVE	2B DG RM N OF AIR COMPR		
2B-DSA-133	LOCKED SHUT	2B DG STARTING AIR CHARGING X-CONN DRAIN TRAP BYPASS VALVE	2B DG RM N OF AIR COMPR		
2B-DSA-134	NOT VENTING	2B DG STARTING AIR EAST AIR RECEIVER HEADER MANUAL START VALVE	2B DG RM N OF DG ON FLOOR		
2B-DSA-135	SHUT	2B DG STARTING AIR AIR BAR THROTTLE VALVE	2B DG RM N SIDE OF DG		
2B-DSA-136	SHUT	2B DG STARTING AIR AIR BAR ISOLATION VALVE	2B DG RM N SIDE OF DG		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DSA-137	SHUT	2B DG STARTING AIR AIR BAR 2-PI-4822 ISOLATION VALVE	2B DG RM N SIDE OF DG		
2B-DSA-138	OPEN	2B DG STARTING AIR #14 BEARING OIL BOOSTER ISOLATION VALVE	2B DG RM N SIDE OF DG		
2B-DSA-1002	LOCKED OPEN	2B DG STARTING AIR EAST AIR HEADER SENSING LINE ISOLATION VALVE	2B DG RM NE OF AIR COMPR		
2B-DSA-1003	LOCKED SHUT	2B DG STARTING AIR WEST AIR HEADER SENSING LINE ISOLATION VALVE	2B DG RM NE OF AIR COMPR		
2B-DSA-1004	LOCKED OPEN	2B DG STARTING AIR EAST AIR HEADER PI & PS-4846 ROOT VALVE	2B DG RM ON VALVE STAND		
2B-DSA-1005	LOCKED OPEN	2B DG STARTING AIR EAST AIR HEADER PI & PS-4846 BACKUP ROOT VALVE	2B DG RM ON VALVE STAND		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DSA-1006	LOCKED OPEN	2B DG STARTING AIR WEST AIR HEADER PI & PS-4845 ROOT VALVE	2B DG RM ON VALVE STAND		
2B-DSA-1007	LOCKED OPEN	2B DG STARTING AIR WEST AIR HEADER PI & PS-4845 BACKUP ROOT VALVE	2B DG RM ON VALVE STAND		
2B-DSA-1008	LOCKED OPEN	2B DG STARTING AIR WEST AIR RECEIVER PS-4837A ROOT VALVE	2B DG RM BY W AIR RCVR		
2B-DSA-1009	LOCKED OPEN	2B DG STARTING AIR EAST AIR RECEIVER PS-4837 ROOT VALVE	2B DG RM BY E AIR RCVR		
2B-DSA-1010	LOCKED OPEN	2B DG STARTING AIR EAST AIR RECEIVER PS-4837 BACKUP ROOT VALVE	2B DG RM BY W AIR RCVR		
2B-DSA-1011	LOCKED OPEN	2B DG STARTING AIR WEST AIR RECEIVER PS-4837A BACKUP ROOT VALVE	2B DG RM BY W AIR RCVR		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DSA-1012	LOCKED SHUT	2B DG STARTING AIR EAST AIR RECEIVER PS-4837 VENT VALVE	2B DG RM BY W AIR RCVR		
2B-DSA-1013	LOCKED SHUT	2B DG STARTING AIR WEST AIR RECEIVER PS-4837A VENT VALVE	2B DG RM BY W AIR RCVR		
2B-DSA-1014	OPEN	2B DG STARTING AIR EAST AIR RECEIVER PI-4839 ROOT VALVE	2B DG RM ON E AIR RCVR		
2B-DSA-1015	OPEN	2B DG STARTING AIR WEST AIR RECEIVER PI-4838 ROOT VALVE	2B DG RM ON W AIR RCVR		
2B-DSA-1016	LOCKED OPEN	2B DG STARTING AIR COMPRESSOR DISCHARGE VALVE	2B DG RM NE CORNER @ COMPR		
2B-DSA-4812-PCV	----	2B DG STARTING AIR AIR COMPRESSOR HYDRAULIC UNLOADER VALVE	2B DG RM ON COMPRESSOR		
2B-DSA-4825-PCV	----	2B DG STARTING AIR #14 BEARING OIL BOOSTER PCV	2B DG RM N SIDE OF DG		

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DSA-4837-RV	----	2B DG STARTING AIR COMPRESSOR DISCHARGE RELIEF VALVE	2B DG RM W OF COMPRESSOR		
2B-DSA-4838-CV	----	2B DG STARTING AIR DIESEL AIR START CONTROL VALVE	2B DG RM N DG NEAR FLOOR		
2B-DSA-4838-RV	----	2B DG STARTING AIR WEST AIR RECEIVER RELIEF VALVE	2B DG RM ON W AIR RCVR		
2B-DSA-4838-SV	----	2B DG STARTING AIR DIESEL AIR START SOLENOID VALVE	2B DG RM N OF DG ON FLOOR		
2B-DSA-4839-CV	----	2B DG STARTING AIR DIESEL AIR START CONTROL VALVE	2B DG RM N DG NEAR FLOOR		
2B-DSA-4839-RV	----	2B DG STARTING AIR EAST AIR RECEIVER RELIEF VALVE	2B DG RM ON E AIR RCVR		
2B-DSA-4839-SV	----	2B DG STARTING AIR DIESEL AIR START SOLENOID VALVE	2B DG RM N OF DG ON FLOOR		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DSA-4840-SV	----	2B DG STARTING AIR DIESEL AIR START HEADER SOLENOID VENT VALVE	2B DG RM N OF DG ON FLOOR		
2B-SCA-1001	OPEN	2B DG SCAVENGING AIR PRESSURE PI-4774 ROOT VALVE	2B DG RM NEAR GAGE BOARD		
2B-SCA-1002	OPEN	2B DG SCAVENGING AIR PRESSURE PI-4774 BACKUP ROOT VALVE	2B DG RM ON VALVE STAND		
2B-DLO-100	LOCKED SHUT	2B DG LUBE OIL DAY TANK DRAIN VALVE	2B DG RM UNDER DLO DAY TK		
2B-DLO-101	LOCKED OPEN	2B DG LUBE OIL DAY TANK TO ENGINE SUMP ISOLATION VALVE	2B DG RM S OF DG ON FLOOR		
2B-DLO-102	LOCKED SHUT	2B DG LUBE OIL FILTER TO ENGINE SUMP DRAIN VALVE	2B DG RM ON FILTER		
2B-DLO-103	LOCKED SHUT	2B DG LUBE OIL COOLER TO ENGINE SUMP DRAIN VALVE	2B DG RM BELOW CLR		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DLO-104	LOCKED SHUT	2B DG LUBE OIL STRAINER DRAIN VALVE	2B DG RM ON STRAINER		
2B-DLO-105	LOCKED SHUT	2B DG LUBE OIL STRAINER TO ENGINE SUMP DRAIN VALVE	2B DG RM ON STRAINER		
2B-DLO-106	----	2B DG PRELUBE PUMP OUTLET CHECK VALVE	2B DG RM ON DISCH PIPE		
2B-DLO-107	LOCKED SHUT	2B DG ENGINE SUMP DRAIN VALVE	2B DG RM N DG NEAR FLOOR		
2B-DLO-108	LOCKED OPEN	2B DG ELECTRIC STANDBY LUBE OIL CIRCULATING PUMP SUCTION VALVE	2B DG RM SE ENG SUMP		
2B-DLO-109	(2)	2B DG ELECTRIC STANDBY LUBE OIL CIRCULATING PUMP OUTLET 3-WAY VALVE	2B DG RM S END UNDER DECK		
2B-DLO-110	LOCKED SHUT	2B DG ELECTRIC STANDBY LUBE OIL CIRCULATING PUMP OUTLET DRAIN VALVE	2B DG RM S DG ON FLOOR		

(2) 3-WAY VALVE NORMALLY LINED UP TO PASS OIL FROM STANDBY CIRC PUMP TO LO HEATER.

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DLO-111	----	2B DG LUBE OIL HEATER OUTLET CHECK VALVE	2B DG RM W OF DLO HTR		
2B-DLO-112	OPEN	2B DG PRELUBE PUMP SUCTION VALVE	2B DG RM W OF DG UNDER DECK		
2B-DLO-113	SHUT	2B DG LUBE OIL DAY TANK FILL ISOLATION VALVE	2B DG RM UNDER DLO DAY TK		
2B-DLO-115	LOCKED SHUT	2B DG LUBE OIL FILTER DRAIN VALVE	2B DG RM ON FILTER		
2B-DLO-116	LOCKED SHUT	2B DG LUBE OIL DAY TANK SAMPLE ISOLATION VALVE	2B DG RM S OF DG ON FLOOR		
2B-DLO-117	SHUT	2B DG LUBE OIL FILL SAMPLE ISOLATION VALVE	2B DG RM UNDER DLO DAY TK		
2B-DLO-118	----	2B DG LUBE OIL TO TURBOCHARGER CHECK VALVE	NW OF DG UNDER TURBOCHARGER		
2B-DLO-1001	OPEN	2B DG LUBE OIL DAY TANK HIGH LS-4796, 4797 UPPER ISOLATION VALVE	2B DG RM NW OF DLO DAY TK		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DLO-1002	SHUT	2B DG LUBE OIL DAY TANK LS-4796, 4797 VENT VALVE	2B DG RM NW OF DLO DAY TK		
2B-DLO-1003	OPEN	2B DG LUBE OIL DAY TANK LOW LS-4796, 4797 LOWER ISOLATION VALVE	2B DG RM ON DLO DAY TK		
2B-DLO-1004	LOCKED OPEN	2B DG LUBE OIL PI-4796 & PS-4795,4796,4797, 4798 ROOT VALVE	2B DG RM ON VALVE STAND		
2B-DLO-1005	LOCKED OPEN	2B DG LUBE OIL PI-4796 & PS-4795,4796,4797, 4798 BACKUP ROOT VALVE	2B DG RM ON VALVE STAND		
2B-DLO-1006	OPEN	2B DG LUBE OIL FILTER PDI-4794 LP ROOT VALVE	2B DG RM ON DLO FILT		
2B-DLO-1007	OPEN	2B DG LUBE OIL STRAINER PDI-4795 LP ROOT VALVE	2B DG RM ON DLO STRN		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DLO-1008	LOCKED OPEN	2B DG CRANKCASE PRESSURE TRIP PS-4799 ROOT VALVE	2B DG RM NE END OF DG		
2B-DLO-1009	LOCKED OPEN	2B DG CRANKCASE PRESSURE TRIP PS-4800 ROOT VALVE	2B DG RM NE END OF DG		
2B-DLO-1010	LOCKED OPEN	2B DG CRANKCASE PRESSURE TRIP PS-4801 ROOT VALVE	2B DG RM NE END OF DG		
2B-DLO-1011	LOCKED OPEN TO CRANKCASE	2B DG CRANKCASE PRESSURE SELECTOR ISOLATION VALVE	2B DG RM NE END OF DG		THIS SELECTOR VALVE IS NOT TO BE USED FOR ISOLATION
2B-DLO-1012	OPEN	2B DG CRANKCASE VACUUM PI-4799 ROOT VALVE	2B DG RM ON VALVE STAND		
2B-DLO-1013	OPEN	2B DG CRANKCASE VACUUM PI-4799 BACKUP ROOT VALVE	2B DG RM ON VALVE STAND		
2B-DLO-1015	OPEN	2B DG LUBE OIL FILTER PDI-4794 HP ROOT VALVE	2B DG RM ON DLO FILT		

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DLO-1016	OPEN	2B DG LUBE OIL STRAINER PDI-4795 HP ROOT VALVE	2B DG RM N OF DLO STRN		
2B-DLO-4777-RV	----	2B DG LUBE OIL SUPPLY TO TURBOCHARGER RELIEF VALVE	NW OF DG UNDER TURBOCHARGER		
2B-DLO-4794-TCV	----	2B DG LUBE OIL COOLER TEMPERATURE CONTROL VALVE	2B DG RM NW CORNER DG		
2B-DLO-4795-RV	----	2B DG ELECTRIC MOTOR DRIVEN PRELUBE PUMP RELIEF VALVE	2B DG RM ON PRELUBE PP		INTERNAL TO PUMP
2B-DLO-4796-RV	----	2B DG STANDBY LUBE OIL CIRCULATING PUMP RELIEF VALVE	2B DG RM ON TOP OF PUMP		
2B-DLO-4797-LCV	----	2B DG ENGINE SUMP LEVEL CONTROL VALVE	2B DG RM S OF DLO SUMP		
2B-DCW-101	SHUT	2B DG JACKET WATER COOLING SRW TO EXPANSION TANK FILL ISOLATION VALVE	2B DG RM TOP OF EXP TK		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DCW-102	LOCKED SHUT	2B DG JACKET WATER COOLING EXPANSION TANK DRAIN VALVE	2B DG RM UNDER EXP TK		
2B-DCW-103	SHUT	2B DG JACKET WATER COOLING TEMPERATURE CONTROL VLV 4810 BYPASS VALVE	2B DG RM W ON TOP OF CLR		
2B-DCW-104	LOCKED SHUT	2B DG JACKET WATER COOLING JACKET WATER COOLER DRAIN VALVE	2B DG RM NE SIDE BY LO CLR		
2B-DCW-105	SHUT	2B DG JACKET WATER COOLING JACKET WATER COOLER VENT VALVE	2B DG RM W ON TOP CLR		
2B-DCW-106	----	2B DG JACKET WATER COOLING JACKET WATER COOLER OUTLET CHECK VALVE	2B DG RM W OF N TURBO		
2B-DCW-107	LOCKED SHUT	2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE	2B DG RM BY LO COOLER		

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DCW-108	LOCKED OPEN	2B DG JACKET WATER COOLING ELECTRIC JACKET COOLING PUMP SUCTION VALVE	2B DG RM BY STBY JCW PUMP		
2B-DCW-109	LOCKED OPEN	2B DG JACKET WATER COOLING ELECTRIC JACKET COOLING PUMP DISCHARGE VALVE	2B DG RM BY STBY JCW PUMP		
2B-DCW-110	LOCKED OPEN	2B DG JACKET WATER COOLING HEATED WATER SUPPLY TO AIR CLR ISOLATION VALVE	2B DG RM E OF AIR CLR		
2B-DCW-111	SHUT	2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE	2B DG RM BY DRIP TK		
2B-DCW-112	----	2B DG JACKET WATER COOLING AIR CLG HEAT EXCHANGER OUTLET CHECK VALVE	2B DG RM W OF DLO STRN		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DCW-113	LOCKED SHUT	2B DG JACKET WATER COOLING AIR COOLING SYSTEM DRAIN VALVE	2B DG RM E OF AIR CLR		
2B-DCW-114	LOCKED SHUT	2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER DRAIN VALVE	2B DG RM BELOW & E OF CLR		
2B-DCW-115	SHUT	2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER VENT VALVE	2B DG RM TOP OF AIR CLR		
2B-DCW-116	LOCKED SHUT	2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE	2B DG RM RIGHT OF AIR CLR		
2B-DCW-117	LOCKED SHUT	2B DG JACKET WATER COOLING JACKET COOLING SYSTEM DRAIN VALVE	2B DG RM BY STBY JCW PUMP		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DCW-120	LOCKED OPEN	2B DG JACKET WATER COOLING JACKET WATER RET FROM TURBO ISOLATION VALVE	2B DG E OF N TURBO		
2B-DCW-123	----	2B DG JACKET WATER COOLING AIR COOLER HX OUTLET CHECK VALVE	2B DG RM IN NW CORNER		
2B-DCW-1001	LOCKED OPEN	2B DG JACKET WATER COOLING LOW PRESS TRIP PS-4810, 4811 & 4812 ROOT VALVE	2B DG RM E OF GAGE BOARD		
2B-DCW-1002	LOCKED OPEN	2B DG JACKET WATER COOLING LOW PRESS TRIP PS-4810, 4811 & 4812 BACKUP ROOT VALVE	2B DG RM NEXT TO VALVE STAND		
2B-DCW-1003	LOCKED SHUT	2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER DRAIN VALVE	2B DG RM N & BELOW AIR CLR		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DCW-1004	LOCKED OPEN	2B DG JACKET WATER COOLING AIR COOLING HX PS-4777 ROOT VALVE	2B DG RM N & BELOW AIR CLR		
2B-DCW-1005	OPEN	2B DG JACKET WATER COOLING ENGINE DRIVEN PUMP PI-4810 ROOT VALVE	2B DG RM ON VALVE STAND		
2B-DCW-1006	OPEN	2B DG JACKET WATER COOLING ENGINE DRIVEN PUMP PI-4810 BACKUP ROOT VALVE	2B DG RM ON VALVE STAND		
2B-DCW-1007	OPEN	2B DG JACKET WATER COOLING EXPANSION TANK LI-4810 LOWER ISOLATION VALVE	2B DG RM ON EXP TK		
2B-DCW-1008	OPEN	2B DG JACKET WATER COOLING EXPANSION TANK LI-4810 UPPER ISOLATION VALVE	2B DG RM ON EXP TK		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DCW-1009	OPEN	2B DG JACKET WATER COOLING INTERCOOLER AIR COOLANT PI-4777 ROOT VALVE	2B DG RM NW CORNER		
2B-DCW-1010	LOCKED OPEN	2B DG JACKET WATER COOLING LOW COOLANT PRESS TRIP PS-4810 ISOLATION VALVE	2B DG RM INSIDE GAGE BOARD		
2B-DCW-1011	LOCKED OPEN	2B DG JACKET WATER COOLING LOW COOLANT PRESS TRIP PS-4811 ISOLATION VALVE	2B DG RM INSIDE GAGE BOARD		
2B-DCW-1012	LOCKED OPEN	2B DG JACKET WATER COOLING LOW COOLANT PRESS TRIP PS-4812 ISOLATION VALVE	2B DG RM INSIDE GAGE BOARD		
2B-DCW-1013	OPEN	2B DG JACKET WATER COOLING INTERCOOLER AIR COOLANT PI-4777 BACKUP ROOT VALVE	2B DG RM IN NW CORNER		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2B-DCW-4777-TCV	----	2B DG JACKET WATER COOLING AIR COOLING HEAT EXCHANGER TEMPERATURE CONTROL VALVE	2B DG RM ON AIR COOLER		
2B-DCW-4810-TCV	----	2B DG JACKET WATER COOLING JACKET WATER COOLER TEMPERATURE CONTROL VALVE	2B DG RM SW ON COOLER		
2-HVAC-5437-PO	----	2B DIESEL GENERATOR ROOM VENTILATION EXHAUST DAMPER	2B DG RM W WALL ABOVE DR		
2-HVAC-5437-SV	----	2B DIESEL GENERATOR ROOM VENTILATION EXHAUST DAMPER SOLENOID VALVE	2B DIESEL GEN ROOM W WALL		
2-HVAC-5438-PO	----	2B DIESEL GENERATOR ROOM VENTILATION FAN RECIRC DAMPER	2B DIESEL GEN RM OVHD		

ATTACHMENT 1B
2B DIESEL GENERATOR VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
2-HVAC-5438A-PO	----	2B DIESEL GENERATOR ROOM VENTILATION FAN SUPPLY DAMPER	2B DIESEL GEN RM OVHD		
2-HVAC-5438-SV	----	2B DIESEL GENERATOR ROOM VENT FAN SUPPLY/RECIRC DAMPER SOLENOID VALVE	2B DIESEL GEN RM W WALL		

CALVERT CLIFFS NUCLEAR POWER PLANT

UNIT ONE AND TWO

OI-21C

0C DIESEL GENERATOR

REVISION 23

SAFETY RELATED

CONTINUOUS USE

Approval Authority: K. Mills

Effective Date: 10/28/2009

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1.0 PURPOSE

This procedure provides the prerequisites, precautions, and instructions for the starting, loading, and shutdown operation of 0C Diesel Generator and associated auxiliary systems.

2.0 APPLICABILITY/SCOPE

A. This procedure provides specific instructions for operation of 0C Diesel Generator when 07 4KV Bus is capable of supplying 11, 14, 21 and 24 4KV Buses.

B. This procedure provides specific instructions for operation of 0C Diesel Generator auxiliary and support systems.

C. Conditional steps may be marked N/A if the condition does not exist or apply.

D. Signature blocks are provided for placekeeping in the slow start sections. Steps shall be initialed immediately upon completion.

3.0 REFERENCES AND DEFINITIONS

3.1 DEVELOPMENTAL REFERENCES

A. Procedures

1. Technical Procedure Writer's Manual
2. MN-1-110, Procedure Controlled Activities
3. Wartsila SACM Operation and Maintenance Manual
4. Wartsila SACM Electrical Wiring Diagram Local Control Panel (ACC) #18002-0099 Sh. 1 - 186
5. CCNPP Technical Specifications
6. FCR 89-0079, Submittal FF, Supplement 20
7. NUMARC 87-00 Rev.1, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout At Light Water Reactors

3.1 DEVELOPMENTAL REFERENCES (Continued)

B. P&IDs

1. 61-007-E Sh. 3, METER AND RELAY DIAGRAM 4KV SYSTEM UNIT BUS 07
2. 61-010-E Sh. 3, METER AND RELAY DIAGRAM 480V SYSTEM UNIT BUS 07
3. 61-024-E Sh. 3, DG0C 125V DC SYSTEM BUS 15
4. 61-027-E Sh. 3, DIESEL GENERATOR 0C 480V MCC 023
5. 61-027-E Sh. 4, DIESEL GENERATOR 0C 480V MCC 024
6. 61-035-E Sh. 3, LOGIC DIAGRAM DIESEL GENERATOR 0C
7. 62-414-E Sh. 1, HVAC SYSTEM
8. 62-415-E Sh. 1 and 2, LUBE OIL SYSTEM
9. 62-416-E Sh. 1 and 2, COMBUSTION AIR INTAKE AND EXHAUST
10. 62-417-E Sh. 1 and 2, STARTING AIR SYSTEM
11. 62-418-E Sh. 1 and 2, HT COOLING WATER SYSTEM
12. 62-419-E Sh. 1 and 2, LT COOLING WATER SYSTEM
13. 62-421-E Sh. 1 and 2, FUEL OIL SYSTEM
14. 62-423-E, GENERATOR AND MISCELLANEOUS INSTRUMENTATION
15. 62-426-E, COOLANT DRAINS AND DEMINERALIZED WATER SYSTEM
16. 62-470-E, LUBE OIL DRAIN SYSTEM

C. CNG-HU-1.01-1001, Human Performance Tools and Verification Practices.

3.2 PERFORMANCE REFERENCES

A. 0C188-ALM, 0C Diesel Generator Alarm Manual

B. CNG-EV-1.01-2000, Chemical Control Program

C. CH-1-101, Hazardous Waste Management

D. NO-1-200, Control Of Shift Activities

E. NO-1-205, Locked Valves

F. OI-22M, 1A And 0C DG Building HVAC

3.2 PERFORMANCE REFERENCES (Continued)

G. OI-26A, 125 Volt Vital DC

H. OI-27C, 4.16 KV System

I. OI-27D, Station Power 480 Volt System

3.3 DEFINITIONS

A. SACM - Societe Alsacienne de Constructions Mecaniques de Mulhouse (Mulhouse, France)

B. MRD - Maintenance and Reliability Diagnostics Monitoring System

C. Unloaded operation - operation of the genset with load less than 1.62 MW.

D. Reset mode - isochronous operation without speed control. Used when **NOT** paralleled to offsite power.

E. Parallel mode - operation providing speed control with speed and voltage droop. May be used at any time.

F. Transfer mode - parallel mode with non-essential trips bypassed. Used during transfer of a Safety Related bus from 0C DG power to offsite power source.

G. Cleanout - operation of 0C DG with at least 2.7 MW load to clean accumulated carbon residue from the engine cylinders and exhaust piping due to low load or unloaded operation.

H. **[PC]:** Symbol preceding a Critical Step which requires a Peer Check Verification Practice **PER** CNG-HU-1.01-1001, HUMAN PERFORMANCE TOOLS AND VERIFICATION PRACTICES.

4.0 PREREQUISITES

A. A pre-evolution brief should be held as determined by the CRS **OR** Shift Manager.

B. The 0C DG Building HVAC shall be in service **PER** OI-22M, 1A And 0C DG Building HVAC, prior to operating 0C DG.

4.0 PREREQUISITES (Continued)

C. 11 FOST shall be sampled **AND** verified **PER** the following requirements: **[B0260]**

- 11 FOST shall be sampled **AND** verified satisfactory for viscosity, water, **AND** sediment within 72 hours PRIOR to transferring fuel oil to the 0C Fuel Oil Day Tank.
- 11 FOST shall be sampled at least every 72 hours when frequent 0C Fuel Oil Day Tank addition is required.
- 11 FOST shall be sampled prior to transfer following any addition to 11 FOST.

D. Prerequisites will vary depending on which section of the procedure is being performed. Prerequisites for each section are listed as Initial Conditions at the beginning of each applicable section.

5.0 PRECAUTIONS

A. Hearing protection shall be worn in marked areas of the 0C DG Building during engine operation.

B. Locked Valves are controlled by NO-1-205.

C. 0C DG Fuel Oil Day Tank level may be reduced below 37" (low level alarm) during periodic testing but shall be refilled following completion of testing to provide four hours of fuel available for SBO events. **[B0260]**

D. The HT **AND** LT Coolant Systems contain propylene glycol and water. Any leakage from these systems shall be collected **AND** handled as a controlled waste that can **NOT** be discharged to the environment.

E. Manual operation of 4KV disconnects shall be performed by two people who are, as a minimum, qualified Turbine Building Operators. One Operator shall perform the switching. The second Operator shall act as an observer to ensure the operation is performed correctly. Prior to operation of a disconnect, the person performing the switching must demonstrate to the observer that they are operating the correct disconnect **AND** that they have satisfied the following conditions:

- The breaker handswitch associated with the disconnect to be operated is in PULL-TO-LOCK.
- The breakers associated with the disconnects to be operated are open.

F. 0C DG shall **NOT** be connected to more than one Safety Related 4KV Bus at a time.

G. Loss of 1E 125VDC Control Power could cause severe engine damage if the genset is loaded and the radiator fans are **NOT** running. 0C188-ALM window SL40 contains specific response actions.

5.0 PRECAUTIONS (Continued)

H. Whenever the 0C Diesel is started during non-emergency conditions, it should be loaded within one hour. Unloaded operation beyond one hour shall be minimized and approved by the Shift Manager. **[B0257]**

I. The 0C DG shall **NOT** be started **OR** loaded with the 480 v Bus 07 powered from the 480 v Bus 17 through the tie breakers.

J. 0C DG load shall **NOT** exceed the following limitations during normal operations:

- 5.4 MW
- 500 KVARS
- 752 AMPS

K. The OC DG can operate at 100% load with a total of ONE radiator fan removed from service PROVIDED outside air temperature is LESS THAN 59.5° F. **[B0513]**

L. This procedure contains step(s) that require Risk Based Verification Practices.

1. **ALL** manipulations on the Main Control Boards require mandatory Peer Checks, so they are not marked with a symbol **UNLESS** a Concurrent Verification or an Independent Verification is required.

2. Pre-screened steps that require the use of a Verification Practice are identified by a symbol preceding the step.

3. The SM, CRS, or any other person involved with the task may designate additional steps requiring the use of Verification Practices.

4. The SM or CRS may waive the use of a Peer Check during emergency conditions, or where an entry into a high radiation area is required.

6.0 PERFORMANCE

6.1 0C DG NORMAL STANDBY

A. Initial Conditions

1. 0C DG valve, switch, **AND** breaker alignments have been verified by completion of the following attachments:
   - ATTACHMENT 1A, 0C STARTING AIR SYSTEM VALVE LINEUP
   - ATTACHMENT 1B, 0C FUEL OIL SYSTEM VALVE LINEUP
   - ATTACHMENT 1C, 0C LUBE OIL SYSTEM VALVE LINEUP
   - ATTACHMENT 1D, 0C HT/LT COOLANT SYSTEM VALVE LINEUP
   - ATTACHMENT 1E, 0C COMBUSTION AIR INTAKE SYSTEM VALVE LINEUP
   - ATTACHMENT 1F, 0C DG SWITCH POSITION VERIFICATION
   - ATTACHMENT 1G, 0C LOCAL BREAKER POSITION VERIFICATION
   - ATTACHMENT 2A, 0C STARTING AIR SYSTEM INSTRUMENT VALVE LINEUP
   - ATTACHMENT 2B, 0C FUEL OIL SYSTEM INSTRUMENT VALVE LINEUP
   - ATTACHMENT 2C, 0C LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP
   - ATTACHMENT 2D, 0C HT/LT COOLANT SYSTEM INSTRUMENT VALVE LINEUP
2. 0C DG Building HVAC is in operation **PER** OI-22M, 1A And 0C DG Building HVAC.
3. The 0C DG 125 VDC system is in operation **PER** OI-26A, 125 Volt Vital DC.
4. The 0C DG 4.16KV system is in operation **PER** OI-27C, 4.16KV System.
5. The 0C DG 480V switchgear **AND** MCCs are in operation **PER** OI-27D, Station Power 480 Volt System.

6.1 0C DG NORMAL STANDBY (Continued)

B. Procedure

NOTE
Steps in this section may be performed in any order.

1. **CHECK** the 0C DG annunciator panel as follows:

   a. **DEPRESS** LAMP TEST PB, 0-HS-10339, **AND CHECK** ALL alarm windows flash.

   b. **DEPRESS** ALARM RESET PB, 0-HS-10340, **AND CHECK** ALL windows **NOT** in valid alarm go out.

   c. **CHECK** that any valid alarms do **NOT** prevent the desired status of 0C DG (standby, startup, etc).

2. **IF** operating,
   THEN CHECK the MRD System for any valid 0C DG alarms.

3. **VERIFY** the barring device handles are removed from the engines.

4. **VERIFY** the following equipment in standby by observing the associated indicating light is illuminated on 0C188:

   - 0C1 HT RAD FAN SEL SW, 0-HS-10082, Green light
   - 0C2 HT RAD FAN SEL SW, 0-HS-10102, Green light
   - 0C1 FO B/U PP SEL SW, 0-HS-10051, Green light
   - 0C2 FO B/U PP SEL SW, 0-HS-10061, Green light
   - OC1 PREHEAT PP SEL SW, 0-HS-10081, Red light
   - OC2 PREHEAT PP SEL SW, 0-HS-10101, Red light
   - OC1 PRELUBE PP SEL SW, 0-HS-10161, Red light
   - OC2 PRELUBE PP SEL SW, 0-HS-10201, Red light

5. **VERIFY** Starting Air Oiler levels are between the full mark (groove) and 1/4 full on each dipstick:

   - 0C1 Oiler 11 (B side)
   - 0C1 Oiler 12 (A side)
   - 0C2 Oiler 11 (A side)
   - 0C2 Oiler 12 (B side)

6.1.B Procedure (Continued)

NOTE
Sump level will drop approximately 1 inch when 0C DG is running.

6. **VERIFY** Engine Oil Sump levels are within the normal shutdown range on the dipsticks:
   - 0C1 LO LVL IND, 0-LI-10165
   - 0C2 LO LVL IND, 0-LI-10204
7. **CHECK** HT Coolant System temperatures are at **OR** above 95° F: **[B0698]**
   - 0C1 HT WTR OUT TEMP IND, 0-TI-10084
   - 0C2 HT WTR OUT TEMP IND, 0-TI-10104
8. **CHECK** Lube Oil temperatures for both engines greater than 80 ° F. (0-TI-10163, 0-TI-10161, 0-TI-10201 and 0-TI-10203) **[B0698]**
9. **IF** 0C Starting Air Compressor is running,
   THEN CHECK the following parameters:
   a. 0C SA LUBE PP DISCH PRESS IND, 0-PI-10250, is greater than 30 psig.

NOTE
The hygrometer reading is accurate only after the compressor has operated a minimum of five minutes.

   b. 0C STARTING AIR HYGROMETER, 0-MIS-10241, is reading (-)45° F **OR** colder.
   c. Air filter DP indicator 0C-11 SA FILT DIFF PRESS IND, 0-PDI-10260, is less than 3/4 of the indication.
      (1) **IF** the DP indicator is tripped,
      THEN WRITE an Issue Report.

6.1.B Procedure (Continued)

10. **IF** 0C Starting Air Compressor is **NOT** running,
THEN PERFORM the following:

NOTE

The following annunciators will alarm when the switch is taken out of AUTOMATIC:

- Local annunciator "SEL SWS NOT IN AUTO POSITION"
- Control Room annunciator "0C DG"

a. **PLACE** 0C SA COMPR SEL SW, 0-HS-10241, to OFF.

b. **VERIFY** 0C Starting Air Compressor crankcase oil level is between the FULL AND ADD marks.

c. **CHECK** compressor 3-stage pressures are zero:

- 0C-11 SA I/CLR PRESS IND, 0-PI-10252
- 0C-12 SA I/CLR PRESS IND, 0-PI-10251
- 0C-13 SA COMPR DISCH PRESS IND, 0-PI-10253

d. **CHECK** air filter DP indicator 0C-11 SA FILT DIFF PRESS IND, 0-PDI-10260, is **NOT** tripped.

(1) **IF** the DP indicator is tripped,
THEN WRITE an Issue Report.

e. **PLACE** 0C SA COMPR SEL SW, 0-HS-10241, to AUTOMATIC.

NOTE

If performing multiple OC DG starts, the Dirty Fuel Oil Tank needs only to be drained prior to the first start. It does not have to be drained for the remainder of the starts.

11. **DRAIN** the 0C Dirty Fuel Oil Tank to a suitable container through 0C DIRTY FUEL OIL TANK DRAIN VALVE, 0C-DFO-74.

****** END ******

6.2 0C DG EMERGENCY START FROM CONTROL ROOM

A. Initial Conditions

1. 0C DG is in Standby **PER** Section 6.1, 0C DG NORMAL STANDBY, Subsection A.
2. 07 4KV BUS TIE, 152-0701, is OPEN.
3. Paralleling 0C DG to 07 4KV Bus is **NOT** desired.

B. Procedure

1. **IF** the 0C DG is being started for testing,
   THEN PERFORM 0C DG system checks **PER** Section 6.1, 0C DG NORMAL STANDBY Subsection B.

NOTE
In a casualty situation **ONLY**, the 5 minute limit of no prelube can be extended to 30 minutes. **[B0255]**

2. **IF** the 0C AC Prelube Pumps are unavailable **AND** have been off longer than five minutes,
   THEN OPERATE the 0C Pneumatic Prelube Pumps **PER** Section 6.22, OPERATE THE 0C PNEUMATIC PRELUBE PUMPS. **[B0255]**

NOTE
The 0C DG Building Fire Panel annunciator will alarm due to the temporarily de-energized buses.

CAUTION
Non-essential trips are bypassed.

3. **DEPRESS** 0C DG EMERGENCY START, 0-HS-0707, pushbutton.
4. **CHECK** 07 4KV BUS FDR, 152-0704, OPENS.
5. **CHECK** 0C DG reaches rated frequency (58.8 to 61.2 Hz) **AND** voltage (3.74 to 4.58 KV).
   - 0C DG FREQUENCY, 0-SI-0701
   - 0C DG VOLTS, 0-EI-0701
6. **WHEN** 0C DG reaches rated frequency **AND** voltage,
   THEN CHECK 0C DG OUT BKR, 152-0703, automatically CLOSES.
7. **VERIFY** 07 4KV Bus re-energizes to supply 07 4KV Bus loads.

6.2.B Procedure (Continued)

8. **IF** the Pneumatic Prelube Pumps were operated,
THEN SECURE the Pneumatic Prelube Pumps **PER** Section 6.22, OPERATE THE 0C PNEUMATIC PRELUBE PUMPS.

9. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 0C188:

   - 0C1 HT RAD FAN SEL SW, 0-HS-10082
   - 0C2 HT RAD FAN SEL SW, 0-HS-10102
   - 0C1 FO B/U PP SEL SW, 0-HS-10051
   - 0C2 FO B/U PP SEL SW, 0-HS-10061

10. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 0C188 **AND** 0C192:

    - 0C1 AC PRELUB PP SEL SW, 0-HS-10161
    - 0C2 AC PRELUB PP SEL SW, 0-HS-10201
    - 0C1 HT PRHT PP SEL SW, 0-HS-10081
    - 0C2 HT PRHT PP SEL SW, 0-HS-10101
    - 0C-F-9 ROOF EXHAUSTER, 0-HS-10584
    - 0C-F-10 ROOF EXHAUSTER, 0-HS-10586

11. **CHECK** 0C DG generator phase voltages are balanced (highest to lowest phase voltage difference is less than 400 volts). **[B0248]**

    - 0C DG VOLTS, 0-EI-0701

12. **RESET** the following bus U/V flags:

    - 07 4KV Bus
    - 07 480V Bus

13. **IF** flags are dropped **AND** the associated 0C188 alarm is clear,
THEN RESET the following relay flags in Panel 0C188 Cabinet 5: (N/A if flags are not dropped or alarm is not clear.)

ALARM:	"GENERATOR UNDERVOLTAGE [27]"
RELAY:	UNDERVOLTAGE PROTECTIVE RELAY, 0ESL 0997-27
ALARM:	"GENERATOR UNDERFREQ [81/U]"
RELAY:	UNDERFREQUENCY PROTECTIVE RELAY, 0SSL 0998-81.U

6.2.B Procedure (Continued)

NOTE

- After 30 minutes of unloaded operation (<1.62 MW), 0C DG should be run loaded for at least 30 minutes at greater than or equal to 2.7 MW for cleanout.
- Unloaded operation longer than six hours is **NOT** recommended.

14. **IF** 0C DG will be paralleled to a Safety Related 4KV Bus, **THEN GO TO** Section 6.7, PARALLEL 0C DG TO A SAFETY RELATED 4KV BUS.

15. **IF** 0C DG will be used to power a de-energized (dead) SR 4KV Bus, **THEN GO TO** Section 6.8, ENERGIZE A SAFETY RELATED 4KV BUS WITH 0C DG.

16. **IF** 0C DG will be stopped, **THEN GO TO** Section 6.12, 0C DG NORMAL SHUTDOWN FROM CONTROL ROOM.

****** END ******

6.3 0C DG SLOW START FROM CONTROL ROOM

A. Initial Conditions

1. 0C DG is in Standby **PER** Section 6.1, 0C DG NORMAL STANDBY, Subsection A.
2. 07 480V Bus is powering 0C DG auxiliary equipment from 07 4KV bus.
3. The AC prelube pump on each engine is operating for the prelube oil pressure start permissive. **[B0255]**
4. **IF** manual speed control below 1176 rpm (58.8 Hz) is required due to maintenance or testing,
   THEN a temporary alteration has been installed to prevent 0C DG from tripping on low coolant pump pressure three minutes after starting 0C DG.
5. Signature blocks shall be completed in this section.

B. Procedure — INITIALS

1. **PERFORM** 0C DG system checks **PER** Section 6.1, 0C DG NORMAL STANDBY, Subsection B. ____
2. **IF** manual speed control below 1176 RPM is necessary due to maintenance or testing,
   THEN PERFORM the following:
   a. **INSERT** the Sync Stick for 0C DG OUT BKR, 0-CS-152-0703. ____

NOTE

- The following local annunciators may momentarily alarm when 0C DG is slow started and then clear:
  (1) SL-20, "SPEED SIGNAL FAIL ENG 1 or 2"
  (2) SL-25, "ENG LOAD UNBALANCED FAILURE"
- The following annunciators will alarm when 0C DG is slow started:
  (1) Local annunciators "GENERATOR UNDRFREQ" and "GENERATOR UNDERVOLTAGE"
  (2) Control Room annunciator "0C DG"

   b. **DEPRESS** 0C DG SLOW START, 0-HS-0708, pushbutton. ____

6.3.B.2 Procedure (Continued) **INITIALS**

NOTE
Speed will continue to raise to 1200 rpm until speed control handswitch is operated.

c. **WHEN** 0C DG speed exceeds 700 RPM,
THEN ADJUST speed as desired using 0C DG SPEED CONTR, 0-CS-0705. ____

d. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 0C188:

- 0C1 HT RAD FAN SEL SW, 0-HS-10082 ____
- 0C2 HT RAD FAN SEL SW, 0-HS-10102 ____

e. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 0C188 **AND** 0C192:

- 0C1 AC PRELUB PP SEL SW, 0-HS-10161 ____
- 0C2 AC PRELUB PP SEL SW, 0-HS-10201 ____
- 0C1 HT PRHT PP SEL SW, 0-HS-10081 ____
- 0C2 HT PRHT PP SEL SW, 0-HS-10101 ____
- 0C-F-9 ROOF EXHAUSTER, 0-HS-10584 ____
- 0C-F-10 ROOF EXHAUSTER, 0-HS-10586 ____

f. **WHEN** speed control for maintenance or testing is complete,
THEN PERFORM the following:

(1) **ADJUST** 0C DG to approximately 60 Hz using 0C DG SPEED CONTR, 0-CS-0705. ____

(2) **REMOVE** the Sync Stick. ____

(3) **REMOVE** the temporary alteration for bypassing the low coolant pressure trips. ____

g. **IF** parallel operation is desired,
THEN GO TO Step 6. ____

h. **IF** 0C DG will be stopped,
THEN GO TO Section 6.12, 0C DG NORMAL SHUTDOWN FROM CONTROL ROOM. ____

6.3.B Procedure (Continued) **INITIALS**

NOTE

- The following local annunciators may momentarily alarm when 0C DG is slow started and then clear:
  a. SL-20, "SPEED SIGNAL FAIL ENG 1 or 2"
  b. SL-25, "ENG LOAD UNBALANCED FAILURE"
- The following annunciators will alarm when 0C DG is slow started:
  a. Local annunciators "GENERATOR UNDRFREQ" and "GENERATOR UNDERVOLTAGE"
  b. Control Room annunciator "0C DG"

3. **DEPRESS** 0C DG SLOW START, 0-HS-0708, pushbutton. ____

4. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 0C188:
   - 0C1 HT RAD FAN SEL SW, 0-HS-10082 ____
   - 0C2 HT RAD FAN SEL SW, 0-HS-10102 ____
   - 0C1 FO B/U PP SEL SW, 0-HS-10051 ____
   - 0C2 FO B/U PP SEL SW, 0-HS-10061 ____

5. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 0C188 **AND** 0C192:
   - 0C1 AC PRELUB PP SEL SW, 0-HS-10161 ____
   - 0C2 AC PRELUB PP SEL SW, 0-HS-10201 ____
   - 0C1 HT PRHT PP SEL SW, 0-HS-10081 ____
   - 0C2 HT PRHT PP SEL SW, 0-HS-10101 ____
   - 0C-F-9 ROOF EXHAUSTER, 0-HS-10584 ____
   - 0C-F-10 ROOF EXHAUSTER, 0-HS-10586 ____

6.3.B Procedure (Continued) **INITIALS**

6. **PERFORM** the following to vent the fuel oil piping and test the Engine driven Fuel Oil Pump as follows:

   a. **PLACE** OC1 FO B/U PP SEL SW, 0-HS-10051, to OFF. ____

   b. **OBSERVE** OC1 FO FEED PRESS, 0-PI-10052, for indication of normal fuel oil pressure. ____

   c. **PLACE** OC2 FO B/U PP SEL SW, 0-HS-10061, to OFF. ____

   d. **OBSERVE** OC2 FO FEED PRESS, 0-PI-10062, for indication of normal fuel oil pressure. ____

7. **IF** paralleling 0C DG,
   THEN PERFORM the following:

   a. **CHECK** 0C DG generator phase voltages are balanced (highest to lowest phase voltage difference is less than 400 volts). **[B0248]** ____

      - 0C DG VOLTS, 0-EI-0701

   b. **CHECK** 0C DG is at rated frequency (58.8 to 61.2 Hz) **AND** voltage (3.74KV to 4.58KV). ____

      - 0C DG FREQUENCY, 0-SI-0701
      - 0C DG VOLTS, 0-EI-0701

8. **IF** flags are dropped **AND** the associated 0C188 alarm is clear,
   THEN RESET the following relay flags in Panel 0C188 Cabinet 5:
   (N/A if flags are not dropped or alarm is not clear.) ____

ALARM:	"GENERATOR UNDERVOLTAGE [27]"
RELAY:	UNDERVOLTAGE PROTECTIVE RELAY, 0ESL 0997-27
ALARM:	"GENERATOR UNDERFREQ [81/U]"
RELAY:	UNDERFREQUENCY PROTECTIVE RELAY, 0SSL 0998-81.U

NOTE

- After 30 minutes of unloaded operation (<1.62 MW), 0C DG should be run loaded for at least 30 minutes at greater than or equal to 2.7 MW for cleanout.
- Unloaded operation longer than six hours is **NOT** recommended.

9. **IF** 0C DG will be paralleled to the 07 4KV Bus,
   THEN GO TO Section 6.6, PARALLEL 0C DG TO 07 4KV BUS. ____

6.3.B Procedure (Continued) **INITIALS**

10. **IF** 0C DG will be stopped,
THEN GO TO Section 6.12, 0C DG NORMAL SHUTDOWN FROM CONTROL ROOM. ____

****** END ******

6.4 0C DG FAST/EMERGENCY START FROM LOCAL CONTROL PANEL 0C188 [B0154 & B0388]

A. Initial Conditions

1. 0C DG is in Standby **PER** Section 6.1, 0C DG NORMAL STANDBY, Subsection A.

2. **IF** a FAST (non-emergency) start is being performed,
   THEN an AC prelube pump on each engine is operating for the prelube oil pressure start permissive.

3. 07 4KV BUS TIE, 152-0701, is OPEN.

4. Keys for the following switches are available (N/A for Emergency Start):

   - 0C GEN CONTR MODE SEL SW, 0-HS-10322
   - 0C GEN STRT/STOP CONTR SW, 0-HS-10327
   - 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A
   - 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A

B. Procedure

1. **IF** the 0C DG is being started for testing,
   THEN PERFORM 0C DG system checks **PER** Section 6.1, 0C DG NORMAL STANDBY Subsection B. (N/A if starting 0C DG **PER** Section 6.29, TIMED EMERGENCY START AND LOAD OF 0C DG ON 24 4KV BUS (PE 0-24-10-O-2A)).

NOTE

In a casualty situation **ONLY**, the 5 minute limit of no prelube can be extended to 30 minutes. **[B0255]**

2. **IF** an emergency start is desired when the 0C AC Prelube Pumps are unavailable **AND** the 0C AC Prelube Pumps have been off longer than five minutes,
   THEN OPERATE the 0C Pneumatic Prelube Pumps **PER** Section 6.22, OPERATE THE 0C PNEUMATIC PRELUBE PUMPS. **[B0255]**

3. **IF** 07 4KV Bus is DE-ENERGIZED (DEAD BUS),
   THEN VERIFY the following breakers are OPEN:

   - 07 4KV BUS TIE, 152-0701
   - 07 4KV BUS FDR, 152-0704

6.4.B Procedure (Continued)

4. **IF** Emergency Start is desired,
   THEN PERFORM the following:

   a. **VERIFY** 0C GEN CONTR MODE SEL SW, 0-HS-10322, is in REMOTE/AUTO.

NOTE

The 0C DG Building Fire Panel annunciator will alarm due to the temporarily de-energized buses.

   b. **DEPRESS** 0C MANUAL EMER START PB, 0-HS-10334.

   c. **VERIFY** 07 4KV BUS FDR, 152-0704, is **OPEN**.

   d. **CHECK** 0C DG accelerates to approximately 1200 rpm on 0C GENSET SPD IND, 0-SI-10321.

   e. **WHEN** 0C DG reaches rated frequency **AND** voltage,
      THEN VERIFY 0C DG OUT BKR, 152-0703, automatically CLOSES.

   f. **CHECK** 0C DG generator phase voltages are balanced (highest to lowest phase voltage difference is less than 400 volts): **[B0248]**

      - 0C GEN PHASE A VOLT IND, 0-EI-10321
      - 0C GEN PHASE B VOLT IND, 0-EI-10322
      - 0C GEN PHASE C VOLT IND, 0-EI-10323

   g. **IF** the Pneumatic Prelube Pumps were operated,
      THEN SECURE the Pneumatic Prelube Pumps **PER** Section 6.22, OPERATE THE 0C PNEUMATIC PRELUBE PUMPS.

6.4.B.4 Procedure (Continued)

h. **IF** manual control of 0C DG from Local Control Panel 0C188 is desired, **THEN PERFORM** the following:

NOTE

- With an emergency start signal present, placing 0-HS-10322 to LOCAL causes the following actions to occur:
  - The emergency start signal is cancelled
  - All 0C DG trips are enabled
  - Annunciator "FIELD FLASHING FAILURE" alarms 3 seconds after selecting local
- The following annunciators will alarm any time the switch is placed to LOCAL:
  - Local annunciator "CONT MODE SEL SWITCH ON LOCAL"
  - Control Room annunciators "0C DG" and "0C DG OUT OF SERVICE"

CAUTION

If either of the following conditions exist, do **NOT** select LOCAL:

- An actual emergency condition exists **AND** the Control Room is habitable

OR

- Non-essential trips are to remain bypassed

(1) **PLACE** 0C GEN CONTR MODE SEL SW, 0-HS-10322, to LOCAL.

(2) **PLACE** 0C FIELD FLASH SEL SW, 0-HS-10329, to ON.

(3) **CHECK** 0C188 annunciator "FIELD FLASHING FAILURE" clears.

(4) **PLACE** 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A, to LOCAL.

(5) **PLACE** 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A, to LOCAL.

i. **RESET** the following bus U/V flags:

- 07 4KV Bus
- 07 480V Bus

6.4.B Procedure (Continued)

5. **IF** a Fast Start is desired,
   THEN PERFORM the following:

   a. **PERFORM** 0C DG system checks **PER** Section 6.1, 0C DG NORMAL STANDBY, Subsection B.

   b. **PLACE** 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A, to LOCAL to prevent inadvertent operation.

NOTE
Control Room annunciator "0C DG OUT OF SERVICE" will alarm when the switch is taken out of REMOTE.

   c. **PLACE** 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A, to LOCAL.

NOTE
The following annunciators will alarm when the switch is taken out of REMOTE:

- Local annunciator "CONT MODE SEL SWITCH ON LOCAL"
- Control Room annunciators "0C DG" and "0C DG OUT OF SERVICE"

   d. **PLACE** 0C GEN CONTR MODE SEL SW, 0-HS-10322, to LOCAL.

   e. **PLACE** 0C GEN LOCAL SPD SEL SW, 0-HS-10325, to FAST.

NOTE
Local Alarm Panel 0C188 annunciator "FIELD FLASHING FAILURE" will be received approximately 3 seconds after starting 0C DG.

CAUTION
If 07 4KV Bus is de-energized, 0C DG should be started and 07 4KV Bus energized without delay to ensure 0C DG support equipment is operating.

   f. **PLACE** 0C GEN STRT/STOP CONTR SW, 0-HS-10327, to START.

   g. **CHECK** 0C DG accelerates to approximately 1200 rpm on 0C GENSET SPD IND, 0-SI-10321.

6.4.B.5 Procedure (Continued)

h. **IF** loaded operation is desired,
THEN PERFORM the following:

(1) **PLACE** 0C FIELD FLASH SEL SW, 0-HS-10329, to ON.

(2) **CHECK** Local Alarm Panel 0C188 annunciator "FIELD FLASHING FAILURE" clears.

(3) **CHECK** 0C DG rated frequency (58.8 to 61.2 Hz) **AND** voltage (3.74KV to 4.58KV) are established:

- 0C GEN FREQ IND, 0-SI-10332
- 0C GEN PHASE A VOLT IND, 0-EI-10321

(4) **IF** 07 4KV Bus is DE-ENERGIZED,
THEN PERFORM the following to energize auxiliary equipment:

(a) **PLACE** Synchronizing Jack SJ to SYNC.

(b) **VERIFY** the Synchroscope is **NOT** rotating.

(c) **PLACE** 0C DG OUT BKR, 0-HS-152-0703C, to CLOSE.

(d) **IF** manual frequency control is required,
THEN PLACE 0C GOVNR SPEED CONTR SW, 0-HS-10330, to RAISE OR LOWER.

(e) **PLACE** Synchronizing Jack SJ to OFF.

(f) **IF** using manual frequency control,
THEN MAINTAIN 0C DG frequency at approximately 60 Hz using 0C GOVNR SPEED CONTR SW, 0-HS-10330.

(5) **CHECK** 0C DG generator phase voltages are balanced (highest to lowest phase voltage difference is less than 400 volts): **[B0248]**

- 0C GEN PHASE A VOLT IND, 0-EI-10321
- 0C GEN PHASE B VOLT IND, 0-EI-10322
- 0C GEN PHASE C VOLT IND, 0-EI-10323

6.4.B Procedure (Continued)

6. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 0C188:

   - 0C1 HT RAD FAN SEL SW, 0-HS-10082
   - 0C2 HT RAD FAN SEL SW, 0-HS-10102
   - 0C1 FO B/U PP SEL SW, 0-HS-10051
   - 0C2 FO B/U PP SEL SW, 0-HS-10061

7. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 0C188 **AND** 0C192:

   - 0C1 AC PRELUB PP SEL SW, 0-HS-10161
   - 0C2 AC PRELUB PP SEL SW, 0-HS-10201
   - 0C1 HT PRHT PP SEL SW, 0-HS-10081
   - 0C2 HT PRHT PP SEL SW, 0-HS-10101
   - 0C-F-9 ROOF EXHAUSTER, 0-HS-10584
   - 0C-F-10 ROOF EXHAUSTER, 0-HS-10586

8. **IF** flags are dropped **AND** the associated 0C188 alarm is clear, **THEN RESET** the following relay flags in Panel 0C188 Cabinet 5: (N/A if flags are not dropped or alarm is not clear.)

ALARM:	"GENERATOR UNDERVOLTAGE [27]"
RELAY:	UNDERVOLTAGE PROTECTIVE RELAY, 0ESL 0997-27
ALARM:	"GENERATOR UNDERFREQ [81/U]"
RELAY:	UNDERFREQUENCY PROTECTIVE RELAY, 0SSL 0998-81.U

6.4.B Procedure (Continued)

9. **IF** transfer of 0C DG operation to the Control Room is desired, **THEN PERFORM** the following:

   a. **PLACE** the following switches to REMOTE:

      - 0C GEN CONTR MODE SEL SW, 0-HS-10322
      - 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A
      - 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A

   b. **REMOVE** keys from the following switches:

      - 0C GEN CONTR MODE SEL SW, 0-HS-10322
      - 0C GEN STRT/STOP CONTR SW, 0-HS-10327
      - 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A
      - 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A

10. **IF** performing PE 0-24-10-O-2A, **THEN GO TO** Section 6.29, TIMED EMERGENCY START AND LOAD OF 0C DG ON 24 4KV BUS (PE 0-24-10-O-2A), STEP 4.

11. **IF** 0C DG will be paralleled to the 07 4KV Bus, **THEN GO TO** Section 6.6, PARALLEL 0C DG TO 07 4KV BUS.

12. **IF** 0C DG was emergency started **AND** will be used to energize a Safety Related 4KV Bus, **THEN GO TO** Section 6.8, ENERGIZE A SAFETY RELATED 4KV BUS WITH 0C DG.

NOTE

- After 30 minutes of unloaded operation (<1.62 MW), 0C DG should be run loaded for at least 30 minutes at greater than or equal to 2.7 MW for cleanout.
- Unloaded operation longer than six hours is **NOT** recommended.

13. **IF** 0C DG will be stopped, **THEN GO TO** the desired section:

    - Section 6.12, 0C DG NORMAL SHUTDOWN FROM CONTROL ROOM
    - Section 6.13, 0C DG NORMAL SHUTDOWN FROM LOCAL CONTROL PANEL 0C188

****** END ******

6.5 0C DG SLOW START FROM LOCAL CONTROL PANEL 0C188

A. Initial Conditions

1. 0C DG is in Standby **PER** Section 6.1, 0C DG NORMAL STANDBY, Subsection A.
2. 07 4KV Bus is powering 0C DG auxiliary equipment from 07 4KV BUS.
3. The AC prelube pump on each engine is operating for the prelube oil pressure start permissive. **[B0255]**
4. **IF** manual speed control below 1176 RPM (58.8 Hz) is required due to maintenance or testing,
   THEN a temporary alteration has been installed to prevent 0C DG from tripping on low coolant pump pressure three minutes after starting 0C DG.
5. Keys for the following switches are available:
   - 0C GEN CONTR MODE SEL SW, 0-HS-10322
   - 0C GEN STRT/STOP CONTR SW, 0-HS-10327
   - 0C DG OUT BKR, 152-0703, remote/local switch 0-HS-152-0703A
   - 07 4KV BUS FDR, 152-0704, remote/local switch 0-HS-152-0704A
6. Signature blocks shall be completed in this section.

B. Procedure

INITIALS

1. **PERFORM** 0C DG system checks **PER** Section 6.1, 0C DG NORMAL STANDBY, Subsection B. ____
2. **PLACE** 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A, to LOCAL. ____

NOTE

Control Room annunciator "0C DG OUT OF SERVICE" will alarm when the switch is taken out of REMOTE.

3. **PLACE** 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A, to LOCAL. ____

6.5.B Procedure (Continued) **INITIALS**

NOTE
The following annunciators will alarm when the switch is taken out of REMOTE:

- Local annunciator "CONT MODE SEL SWITCH ON LOCAL"
- Control Room annunciators "0C DG" and "0C DG OUT OF SERVICE"

4. **PLACE** 0C GEN CONTR MODE SEL SW, 0-HS-10322, to LOCAL. ____

5. **PLACE** 0C GEN LOCAL SPD SEL SW, 0-HS-10325, to SLOW. ____

6. **IF** manual speed control below 1176 RPM (58.8 Hz) is necessary due to maintenance or testing,
THEN PERFORM the following:

   a. **PLACE** Synchronizing Jack SJ to SYNC. ____

NOTE
Local Control Panel 0C188 annunciator "FIELD FLASHING FAILURE" will be received approximately 3 seconds after starting 0C DG.

   b. **PLACE** 0C GEN STRT/STOP CONTR SW, 0-HS-10327, to START. ____

   c. **WHEN** 0C DG speed exceeds 700 RPM,
   THEN ADJUST speed as desired using 0C GOVNR SPEED CONTR SW, 0-HS-10330. ____

   d. **PLACE** Synchronizing Jack SJ to OFF. ____

   e. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 0C188:

      - 0C1 HT RAD FAN SEL SW, 0-HS-10082 ____
      - 0C2 HT RAD FAN SEL SW, 0-HS-10102 ____
      - 0C1 FO B/U PP SEL SW, 0-HS-10051 ____
      - 0C2 FO B/U PP SEL SW, 0-HS-10061 ____

6.5.B.6 Procedure (Continued) **INITIALS**

f. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 0C188 **AND** 0C192:

- 0C1 AC PRELUB PP SEL SW, 0-HS-10161 ____
- 0C2 AC PRELUB PP SEL SW, 0-HS-10201 ____
- 0C1 HT PRHT PP SEL SW, 0-HS-10081 ____
- 0C2 HT PRHT PP SEL SW, 0-HS-10101 ____
- 0C-F-9 ROOF EXHAUSTER, 0-HS-10584 ____
- 0C-F-10 ROOF EXHAUSTER, 0-HS-10586 ____

g. **WHEN** speed control for maintenance or testing is complete, **THEN PERFORM** the following:

(1) **ADJUST** speed to approximately 1200 RPM using 0C GOVNR SPEED CONTR SW, 0-HS-10330. ____

(2) **REMOVE** the temporary alteration for bypassing the low coolant pressure trips. ____

h. **IF** loaded operation is desired, **THEN GO TO** Step 10. ____

i. **IF** 0C DG will be stopped, **THEN GO TO** Section 6.13, 0C DG NORMAL SHUTDOWN FROM LOCAL CONTROL PANEL 0C188. ____

NOTE
Local Control Panel 0C188 annunciator "FIELD FLASHING FAILURE" will be received approximately 3 seconds after starting 0C DG.

7. **PLACE** 0C GEN STRT/STOP CONTR SW, 0-HS-10327, to START. ____

8. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 0C188:

- 0C1 HT RAD FAN SEL SW, 0-HS-10082 ____
- 0C2 HT RAD FAN SEL SW, 0-HS-10102 ____
- 0C1 FO B/U PP SEL SW, 0-HS-10051 ____
- 0C2 FO B/U PP SEL SW, 0-HS-10061 ____

6.5.B Procedure (Continued) **INITIALS**

9. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 0C188 **AND** 0C192:

   - 0C1 AC PRELUB PP SEL SW, 0-HS-10161 ____
   - 0C2 AC PRELUB PP SEL SW, 0-HS-10201 ____
   - 0C1 HT PRHT PP SEL SW, 0-HS-10081 ____
   - 0C2 HT PRHT PP SEL SW, 0-HS-10101 ____
   - 0C-F-9 ROOF EXHAUSTER, 0-HS-10584 ____
   - 0C-F-10 ROOF EXHAUSTER, 0-HS-10586 ____

10. **IF** loaded operation is desired,
    THEN PERFORM the following:

    a. **PLACE** 0C FIELD FLASH SEL SW, 0-HS-10329, to ON. ____

    b. **CHECK** 0C DG generator phase voltages are balanced (highest to lowest phase voltage difference is less than 400 volts): **[B0248]** ____

       - 0C GEN PHASE A VOLT IND, 0-EI-10321
       - 0C GEN PHASE B VOLT IND, 0-EI-10322
       - 0C GEN PHASE C VOLT IND, 0-EI-10323

    c. **CHECK** 0C DG rated frequency (58.8 to 61.2 Hz) **AND** voltage (3.74KV to 4.58KV) are established: ____

       - 0C GEN FREQ IND, 0-SI-10332
       - 0C GEN PHASE A VOLT IND, 0-EI-10321

11. **IF** flags are dropped **AND** the associated 0C188 alarm is clear,
    THEN RESET the following relay flags in Panel 0C188 Cabinet 5:
    (N/A if flags are not dropped or alarm is not clear.) ____

ALARM:	"GENERATOR UNDERVOLTAGE [27]"
RELAY:	UNDERVOLTAGE PROTECTIVE RELAY, OESL 0997-27
ALARM:	"GENERATOR UNDERFREQ [81/U]"
RELAY:	UNDERFREQUENCY PROTECTIVE RELAY, OSSL 0998-81.U

6.5.B Procedure (Continued) **INITIALS**

12. **IF** transfer of 0C DG operation to the Control Room is desired, **THEN PERFORM** the following:

    a. **PLACE** the following switches to REMOTE:

    - 0C GEN CONTR MODE SEL SW, 0-HS-10322 ____
    - 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A ____
    - 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A ____

    b. **REMOVE** keys from the following switches:

    - 0C GEN CONTR MODE SEL SW, 0-HS-10322 ____
    - 0C GEN STRT/STOP CONTR SW, 0-HS-10327 ____
    - 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A ____
    - 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A ____

13. **IF** 0C DG will be paralleled to 07 4KV Bus, **THEN GO TO** Section 6.6, PARALLEL 0C DG TO 07 4KV BUS. ____

NOTE

- After 30 minutes of unloaded operation (<1.62 MW), 0C DG should be run loaded for at least 30 minutes at greater than or equal to 2.7 MW for cleanout.
- Unloaded operation longer than six hours is **NOT** recommended.

14. **IF** 0C DG will be stopped, **THEN GO TO** the desired section: ____

    - Section 6.12, 0C DG NORMAL SHUTDOWN FROM CONTROL ROOM
    - Section 6.13, 0C DG NORMAL SHUTDOWN FROM LOCAL CONTROL PANEL 0C188

****** END ******

6.6 PARALLEL 0C DG TO 07 4KV BUS

A. Initial Conditions

1. 0C DG is running satisfactorily **AND** will be paralleled to the 07 4KV Bus.

2. 0C DG was **NOT** emergency started.

3. **IF** Local Control Panel 0C188 operation is desired,
   THEN keys for the following switches are available:

   - 0C GEN CONTR MODE SEL SW, 0-HS-10322
   - 0C GEN STRT/STOP CONTR SW, 0-HS-10327
   - 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A
   - 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A

B. Procedure

1. **IF** 0C DG will be paralleled with 07 4KV BUS FDR, 152-0704, from the Control Room,
   THEN PERFORM the following:

   a. **INSERT** the Sync Stick for 0C DG OUT BKR, 0-CS-152-0703, to put the governor in the parallel mode.

   b. **MOMENTARILY PLACE** 0C DG SPEED CONTR, 0-CS-0705, to RAISE **OR** LOWER.

   c. **CHECK** the Synchroscope **AND** Sync Lights are operating on 1C18B.

   d. **ADJUST** INCOMING VOLTS, 1-EI-4001A, equal to RUNNING VOLTS, 1-EI-4001B, using 0C DG AUTO VOLT CONTR, 0-CS-0704.

   e. **ADJUST** 0C DG speed so the Synchroscope pointer is rotating slowly in the FAST direction using 0C DG SPEED CONTR, 0-CS-0705.

6.6.B.1 Procedure (Continued)

NOTE
SITE POWER breaker 152-0704 should be tripped as soon as 0C DG Output breaker 152-0703 is closed.

CAUTION
Do **NOT** exceed 0.5 MW while paralleled with 07 4KV BUS FDR, 152-0704, to preclude tripping 152-0704 on excess reverse current. **[B0248]**

f. **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position,
THEN PLACE 0C DG OUT BKR, 0-CS-152-0703, to CLOSE.

g. **PLACE** 07 4KV BUS FDR, 0-HS-152-0704, to TRIP.

h. **ADJUST** 0C DG SPEED CONTR, 0-CS-0705, to obtain approximately 60 Hz on 0C DG FREQUENCY, 0-SI-0701.

i. **REMOVE** the Sync Stick **AND RETURN** to Home Base.

j. **IF** 0C DG will remain on 07 4KV Bus,
THEN RECORD equipment operating data after 15 minutes **AND** at 60 minute intervals thereafter on the 0C Diesel Generator Logsheet.

k. **IF** desired,
THEN SELECT a different 0C DG governor operating mode **PER** Section 6.10, CHANGE 0C DG GOVERNOR OPERATING MODES FROM CONTROL ROOM.

l. **IF** 0C DG will be placed on a Safety Related 4KV Bus,
THEN GO TO the applicable section:

- Section 6.7, PARALLEL 0C DG TO A SAFETY RELATED 4KV BUS

OR

- Section 6.8, ENERGIZE A SAFETY RELATED 4KV BUS WITH 0C DG

m. **WHEN** 0C DG is to be stopped,
THEN GO TO Section 6.12, 0C DG NORMAL SHUTDOWN FROM CONTROL ROOM.

6.6.B Procedure (Continued)

2. **IF** 0C DG will be paralleled with 07 4KV BUS FDR, 152-0704, from Local Control Panel 0C188,
THEN PERFORM the following:

NOTE
The following annunciators will alarm when the switch is taken out of REMOTE:

- Local annunciator "CONT MODE SEL SWITCH ON LOCAL"
- Control Room annunciators "0C DG" and "0C DG OUT OF SERVICE"

a. **VERIFY** 0C GEN CONTR MODE SEL SW, 0-HS-10322, is in LOCAL.

b. **VERIFY** 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A, is in LOCAL.

c. **VERIFY** 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A, is in LOCAL.

d. **PLACE** Synchronizing Jack SJ to SYNC to put 0C DG in the parallel mode.

e. **MOMENTARILY PLACE** 0C GOVNR SPEED CONTR SW, 0-HS-10330, to RAISE OR LOWER.

f. **CHECK** the Synchroscope **AND** Sync Lights are operating.

g. **ADJUST** 0C GEN PHASE A VOLT IND, 0-EI-10321, equal to 0C GEN BUS VOLT IND, 0-EI-10342, using 0C AUTO VOLT REG CONTR SW, 0-HS-10331.

h. **ADJUST** 0C DG frequency so the Synchroscope pointer is rotating slowly in the FAST direction using 0C GOVNR SPEED CONTR SW, 0-HS-10330.

6.6.B.2 Procedure (Continued)

NOTE

SITE POWER breaker 152-0704 should be tripped as soon as 0C DG Output breaker 152-0703 is closed.

CAUTION

Do **NOT** exceed 0.5 MW while paralleled with 07 4KV BUS FDR, 152-0704 (SITE POWER). **[B0248]**

i. **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position,
THEN PLACE 0C DG OUT BKR, 0-HS-152-0703C, to CLOSE.

j. **LOCALLY OPEN** 07 4KV BUS FDR, 152-0704.

k. **PLACE** Synchronizing Jack SJ to OFF.

l. **ADJUST** 0C GOVNR SPEED CONTR SW, 0-HS-10330, to obtain approximately 1200 rpm on 0C GENSET SPD IND, 0-SI-10321.

m. **IF** desired,
THEN PLACE 0C DG in a different governor operating mode **PER** Section 6.11, CHANGE 0C DG GOVERNOR OPERATING MODES FROM LOCAL CONTROL PANEL 0C188.

n. **IF** 0C DG will remain on 07 4KV Bus,
THEN RECORD equipment operating data after 15 minutes **AND** at 60 minute intervals thereafter on the 0C Diesel Generator Logsheet.

o. **IF** 0C DG will be used to energize a Safety Related 4KV Bus,
THEN GO TO Section 6.8, ENERGIZE A SAFETY RELATED 4KV BUS WITH 0C DG.

p. **WHEN** 0C DG is to be stopped,
THEN GO TO Section 6.13, 0C DG NORMAL SHUTDOWN FROM LOCAL CONTROL PANEL 0C188.

****** END ******

6.7 PARALLEL 0C DG TO A SAFETY RELATED 4KV BUS

A. Initial Conditions

1. 0C DG is supplying 07 4KV Bus power **AND** will be paralleled to a Safety Related 4KV Bus from the Control Room.
2. 07 4KV BUS FDR, 152-0704, is OPEN.
3. The selected 4KV Bus Safety Related DG is **NOT** operating:

4KV Bus	DG
11	1A DG
14	1B DG
21	2A DG
24	2B DG

4. SIAS **AND** U/V actuation signals on the selected 4KV Bus are reset.
5. Kirk keys for the selected 4KV Bus 0C DG disconnect are available:

4KV BUS	DISC	KEYS
11	189-1106	11893, 11901, 11940, 14259
14	189-1406	11895, 11896, 11901
21	189-2106	11900, 11903, 14259
24	189-2406	11898, 11899, 11901, 14259

6.7 PARALLEL 0C DG TO A SAFETY RELATED 4KV BUS (Continued)

B. Procedure

CAUTION
When the DG is paralleled to 11 or 24 bus, the Shutdown Sequencer will start 11 and 12 Post-LOCI Filter fans and stop the Kitchen/Toilet Exhaust fan.

1. **IF** desired, **ALIGN** the Control Room HVAC as follows:
   - **VERIFY** 1C22, 0-RI-5350 "CONTR RM VENT" is clear.
   - **PLACE** the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to OFF
   - **START** the Post-LOCI filter fans by placing the handswitches to START **AND LOG** the starting time in the Charcoal Filter Log
     - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352
     - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353
   - **IF** aligning to 11 Bus, Control Room HVAC Units in the following alignment:
     - **PREFERRED ALIGNMENT** - 12 CR HVAC in operation

     OR

     - 11 CR HVAC in operation with the Control Room chiller Unit secured.
   - **IF** aligning to 24 Bus, Control Room HVAC Units in the following alignment:
     - **PREFERRED ALIGNMENT** - 11 CR HVAC in operation

     OR

     - 12 CR HVAC in operation with the Control Room chiller Unit secured.

6.7.B Procedure (Continued)

CAUTION
0C DG should **NOT** be paralleled with a 4KV Bus during periods when power is suspect (for example, during a severe storm).

2. **IF** 0C DG was paralleled to the 07 4KV Bus,
THEN PLACE the selected 4KV Bus 0C DG feeder breaker handswitch in PULL-TO-LOCK:

4KV BUS	:	HANDSWITCH
11	:	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	:	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	:	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	:	0C DG 24 4KV BUS FDR, 2-CS-152-2406

6.7.B Procedure (Continued)

3. **IF** 0C DG was emergency started,
THEN PERFORM the following to select parallel mode:

   a. **DEPRESS** 0C DG SLOW START, 0-HS-0708, pushbutton, to clear the emergency start signal.

NOTE

The 0C DG Building Fire Panel annunciator will alarm due to the temporarily de-energized buses.

CAUTION

- Opening the breaker may cause a loss of power to the 0C DG Building **AND** de-energize 0C DG support equipment.
- If the 480V crosstie breaker alignment is in effect the following may occur:
  - 1A DG Building may lose power
  - 1A DG Building Fire Panel annunciator may alarm
- 07 4KV Bus should be re-energized from 0C DG without delay to restore 0C DG auxiliary equipment operation (i.e.- radiator fans, lighting, HVAC, etc.).

   b. **PLACE** 0C DG OUT BKR, 0-CS-152-0703, to TRIP.

   c. **INSERT** the Sync Stick for 0C DG OUT BKR, 0-CS-152-0703, to place 0C DG in the parallel mode.

   d. **MOMENTARILY PLACE** 0C DG SPEED CONTR, 0-CS-0705, to RAISE OR LOWER **AND ADJUST** 0C DG frequency to approximately 60 Hz.

   e. **VERIFY** 07 4KV Bus is de-energized by observing zero voltage on 07 4KV BUS VOLTS, 0-EI-0702.

   f. **CHECK** the Synchroscope pointer on 1C18B is **NOT** rotating.

   g. **PLACE** 0C DG OUT BKR, 0-CS-152-0703, to CLOSE.

   h. **ADJUST** 0C DG frequency to approximately 60 Hz using 0C DG SPEED CONTR, 0-CS-0705.

   i. **REMOVE** the Sync Stick from 0C DG OUT BKR, 0-CS-152-0703.

6.7.B.3 Procedure (Continued)

j. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 0C188:

- 0C1 HT RAD FAN SEL SW, 0-HS-10082
- 0C2 HT RAD FAN SEL SW, 0-HS-10102
- 0C1 FO B/U PP SEL SW, 0-HS-10051
- 0C2 FO B/U PP SEL SW, 0-HS-10061

k. **RESET** the following bus U/V flags:

- 07 4KV Bus
- 07 480V Bus

l. **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch in PULL-TO-LOCK:

4KV BUS	:	HANDSWITCH
11	:	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	:	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	:	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	:	0C DG 24 4KV BUS FDR, 2-CS-152-2406

6.7.B Procedure (Continued)

WARNING

Improper operation of disconnects can result in serious injury. Keep body **AND** head clear of operating arc of handle. DO **NOT** release handle prior to full travel. When disconnect is opened **OR** closed, a very loud bang will be heard **AND** a switch position flag will be visible indicating disconnect position.

4. In the associated Unit SWGR Room, **CLOSE** the selected 0C DG 4KV Bus disconnect by performing the following: **(P0035)**

   a. **VERIFY** the selected 4KV Bus 0C DG feeder breaker is OPEN by local indication.

4KV BUS	BREAKER
11	0C DG 11 4KV BUS FDR, 152-1106
14	0C DG 14 4KV BUS FDR, 152-1406
21	0C DG 21 4KV BUS FDR, 152-2106
24	0C DG 24 4KV BUS FDR, 152-2406

   b. **INSERT** keys **AND UNLOCK** the selected 0C DG 4KV Bus disconnect:

4KV BUS	DISC	KEYS
11	189-1106	11893, 11901, 14259
14	189-1406	11896, 11901
21	189-2106	11903, 14259
24	189-2406	11899, 11901, 14259

   c. **CLOSE** the selected 0C DG 4KV Bus disconnect.

6.7.B.4 Procedure (Continued)

d. **INSERT** key **AND LOCK** the selected 0C DG 4KV Bus disconnect in the CLOSED position:

4KV BUS	DISC	KEY
11	189-1106	11940
14	189-1406	11895
21	189-2106	11900
24	189-2406	11898

5. **PLACE** 07 4KV BUS TIE, 0-CS-152-0701, to CLOSE.

6. **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch to NORMAL:

4KV BUS	HANDSWITCH
11	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	0C DG 24 4KV BUS FDR, 2-CS-152-2406

7. **INSERT** the Sync Stick for the selected 0C DG 4KV Bus feeder breaker.

6.7.B Procedure (Continued)

8. **ADJUST** INCOMING VOLTS equal to RUNNING VOLTS using 0C DG AUTO VOLT CONTR, 0-CS-0704.

4KV BUS	:	METERS
11/14	:	INCOMING VOLTS, 1-EI-4001A RUNNING VOLTS, 1-EI-4001B
21/24	:	INCOMING VOLTS, 2-EI-4001A RUNNING VOLTS, 2-EI-4001B

9. **ADJUST** 0C DG frequency so the Synchroscope pointer is rotating slowly in the FAST direction using 0C DG SPEED CONTR, 0-CS-0705.

6.7.B Procedure (Continued)

NOTE

0C DG load must be adjusted immediately after closing the breaker to ensure minimum 0C DG load is obtained.

CAUTION

TABLE 1, SHUTDOWN SEQUENCER LOADS, lists equipment that receives an auto-start signal from the Shutdown Sequencer when the selected 0C DG 4KV Bus feeder breaker is closed.

10. **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position,
THEN PLACE the selected 0C DG 4KV Bus feeder breaker handswitch to CLOSE:

4KV BUS	HANDSWITCH
11	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	0C DG 24 4KV BUS FDR, 2-CS-152-2406

11. **IMMEDIATELY ADJUST** 0C DG load using 0C DG SPEED CONTR, 0-CS-0705, to obtain between 0.45 MW **AND** 1.0 MW load on 0C DG VAR/WATT, 0-JI-0701B.

12. **CHECK** annunciator "SEQUENCER INITIATED" alarm is received.

4KV BUS	PANEL
11/14	1C08
21/24	2C08

6.7.B Procedure (Continued)

13. **IF** aligned to 11 or 24 Bus,
THEN CHECK 1C17 annunciator "RAD MON PANEL 1C22" alarms. (N/A if 0-RI-5350 is bypassed)

NOTE
The Control Room Vent RMS alarm, 0-RI-5350, may **NOT** be lit.

- **BYPASS** 1C22, 0-RI-5350 "CONTR RM VENT"

14. **REMOVE** the Sync Stick **AND RETURN** to Home Base.

6.7.B Procedure (Continued)

15. **LOAD** 0C DG as follows:

CAUTION
Do **NOT** exceed limits of 5.4 MW, 500 KVARs, **AND** 752 amps.

a. **REFER** to FIGURE 1, 0C DIESEL GENERATOR ELECTRICAL LIMITS, **AND PERFORM** the following:

(1) **RAISE** MW load by approximately 1.0 MW, using 0C DG SPEED CONTR, 0-CS-0705.

(2) **MAINTAIN** 0 to 500 KVARs using 0C DG AUTO VOLT CONTR, 0-CS-0704 **AND** FIGURE 1, 0C DIESEL GENERATOR ELECTRICAL LIMITS.

(3) **MONITOR** the selected 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**

(4) **WAIT** approximately 5 minutes,
THEN REPEAT Steps 15.a.1 through 15.a.4 until 0C DG reaches the desired load. **[B0254]**

16. **MONITOR** 0C DG while loaded to maintain MW **AND** KVAR loads within prescribed limits.

6.7.B Procedure (Continued)

17. **IF** 0C DG OUT BKR, 152-0703, trips while aligned to a Safety Related 4KV bus, **THEN PERFORM** the following: **[B0267]**

    a. **PLACE** 07 4KV BUS TIE, 0-CS-152-0701, to TRIP.

    b. **INSERT** the Sync Stick for 07 4KV BUS FDR, 0-CS-152-0704.

    c. **CHECK** the Synchroscope pointer on 1C18B is **NOT** rotating.

    d. **PLACE** 07 4KV BUS FDR, 0-CS-152-0704, to CLOSE.

    e. **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch to TRIP:

4KV BUS	:	HANDSWITCH
11	:	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	:	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	:	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	:	0C DG 24 4KV BUS FDR, 2-CS-152-2406

    f. **EVALUATE** whether to continue load testing.

    g. **RESET** the following bus U/V flags:

    - 07 4KV Bus
    - 07 480V Bus

6.7.B Procedure (Continued)

18. **IF** D/G was started **PER** Section 6.3, 0C DG SLOW START FROM CONTROL ROOM,
THEN PERFORM the following to check Engine Driven Fuel Oil Pumps:

    a. **VERIFY** OC1 FO B/U PP SEL SW, 0-HS-10051, in OFF.

    b. **OBSERVE** OC1 FO FEED PRESS, 0-PI-10052, for indication of normal fuel oil pressure.

    c. **PLACE** OC1 FO B/U PP SEL SW, 0-HS-10051, to AUTO.

    d. **VERIFY** OC2 FO B/U PP SEL SW, 0-HS-10061, to OFF.

    e. **OBSERVE** OC2 FO FEED PRESS, 0-PI-10062, for indication of normal fuel oil pressure.

    f. **PLACE** OC2 FO B/U PP SEL SW, 0-HS-10061, to AUTO.

19. **RECORD** equipment operating data 15 minutes after reaching the desired load **AND** at 60 minute intervals thereafter on the 0C Diesel Generator Logsheet.

20. **IF** performing PE 0-24-10-O-2A,
THEN GO TO Section 6.29, TIMED EMERGENCY START AND LOAD OF 0C DG ON 24 4KV BUS (PE 0-24-10-O-2A), STEP 6.

21. **WHEN** 0C DG is to be stopped,
THEN GO TO Section 6.12, 0C DG NORMAL SHUTDOWN FROM CONTROL ROOM.

****** END ******

6.8 ENERGIZE A SAFETY RELATED 4KV BUS WITH 0C DG

A. Initial Conditions

1. 0C DG is providing power to 07 4KV Bus.
2. 07 4KV BUS FDR, 152-0704, is OPEN.
3. 11, 14, 21, **OR** 24 4KV Bus is DE-ENERGIZED.
4. The selected 4KV Bus Normal **AND** Alternate bus feeder breakers are OPEN.
5. The selected 4KV Bus Safety Related DG is **NOT** available:

4KV Bus	DG
11	1A DG
14	1B DG
21	2A DG
24	2B DG

6. Kirk keys for the selected 0C DG 4KV Bus disconnect are available:

4KV BUS	DISC	KEYS
11	189-1106	11893, 11901, 11940, 14259
14	189-1406	11895, 11896, 11901
21	189-2106	14259, 11903, 11900
24	189-2406	11898, 11899, 11901, 14259

6.8.A Initial Conditions (Continued)

7. **IF** local operation is required,
   THEN keys for the following switches are available:

   - 07 4KV BUS TIE, 152-0701, remote/local switch, 0-HS-152-0701A
   - 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A
   - 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A
   - The selected 4KV Bus Safety Related DG breaker remote/local switch:

4KV BUS	BREAKER	HANDSWITCH
11	152-1703	1-HS-152-1703A
14	152-1403	1-HS-1403A
21	152-2103	2-HS-2103A
24	152-2403	2-HS-2403A

   - The selected 0C DG 4KV Bus feeder breaker remote/local switch:

4KV BUS	BREAKER	HANDSWITCH
11	152-1106	1-HS-1106A
14	152-1406	1-HS-1406A
21	152-2106	2-HS-2106A
24	152-2406	2-HS-2406A

6.8 ENERGIZE A SAFETY RELATED 4KV BUS WITH 0C DG (Continued)

B. Procedure

1. **IF** 0C DG will be connected to a de-energized (dead) Safety Related 4KV Bus from the Control Room,
   THEN PERFORM the following:

   a. **VERIFY** the selected 4KV Bus is DE-ENERGIZED.

   b. **DEPRESS** 0C DG EMERGENCY START, 0-HS-0707, to ensure 0C DG is in the RESET MODE.

   c. **PLACE** the selected 4KV Bus Normal **AND** Alternate Feeder Breaker handswitches in PULL-TO-LOCK:

4KV Bus :	HANDSWITCH
11 :	11 4KV BUS NORMAL FDR, 1-CS-152-1115 **AND** 11 4KV BUS ALT FDR, 1-CS-152-1101
14 :	14 4KV BUS NORMAL FDR, 1-CS-152-1414 **AND** 14 4KV BUS ALT FDR, 1-CS-152-1401
21 :	21 4KV BUS NORMAL FDR, 2-CS-152-2101 **AND** 21 4KV BUS ALT FDR, 2-CS-152-2115
24 :	24 4KV BUS NORMAL FDR, 2-CS-152-2401 **AND** 24 4KV BUS ALT FDR, 2-CS-152-2414

6.8.B.1 Procedure (Continued)

d. **PLACE** the associated Safety Related DG 4KV Bus breaker handswitch in PULL-TO-LOCK:

4KV BUS :	HANDSWITCH
11 :	1A DG OUT BKR, 152-1703, 1-CS-152-1703
14 :	1B DG OUT BKR, 152-1403, 1-CS-152-1403
21 :	2A DG OUT BKR, 152-2103, 2-CS-152-2103
24 :	2B DG OUT BKR, 152-2403, 2-CS-152-2403

e. **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch in PULL-TO-LOCK:

4KV BUS :	HANDSWITCH
11 :	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14 :	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21 :	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24 :	0C DG 24 4KV BUS FDR, 2-CS-152-2406

6.8.B.1 Procedure (Continued)

WARNING

Improper operation of disconnects can result in serious injury. Keep body **AND** head clear of operating arc of handle. DO **NOT** release handle prior to full travel. When disconnect is opened **OR** closed, a very loud bang will be heard **AND** a switch position flag will be visible indicating disconnect position.

f. In the selected Unit SWGR Room, **CLOSE** the selected 0C DG 4KV Bus disconnect by performing the following: **(P0035)**

(1) **VERIFY** the selected 0C DG 4KV Bus feeder breaker is OPEN by local indication:

4KV BUS	BREAKER
11	0C DG 11 4KV BUS FDR, 152-1106
14	0C DG 14 4KV BUS FDR, 152-1406
21	0C DG 21 4KV BUS FDR, 152-2106
24	0C DG 24 4KV BUS FDR, 152-2406

(2) **INSERT** keys **AND UNLOCK** the selected 0C DG 4KV Bus disconnect:

4KV BUS	DISC	KEYS
11	189-1106	11893, 11901, 14259
14	189-1406	11896, 11901
21	189-2106	14259, 11903
24	189-2406	11899, 11901, 14259

(3) **CLOSE** the selected 0C DG 4KV Bus disconnect.

6.8.B.1.f Procedure (Continued)

(4) **INSERT** key **AND LOCK** the selected 0C DG 4KV Bus disconnect in the CLOSED position:

4KV BUS	DISC	KEY
11	189-1106	11940
14	189-1406	11895
21	189-2106	11900
24	189-2406	11898

g. **PLACE** 07 4KV BUS TIE, 0-CS-152-0701, to CLOSE.

h. **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch to NORMAL:

4KV BUS	HANDSWITCH
11	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	0C DG 24 4KV BUS FDR, 2-CS-152-2406

i. **INSERT** the Sync Stick for the selected 0C DG 4KV Bus feeder breaker handswitch.

j. **CHECK** the following indications on the associated panel:

- Zero volts on RUNNING VOLTS
- Approximately 120 volts on INCOMING VOLTS

k. **CHECK** the associated Synchroscope pointer is **NOT** rotating.

6.8.B.1 Procedure (Continued)

CAUTION
TABLE 1, SHUTDOWN SEQUENCER LOADS, lists equipment that receives an auto-start signal from the Shutdown Sequencer when the selected 0C DG 4KV Bus feeder breaker is closed.

l. **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch to CLOSE:

4KV BUS	:	HANDSWITCH
11	:	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	:	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	:	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	:	0C DG 24 4KV BUS FDR, 2-CS-152-2406

m. **VERIFY** the selected 4KV Bus has energized **AND** equipment is loading.

n. **CHECK** 0C DG frequency **AND** voltage are stable:

- 0C DG FREQUENCY, 0-SI-0701
- 0C DG VOLTS, 0-EI-0701

o. **REMOVE** the Sync Stick **AND RETURN** it to Home Base.

p. **MAINTAIN** 4KV Bus voltage between 4.1KV and 4.35KV by adjusting 0C DG voltage. **[B0120]**

- 0C DG AUTO VOLT CONTR SW, 0-CS-0704

CAUTION
Do **NOT** exceed limits of 5.4 MW, 4050 KVARs, **AND** 937 amps.

q. **OPERATE** the selected 4KV bus equipment as necessary **AND MONITOR** 0C DG loading.

r. **RECORD** equipment operating data 15 minutes after reaching the desired load **AND** at 60 minute intervals thereafter on the 0C Diesel Generator Logsheet.

6.8.B.1 Procedure (Continued)

s. **WHEN** a preferred power source is available to the selected 4KV Bus, **THEN GO TO** Section 6.9, TRANSFER SAFETY RELATED 4KV BUS LOADS FROM 0C DG TO A PREFERRED POWER.

6.8.B Procedure (Continued)

2. **IF** 0C DG will be connected to a de-energized (dead) Safety Related 4KV Bus from Local Control Panel 0C188,
THEN PERFORM the following:

   a. **VERIFY** 07 4KV BUS TIE, 152-0701, remote/local switch, 0-HS-152-0701A, is in LOCAL.

   b. **VERIFY** 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A, is in LOCAL.

   c. **VERIFY** 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A, is in LOCAL.

   d. **VERIFY** 0C GEN CONTR MODE SEL SW, 0-HS-10322, is in REMOTE/AUTO.

   e. **DEPRESS** 0C MANUAL EMER START PB, 0-HS-10334, to ensure 0C DG governor is in the RESET MODE.

   f. **PERFORM** the following actions in the associated Unit SWGR Room:

      (1) **VERIFY** the selected 4KV Bus Normal **AND** Alternate feeder breakers are OPEN:

4KV Bus	:	BREAKER
11	:	11 4KV BUS NORMAL FDR, 152-1115 **AND** 11 4KV BUS ALT FDR, 152-1101
14	:	14 4KV BUS NORMAL FDR, 152-1414 **AND** 14 4KV BUS ALT FDR, 152-1401
21	:	21 4KV BUS NORMAL FDR, 152-2101 **AND** 21 4KV BUS ALT FDR, 152-2115
24	:	24 4KV BUS NORMAL FDR, 152-2401 **AND** 24 4KV BUS ALT FDR, 152-2414

6.8.B.2.f **Procedure (Continued)**

(2) **PLACE** the associated Safety Related DG 4KV Bus breaker remote/local switch to LOCAL **AND VERIFY** the breaker is OPEN:

4KV BUS	BREAKER	HANDSWITCH
11	152-1703	1-HS-152-1703A
14	152-1403	1-HS-1403A
21	152-2103	2-HS-2103A
24	152-2403	2-HS-2403A

(3) **PLACE** the selected 0C DG 4KV Bus feeder breaker remote/local switch to LOCAL:

4KV BUS	BREAKER	HANDSWITCH
11	152-1106	1-HS-1106A
14	152-1406	1-HS-1406A
21	152-2106	2-HS-2106A
24	152-2406	2-HS-2406A

6.8.B.2.f Procedure (Continued)

WARNING

Improper operation of disconnects can result in serious injury. Keep body **AND** head clear of operating arc of handle. Do **NOT** release handle prior to full travel. When disconnect is opened **OR** closed, a very loud bang will be heard **AND** a switch position flag will be visible indicating disconnect position.

(4) In the selected Unit SWGR Room, **CLOSE** the selected 0C DG 4KV Bus disconnect by performing the following: **(P0035)**

(a) **VERIFY** the selected 0C DG 4KV Bus feeder breaker is OPEN by local indication:

4KV BUS	BREAKER
11	0C DG 11 4KV BUS FDR, 152-1106
14	0C DG 14 4KV BUS FDR, 152-1406
21	0C DG 21 4KV BUS FDR, 152-2106
24	0C DG 24 4KV BUS FDR, 152-2406

(b) **INSERT** keys **AND UNLOCK** the selected 0C DG 4KV Bus disconnect:

4KV BUS	DISC	KEYS
11	189-1106	11893, 11901, 14259
14	189-1406	11896, 11901
21	189-2106	14259, 11903
24	189-2406	11899, 11901, 14259

6.8.B.2.f.4 **Procedure (Continued)**

(c) **CLOSE** the selected 0C DG 4KV Bus disconnect.

(d) **INSERT** key **AND LOCK** the selected 0C DG 4KV Bus disconnect in the CLOSED position:

4KV BUS	DISC	KEY
11	189-1106	11940
14	189-1406	11895
21	189-2106	11900
24	189-2406	11898

g. In the 07 4KV SWGR Room, **CLOSE** 07 4KV BUS TIE, 152-0701.

CAUTION
TABLE 1, SHUTDOWN SEQUENCER LOADS, lists equipment that receives an auto-start signal from the Shutdown Sequencer when the selected 0C DG 4KV Bus feeder breaker is closed.

h. In the associated Unit SWGR Room, **CLOSE** the selected 0C DG 4KV Bus feeder breaker to energize the selected 4KV Bus:

4KV BUS	BREAKER
11	0C DG 11 4KV BUS FDR, 152-1106
14	0C DG 14 4KV BUS FDR, 152-1406
21	0C DG 21 4KV BUS FDR, 152-2106
24	0C DG 24 4KV BUS FDR, 152-2406

6.8.B.2 Procedure (Continued)

i. At Local Control Panel 0C188, **CHECK** 0C DG frequency **AND** voltage are stable:

- 0C BUS POT FREQ IND, 0-SI-10331
- 0C GEN BUS VOLT IND, 0-EI-10342

j. **VERIFY** 4KV Bus voltage remains between 4.1KV and 4.35KV. **[B0120]**

CAUTION
Do **NOT** exceed limits of 5.4 MW, 4050 KVARs, **AND** 937 amps.

k. **OPERATE** equipment as necessary **AND MONITOR** 0C DG loading.

l. **RECORD** equipment operating data 15 minutes after reaching the desired load **AND** at 60 minute intervals thereafter on the 0C Diesel Generator Logsheet.

m. **WHEN** a preferred power source is available to the selected 4KV Bus, **THEN GO TO** Section 6.9, TRANSFER SAFETY RELATED 4KV BUS LOADS FROM 0C DG TO A PREFERRED POWER.

****** END ******

6.9 TRANSFER SAFETY RELATED 4KV BUS LOADS FROM 0C DG TO A PREFERRED POWER

A. Initial Conditions

1. 0C DG is providing power for a Safety Related 4KV Bus.
2. The selected 4KV Bus Normal **AND** Alternate Bus feeder breakers are OPEN.
3. The selected 4KV Bus SIAS **AND** UV signals are RESET.
4. One of the following preferred power sources is available to the selected 4KV Bus **AND** transfer of the selected 4KV Bus loads to the preferred power source is desired:

4KV Bus :	POWER SOURCE
11 :	11 4KV BUS NORMAL FDR, 152-1115 OR 11 4KV BUS ALT FDR, 152-1101 OR 1A DG
14 :	14 4KV BUS NORMAL FDR, 152-1414 OR 14 4KV BUS ALT FDR, 152-1401 OR 1B DG
21 :	21 4KV BUS NORMAL FDR, 152-2101 OR 21 4KV BUS ALT FDR, 152-2115 OR 2A DG
24 :	24 4KV BUS NORMAL FDR, 152-2401 OR 24 4KV BUS ALT FDR, 152-2414 OR 2B DG

6.9.A Initial Conditions (Continued)

5. **IF** local operation is required,
   THEN keys for the following switches are available:

   - 07 4KV BUS TIE, 152-0701, remote/local switch, 0-HS-152-0701A
   - 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A
   - 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A
   - The selected Safety Related DG 4KV Bus breaker remote/local switch:

4KV BUS	BREAKER	HANDSWITCH
11	152-1703	1-HS-152-1703A
14	152-1403	1-HS-1403A
21	152-2103	2-HS-2103A
24	152-2403	2-HS-2403A

   - The selected 0C DG 4KV Bus feeder breaker remote/local switch:

4KV BUS	BREAKER	HANDSWITCH
11	152-1106	1-HS-1106A
14	152-1406	1-HS-1406A
21	152-2106	2-HS-2106A
24	152-2406	2-HS-2406A

6.9 TRANSFER SAFETY RELATED 4KV BUS LOADS FROM 0C DG TO A PREFERRED POWER (Continued)

B. Procedure

NOTE
Two Operators should be utilized to perform the transfer. One to operate 0C DG on 1C19C **AND** one to synchronize to the selected Safety Related 4KV Bus.

1. **IF** Control Room transfer of the selected 4KV Bus from 0C DG to offsite power is desired,
   THEN PERFORM the following:

   a. **VERIFY** the selected 4KV Bus offsite power source is expected to remain available:

4KV Bus	:	POWER SOURCE
11	:	11 4KV BUS NORMAL FDR, 152-1115 OR 11 4KV BUS ALT FDR, 152-1101
14	:	14 4KV BUS NORMAL FDR, 152-1414 OR 14 4KV BUS ALT FDR, 152-1401
21	:	21 4KV BUS NORMAL FDR, 152-2101 OR 21 4KV BUS ALT FDR, 152-2115
24	:	24 4KV BUS NORMAL FDR, 152-2401 OR 24 4KV BUS ALT FDR, 152-2414

   b. **VERIFY** DC control power is available by observing the selected 4KV Bus breaker position lights being illuminated at the control switch.

   c. **IF** possible,
   THEN REDUCE the selected 4KV Bus load below 1.0 MW by stopping selected 4KV Bus equipment **AND** using redundant 4KV Bus equipment.

6.9.B.1 Procedure (Continued)

CAUTION
While UNDERFREQUENCY PROTECTIVE RELAY, 0SSL 0998-81.U, is defeated, there is no underfrequency protection for 0C DG.

d. **IF NOT** possible to reduce the selected 4KV Bus load below 1.0 MW, **THEN BYPASS** breaker 152-0703 underfrequency trip as follows:

(1) **REMOVE** the cover from UNDERFREQUENCY PROTECTIVE RELAY, 0SSL 0998-81.U, in 0C DG Local Control Panel 0C188 Cabinet 5.

(2) **DISCONNECT** the RED knifeswitch in the bottom right of the relay by PRESSING the top down.

e. **PLACE** 0C DG in the TRANSFER MODE by performing the following:

(1) **DEPRESS** 0C DG EMERGENCY START, 0-HS-0707, pushbutton, to ensure an emergency start signal exists.

(2) **INSERT** the Sync Stick for 0C DG OUT BKR, 0-CS-152-0703.

CAUTION
0C DG OUT BKR, 152-0703, trips on underfrequency at 59.5 Hz when in the parallel **OR** transfer modes, unless bypassed.

(3) **DEPRESS** 0C DG SLOW START, 0-HS-0708, pushbutton, to put 0C DG in the TRANSFER MODE.

(4) **MOMENTARILY PLACE** 0C DG SPEED CONTR, 0-CS-0705, to RAISE OR LOWER.

(5) **MAINTAIN** 0C DG at approximately 60 Hz using 0C DG SPEED CONTR, 0-HS-0705.

(6) **REMOVE** the Sync Stick from 0C DG OUT BKR, 0-CS-152-0703.

6.9.B.1.e Procedure (Continued)

(7) **IF** UNDERFREQUENCY PROTECTIVE RELAY, 0SSL 0998-81.U, is bypassed,
THEN PERFORM the following in 0C DG Local Control Panel 0C188, Cabinet 5, to enable the underfrequency trip:

(a) **VERIFY** UNDERFREQUENCY PROTECTIVE RELAY, 0SSL 0998-81.U, is RESET.

(b) **RAISE** the RED knifeswitch until the switch is fully engaged.

(c) **REQUEST** an independent person second check the knifeswitch is closed properly.

(d) **INSTALL** the cover for UNDERFREQUENCY PROTECTIVE RELAY, 0SSL 0998-81.U.

f. **INSERT** the Sync Stick for the selected 4KV Bus Normal **OR** Alternate Feeder breaker handswitch:

4KV Bus :	HANDSWITCH
11 :	11 4KV BUS NORMAL FDR, 1-CS-152-1115 OR 11 4KV BUS ALT FDR, 1-CS-152-1101
14 :	14 4KV BUS NORMAL FDR, 1-CS-152-1414 OR 14 4KV BUS ALT FDR, 1-CS-152-1401
21 :	21 4KV BUS NORMAL FDR, 2-CS-152-2101 OR 21 4KV BUS ALT FDR, 2-CS-152-2115
24 :	24 4KV BUS NORMAL FDR, 2-CS-152-2401 OR 24 4KV BUS ALT FDR, 2-CS-152-2414

g. **CHECK** the associated Synchroscope **AND** Sync Lights are operating.

NOTE
Offsite power voltage indication will be on the INCOMING voltmeter.

h. **ADJUST** RUNNING VOLTS equal to INCOMING VOLTS using 0C DG AUTO VOLT CONTR, 0-CS-0704.

6.9.B.1 Procedure (Continued)

NOTE
The Synchroscope works in the opposite direction when 0C DG is the RUNNING power source.

i. **ADJUST** 0C DG frequency so the Synchroscope pointer is rotating slowly in the FAST direction using 0C DG SPEED CONTR, 0-CS-0705.

CAUTION
To avoid improper paralleling, do **NOT** start **OR** stop any large loads on the selected 4KV Bus.

j. **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position,
THEN CLOSE the selected 4KV Bus Normal **OR** Alternate Feeder breaker:

4KV Bus :	HANDSWITCH
11 :	11 4KV BUS NORMAL FDR, 1-CS-152-1115 OR 11 4KV BUS ALT FDR, 1-CS-152-1101
14 :	14 4KV BUS NORMAL FDR, 1-CS-152-1414 OR 14 4KV BUS ALT FDR, 1-CS-152-1401
21 :	21 4KV BUS NORMAL FDR, 2-CS-152-2101 OR 21 4KV BUS ALT FDR, 2-CS-152-2115
24 :	24 4KV BUS NORMAL FDR, 2-CS-152-2401 OR 24 4KV BUS ALT FDR, 2-CS-152-2414

k. **REMOVE** the Sync Stick **AND RETURN** to Home Base.

l. **MONITOR** 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**

6.9.B.1 Procedure (Continued)

m. **IF** continued parallel operation of 0C DG for a cleanout is desired, **THEN PERFORM** ALL of the following:

(1) **UNLOAD** 0C DG **PER** Section 6.12, 0C DG NORMAL SHUTDOWN FROM CONTROL ROOM, Subsection B, Step 1.

(2) **CHANGE** 0C DG governor mode to PARALLEL **PER** Section 6.10, CHANGE 0C DG GOVERNOR OPERATING MODES FROM CONTROL ROOM, Subsection B, Step 3.

(3) **PARALLEL** 0C DG to the selected 4KV Bus **PER** Section 6.7, PARALLEL 0C DG TO A SAFETY RELATED 4KV BUS, Subsection B, Step 5.

n. **IF** 0C DG will be stopped, **THEN GO TO** Section 6.12, 0C DG NORMAL SHUTDOWN FROM CONTROL ROOM.

NOTE
Load transfer to a Safety Related DG is by dead-bus transfer only.

2. **IF** Control Room transfer of a selected 4KV Bus from 0C DG to the associated Safety Related DG is desired, **THEN PERFORM** the following:

a. **VERIFY** any essential equipment is **NOT** being powered from 0C DG.

b. **VERIFY** the associated Safety Related DG 4KV Bus breaker handswitch is in PULL-TO-LOCK:

4KV BUS	:	HANDSWITCH
11	:	1A DG OUT BKR, 152-1703, 1-CS-152-1703
14	:	1B DG OUT BKR, 152-1403, 1-CS-152-1403
21	:	2A DG OUT BKR, 152-2103, 2-CS-152-2103
24	:	2B DG OUT BKR, 152-2403, 2-CS-152-2403

6.9.B.2 *Procedure* (Continued)

c. **START** the associated Safety Related DG **PER** the applicable procedure:

- Unit 1 OI-21A, 1A Diesel Generator
- Unit 1 OI-21B, 1B Diesel Generator
- Unit 2 OI-21A, 2A Diesel Generator
- Unit 2 OI-21B, 2B Diesel Generator

CAUTION
The effects on plant equipment of de-energizing the selected 4KV Bus should be considered.

d. **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch to TRIP:

4KV BUS	:	HANDSWITCH
11	:	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	:	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	:	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	:	0C DG 24 4KV BUS FDR, 2-CS-152-2406

e. **IF** automatic equipment sequencing is desired,
THEN VERIFY handswitches for the selected 4KV Bus equipment are positioned to NORMAL, as applicable:

- HPSI Pump
- LPSI Pump
- Salt Water Pump
- Service Water Pump
- Containment Spray Pump
- Auxiliary Feedwater Pump

6.9.B.2 Procedure (Continued)

CAUTION

- With the selected 4KV Bus de-energized, placing the associated Safety Related DG breaker handswitch to normal will cause the output breaker to CLOSE automatically.
- TABLE 1, SHUTDOWN SEQUENCER LOADS, lists equipment that receives an auto-start signal from the Shutdown Sequencer when the selected Safety Related DG output breaker is closed.

f. **PLACE** the associated Safety Related DG output breaker handswitch to NORMAL **AND VERIFY** the selected 4KV Bus re-energizes:

4KV BUS	:	HANDSWITCH
11	:	1A DG OUT BKR, 152-1703, 1-CS-152-1703
14	:	1B DG OUT BKR, 152-1403, 1-CS-152-1403
21	:	2A DG OUT BKR, 152-2103, 2-CS-152-2103
24	:	2B DG OUT BKR, 152-2403, 2-CS-152-2403

g. **OPERATE** the selected Safety Related DG **PER** the applicable operating procedure:

- Unit 1 OI-21A, 1A Diesel Generator
- Unit 1 OI-21B, 1B Diesel Generator
- Unit 2 OI-21A, 2A Diesel Generator
- Unit 2 OI-21B, 2B Diesel Generator

h. **PLACE** 07 4KV BUS TIE, 0-CS-152-0701, to TRIP.

6.9.B.2 Procedure (Continued)

i. **WHEN** 0C DG is to be stopped,
THEN PERFORM the following:

(1) **VERIFY** 0C DG frequency **AND** voltage are stable **AND** 07 4KV Bus is energized:

- 0C DG FREQUENCY, 0-SI-0701
- 0C DG VOLTS, 0-EI-0701
- 07 4KV BUS VOLTS, 0-EI-0702

(2) **GO TO** Section 6.12, 0C DG NORMAL SHUTDOWN FROM CONTROL ROOM.

****** END ******

6.10 CHANGE 0C DG GOVERNOR OPERATING MODES FROM CONTROL ROOM

A. Initial Conditions

1. 0C DG is being operated from the Control Room.
2. 0C DG is supplying power to 07 4KV Bus.
3. 0C DG OUT BKR, 152-0703, is CLOSED.
4. 07 4KV BUS FDR, 152-0704, is OPEN.

B. Procedure

NOTE

Four 0C DG governor operating modes are available as follows:

- RESET MODE operation with non-essential trips bypassed
- RESET MODE operation with ALL trips active
- PARALLEL MODE operation with ALL trips active
- TRANSFER MODE operation (parallel mode with non-essential trips bypassed)

CAUTION

Steps that de-energize **AND** re-energize the 07 4KV Bus should be performed as quickly as possible to restore 0C DG auxiliary equipment operation (i.e.; radiator fans, lighting, HVAC, etc.).

1. **IF** RESET MODE operation with non-essential trips bypassed is desired, **THEN PERFORM** the following:
   a. **VERIFY** the Sync Stick is removed from 0C DG OUT BKR, 0-CS-152-0703.
   b. **DEPRESS** 0C DG EMERGENCY START, 0-HS-0707, pushbutton, to put 0C DG in the RESET MODE with non-essential trips bypassed.
   c. **GO TO** the desired applicable section of this procedure for continued 0C DG operation.

6.10.B Procedure (Continued)

2. **IF** RESET MODE operation with ALL trips active is desired,
   THEN PERFORM the following:

   a. **VERIFY** the Sync Stick is removed from 0C DG OUT BKR, 0-CS-152-0703.

   b. **DEPRESS** 0C DG EMERGENCY START, 0-HS-0707, pushbutton, to put 0C DG in the RESET MODE.

   c. **DEPRESS** 0C DG SLOW START, 0-HS-0708, pushbutton, to make ALL trips active.

   d. **GO TO** the desired applicable section of this procedure for continued 0C DG operation.

CAUTION

0C DG OUT BKR, 152-0703, trips on underfrequency at 59.5 Hz when in the parallel **OR** transfer modes.

3. **IF** PARALLEL MODE operation with ALL trips active is desired **AND** 0C DG was emergency started,
   THEN PERFORM the following to select parallel mode:

   a. **DEPRESS** 0C DG SLOW START, 0-HS-0708.

NOTE

- Opening 0C DG OUT BKR, 152-0703, restores the non-essential trips that were bypassed in transfer mode.
- The 0C DG Building Fire Panel annunciator will alarm due to the temporarily de-energized buses.

CAUTION

- Opening the 0C DG breaker may cause the 0C DG Building to lose power **AND** de-energize 0C DG support equipment.
- If the 480V crosstie breaker alignment is in effect the following may occur:
  - 1A DG Building may lose power
  - 1A DG Building Fire Panel annunciator may alarm

   b. **PLACE** 0C DG OUT BKR, 0-CS-152-0703, to TRIP (removes the seal-in for the transfer relay).

   c. **INSERT** the Sync Stick for 0C DG OUT BKR, 0-CS-152-0703, to put 0C DG in the PARALLEL MODE.

6.10.B.3 Procedure (Continued)

d. **IF** 07 4KV Bus is ENERGIZED,
THEN PERFORM the following:

(1) **CHECK** the Synchroscope **AND** Sync Lights are operating on 1C18B.

(2) **ADJUST** INCOMING VOLTS, 1-EI-4001A, equal to RUNNING VOLTS, 1-EI-4001B, using 0C DG AUTO VOLT CONTR, 0-CS-0704.

(3) **ADJUST** 0C DG speed so the Synchroscope pointer is rotating slowly in the FAST direction using 0C DG SPEED CONTR, 0-CS-0705.

(4) **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position,
THEN PLACE 0C DG OUT BKR, 0-CS-152-0703, to CLOSE.

(5) **REMOVE** the Sync Stick from 0C DG OUT BKR, 0-CS-152-0703, **AND RETURN** to Home Base.

e. **IF** 07 4KV Bus is DE-ENERGIZED,
THEN PERFORM the following:

(1) **VERIFY** 07 4KV Bus is de-energized on 07 4KV BUS VOLTS, 0-EI-0702.

(2) **VERIFY** 0C DG frequency is approximately 60 Hz on 0C DG FREQUENCY, 0-SI-0701.

(3) **PLACE** 0C DG OUT BKR, 0-CS-152-0703, to CLOSE.

(4) **MOMENTARILY PLACE** 0C DG SPEED CONTR, 0-CS-0705, to RAISE.

(5) **MAINTAIN** 0C DG frequency at approximately 60 Hz on 0C DG FREQUENCY, 0-SI-0701.

(6) **REMOVE** the Sync Stick from 0C DG OUT BKR, 0-CS-152-0703, **AND RETURN** to Home Base.

(7) **RESET** the following bus U/V flags:

- 07 4KV Bus
- 07 480V Bus

f. **GO TO** the desired applicable section of this procedure for continued 0C DG operation.

6.10.B Procedure (Continued)

CAUTION
0C DG OUT BKR, 152-0703, trips on underfrequency at 59.5 Hz when in the parallel **OR** transfer modes.

4. **IF** PARALLEL MODE operation with ALL trips active is desired **AND** 0C DG was **NOT** emergency started,
THEN PERFORM the following:

   a. **INSERT** the Sync Stick for 0C DG OUT BKR, 0-CS-152-0703, to put 0C DG in the PARALLEL MODE.

   b. **MOMENTARILY PLACE** 0C DG SPEED CONTR, 0-CS-0705, to RAISE.

   c. **VERIFY** 0C DG frequency is approximately 60 Hz on 0C DG FREQUENCY, 0-SI-0701.

   d. **REMOVE** the Sync Stick from 0C DG OUT BKR, 0-CS-152-0703, **AND RETURN** to Home Base.

   e. **GO TO** the desired applicable section of this procedure for continued 0C DG operation.

6.10.B Procedure (Continued)

CAUTION

0C DG OUT BKR, 152-0703, trips on underfrequency at 59.5 Hz when in the parallel **OR** transfer modes.

5. **IF** TRANSFER MODE operation is desired,
   THEN PERFORM the following:

   a. **DEPRESS** 0C DG EMERGENCY START, 0-HS-0707, pushbutton, to initiate an emergency start signal (required for transfer mode).

   b. **INSERT** the Sync Stick for 0C DG OUT BKR, 0-CS-152-0703.

   c. **DEPRESS** 0C DG SLOW START, 0-HS-0708, pushbutton, to put 0C DG in the TRANSFER MODE.

   d. **MOMENTARILY PLACE** 0C DG SPEED CONTR, 0-CS-0705, to RAISE.

   e. **VERIFY** 0C DG frequency is approximately 60 Hz on 0C DG FREQUENCY, 0-SI-0701.

   f. **REMOVE** the Sync Stick from 0C DG OUT BKR, 0-CS-152-0703, **AND RETURN** to Home Base.

   g. **GO TO** the desired applicable section of this procedure for continued 0C DG operation.

****** END ******

6.11 CHANGE 0C DG GOVERNOR OPERATING MODES FROM LOCAL CONTROL PANEL 0C188

A. Initial Conditions

1. 0C DG is being operated from Local Control Panel 0C188.
2. 0C DG is supplying power to 07 4KV Bus.
3. Keys for the following switches are available:
   - 0C GEN CONTR MODE SEL SW, 0-HS-10322
   - 0C GEN STRT/STOP CONTR SW, 0-HS-10327
4. 0C GEN CONTR MODE SEL SW, 0-HS-10322, is in REMOTE/AUTO.
5. 0C DG OUT BKR, 152-0703, is CLOSED.
6. 07 4KV BUS FDR, 152-0704, is OPEN.

B. Procedure

NOTE

Four 0C DG governor operating modes are available as follows:

- RESET MODE operation with non-essential trips bypassed
- RESET MODE operation with ALL trips active
- PARALLEL MODE operation with ALL trips active
- TRANSFER MODE operation (parallel mode with non-essential trips bypassed)

CAUTION

Steps that de-energize **AND** re-energize the 07 4KV Bus should be performed as quickly as possible to restore 0C DG auxiliary equipment operation (i.e.- radiator fans, lighting, HVAC, etc.).

1. **[PC] IF** RESET MODE operation with non-essential trips bypassed is desired, **THEN PERFORM** the following:
   a. **VERIFY** 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A, is in LOCAL.
   b. **VERIFY** 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A, is in LOCAL.
   c. **VERIFY** Synchronizing Jack SJ is positioned to OFF.

6.11.B.1 Procedure (Continued)

d. **VERIFY** 0C GEN CONTR MODE SEL SW, 0-HS-10322, is in REMOTE/AUTO.

e. **DEPRESS** 0C MANUAL EMER START PB, 0-HS-10334, to put 0C DG in the RESET MODE with non-essential trips bypassed.

f. **GO TO** the desired applicable section of this procedure for continued 0C DG operation.

2. **[PC] IF** RESET MODE operation with ALL trips active is desired, **THEN PERFORM** the following:

a. **VERIFY** 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A, is in LOCAL.

b. **VERIFY** 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A, is in LOCAL.

c. **VERIFY** Synchronizing Jack SJ is positioned to OFF.

d. **VERIFY** 0C GEN CONTR MODE SEL SW, 0-HS-10322, is in REMOTE/AUTO.

e. **DEPRESS** 0C MANUAL EMER START PB, 0-HS-10334, to put 0C DG in the RESET MODE.

NOTE

With an emergency start signal present, placing 0-HS-10322 to LOCAL causes the following actions to occur:

- The emergency start signal is cancelled
- ALL 0C DG trips are enabled
- The following annunciators will alarm any time the switch is placed to LOCAL:
  - Local annunciator "CONT MODE SEL SWITCH ON LOCAL"
  - Control Room annunciators "0C DG" and "0C DG OUT OF SERVICE"
- Annunciator "FIELD FLASHING FAILURE" alarms 3 seconds after selecting LOCAL.

f. **PLACE** 0C GEN CONTR MODE SEL SW, 0-HS-10322, to LOCAL to make ALL trips active.

g. **PLACE** 0C FIELD FLASH SEL SW, 0-HS-10329, to ON to clear the alarm.

h. **GO TO** the desired applicable section of this procedure for continued 0C DG operation.

6.11.B Procedure (Continued)

CAUTION
0C DG OUT BKR, 152-0703, trips on underfrequency at 59.5 Hz when in the parallel **OR** transfer modes.

3. **[PC] IF** PARALLEL MODE operation with ALL trips active is desired **AND** 0C DG was emergency started,
THEN PERFORM the following to select PARALLEL MODE:

   a. **VERIFY** 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A, is in LOCAL.

   b. **VERIFY** 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A, is in LOCAL.

   c. **PLACE** 0C GEN LOCAL SPD SEL SW, 0-HS-10325, to SLOW.

NOTE
Placing 0-HS-10322 to LOCAL causes the following actions to occur:

- The emergency start signal is cancelled
- ALL 0C DG trips are enabled
- The following annunciators will alarm any time the switch is placed to LOCAL:
  - Local annunciator "CONT MODE SEL SWITCH ON LOCAL"
  - Control Room annunciators "0C DG" and "0C DG OUT OF SERVICE"
- Annunciator "FIELD FLASHING FAILURE" alarms 3 seconds after selecting LOCAL.

   d. **PLACE** 0C GEN CONTR MODE SEL SW, 0-HS-10322, to LOCAL to clear the emergency start signal.

   e. **PLACE** 0C FIELD FLASH SEL SW, 0-HS-10329, to ON to clear the alarm.

   f. **PLACE** 0C GEN STRT/STOP CONTR SW, 0-HS-10327, to START.

6.11.B.3 Procedure (Continued)

NOTE

The 0C DG Building Fire Panel annunciator will alarm due to the temporarily de-energized buses.

CAUTION

- Opening the 0C DG breaker may cause a loss of power to the 0C DG Building **AND** de-energize 0C DG support equipment.
- If the 480V crosstie breaker alignment is in effect the following may occur:
  - 1A DG Building may lose power
  - 1A DG Building Fire Panel annunciator may alarm

g. **PLACE** 0C DG OUT BKR, 0-HS-152-0703C, to TRIP.

h. **PLACE** Synchronizing Jack SJ to SYNC to put 0C DG in the PARALLEL MODE.

i. **IF** 07 4KV Bus is ENERGIZED,
THEN PERFORM the following:

(1) **CHECK** the Synchroscope **AND** Sync Lights are operating.

(2) **ADJUST** 0C GEN PHASE A VOLT IND, 0-EI-10321, equal to 0C GEN BUS VOLT IND, 0-EI-10342, using 0C AUTO VOLT REG CONTR SW, 0-HS-10331.

(3) **ADJUST** 0C DG speed so the Synchroscope pointer is rotating slowly in the FAST direction using 0C GOVNR SPEED CONTR SW, 0-HS-10330.

(4) **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position,
THEN PLACE 0C DG OUT BKR, 0-HS-152-0703C, to CLOSE.

(5) **PLACE** Synchronizing Jack SJ to OFF.

6.11.B.3 Procedure (Continued)

j. **IF** 07 4KV Bus is DE-ENERGIZED,
THEN PERFORM the following:

(1) **VERIFY** 07 4KV Bus is de-energized on 0C GEN BUS VOLT IND, 0-EI-10342.

(2) **PLACE** 0C DG OUT BKR, 0-HS-152-0703C, to CLOSE.

(3) **MOMENTARILY PLACE** 0C GOVNR SPEED CONTR SW, 0-HS-10330, to RAISE.

(4) **VERIFY** 0C DG speed is approximately 1200 rpm on 0C GENSET SPD IND, 0-SI-10321.

(5) **PLACE** Synchronizing Jack SJ to OFF.

(6) **RESET** the following bus U/V flags:

- 07 4KV Bus
- 07 480V Bus

k. **GO TO** the desired applicable section of this procedure for continued 0C DG operation.

CAUTION
0C DG OUT BKR, 152-0703, trips on underfrequency at 59.5 Hz when in the parallel **OR** transfer modes.

4. **[PC] IF** PARALLEL MODE operation with ALL trips active is desired **AND** 0C DG was **NOT** emergency started,
THEN PERFORM the following:

a. **VERIFY** 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A, is in LOCAL.

b. **VERIFY** 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A, is in LOCAL.

NOTE
The following annunciators will alarm any time the switch is placed to LOCAL:

- Local annunciator "CONT MODE SEL SWITCH ON LOCAL"
- Control Room annunciators "0C DG" and "0C DG OUT OF SERVICE"

c. **PLACE** 0C GEN CONTR MODE SEL SW, 0-HS-10322, to LOCAL.

6.11.B.4 Procedure (Continued)

d. **PLACE** Synchronizing Jack SJ to SYNC to put 0C DG in the PARALLEL MODE.

e. **MOMENTARILY PLACE** 0C GOVNR SPEED CONTR SW, 0-HS-10330, to RAISE.

f. **VERIFY** 0C DG speed is approximately 1200 rpm on 0C GENSET SPD IND, 0-SI-10321.

g. **PLACE** Synchronizing Jack SJ to OFF.

h. **GO TO** the desired applicable section of this procedure for continued 0C DG operation.

CAUTION

0C DG OUT BKR, 152-0703, trips on underfrequency at 59.5 Hz when in the parallel **OR** transfer modes.

5. **[PC] IF** TRANSFER MODE operation is desired, **THEN PERFORM** the following:

a. **VERIFY** 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A, is in LOCAL.

b. **VERIFY** 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A, is in LOCAL.

c. **VERIFY** 0C GEN CONTR MODE SEL SW, 0-HS-10322, is in REMOTE/AUTO.

d. **DEPRESS** 0C MANUAL EMER START PB, 0-HS-10334, to ensure an emergency start signal exists (required for transfer mode).

e. **PLACE** Synchronizing Jack SJ to SYNC to maintain the bypass of the non-essential 0C DG trips.

6.11.B.5 Procedure (Continued)

NOTE
Placing 0-HS-10322 to LOCAL causes the following actions to occur:

- The emergency start signal is cancelled
- The following annunciators will alarm when the switch is taken out of REMOTE:
  - Local annunciator "CONT MODE SEL SWITCH ON LOCAL"
  - Control Room annunciators "0C DG" and "0C DG OUT OF SERVICE"
- Annunciator "FIELD FLASHING FAILURE" alarms 3 seconds after selecting LOCAL.

f. **PLACE** 0C GEN CONTR MODE SEL SW, 0-HS-10322, to LOCAL to put 0C DG in the TRANSFER MODE.

g. **MOMENTARILY PLACE** 0C GOVNR SPEED CONTR SW, 0-HS-10330, to RAISE.

h. **VERIFY** 0C DG speed is approximately 1200 rpm on 0C GENSET SPD IND, 0-SI-10321.

i. **PLACE** Synchronizing Jack SJ to OFF.

j. **GO TO** the desired applicable section of this procedure for continued 0C DG operation.

****** END ******

6.12 0C DG NORMAL SHUTDOWN FROM CONTROL ROOM

A. Initial Conditions

1. 0C DG is being operated from the Control Room.

B. Procedure

1. **IF** 0C DG is in parallel operation with a Safety Related 4KV Bus, **THEN REMOVE** 0C DG from the 4KV Bus by performing the following:

CAUTION
MW load should **NOT** be reduced below 0.3 MW to preclude tripping 0C DG OUT BKR, 152-0703, on reverse power.

a. **LOWER** MW **AND** KVAR loads concurrently to approximately 0.45 MW **AND** zero KVARs **PER** the following:

(1) **LOWER** MW load approximately 1.0 MW using 0C DG SPEED CONTR, 0-CS-0705. **[B0254]**

(2) **MAINTAIN** 0 to 500 KVARs using 0C DG AUTO VOLT CONTR, 0-CS-0704 **AND** FIGURE 1, 0C DIESEL GENERATOR ELECTRICAL LIMITS.

(3) **MONITOR** the selected 4KV Bus voltage between 4.1KV and 4.35KV **[B0120]**

(4) **WAIT** approximately 5 minutes, **THEN REPEAT** Steps 1.a.1 through 1.a.4 until 0C DG reaches the desired load.

b. **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch to TRIP:

4KV BUS	:	HANDSWITCH
11	:	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	:	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	:	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	:	0C DG 24 4KV BUS FDR, 2-CS-152-2406

6.12.B.1 Procedure (Continued)

CAUTION
0C DG OUT BKR, 152-0703, trips on underfrequency at 59.5 Hz when in the parallel **OR** transfer modes, unless bypassed.

c. **VERIFY** 0C DG frequency **AND** voltage are stable **AND** 07 4KV Bus is energized at approximately 60 Hz:

- 0C DG FREQUENCY, 0-SI-0701
- 0C DG VOLTS, 0-EI-0701
- 07 4KV BUS VOLTS, 0-EI-0702

d. **PLACE** 07 4KV BUS TIE, 0-CS-152-0701, to TRIP.

e. **IF** 0C DG is being stopped,
THEN NOTE the time **AND BEGIN** a 5 minute engine cooldown period prior to 0C DG stop.

f. **IF** 0C DG governor mode change from transfer mode to parallel mode is desired for loaded operation,
THEN GO TO Section 6.10, CHANGE 0C DG GOVERNOR OPERATING MODES FROM CONTROL ROOM, Subsection B, Step 3.

6.12.B Procedure (Continued)

NOTE
0C DG should be stopped within approximately 5 minutes after load is 0.5 MW **OR** less.

2. **IF** 0C DG is powering 07 4KV Bus **AND** a parallel transfer to 07 4KV BUS FDR, 152-0704, is desired, **THEN PERFORM** the following:

   a. **VERIFY** 07 4KV BUS TIE, 152-0701, is OPEN.

NOTE
Frequency can **NOT** be adjusted when the governor is in the RESET MODE.

CAUTION
0C DG OUT BKR, 152-0703, trips on underfrequency at 59.5 Hz when in the parallel **OR** transfer modes.

   b. **IF** the 0C DG governor is in the RESET MODE, **THEN PERFORM** the following to put the 0C DG governor in the PARALLEL MODE:

      (1) **INSERT** the Sync Stick for 0C DG OUT BKR, 0-CS-152-0703.

      (2) **DEPRESS** 0C DG SLOW START, 0-HS-0708, pushbutton.

      (3) **MOMENTARILY PLACE** 0C DG SPEED CONTR, 0-CS-0705, to RAISE.

      (4) **REMOVE** the Sync Stick from 0C DG OUT BKR, 0-CS-152-0703.

   c. **INSERT** the Sync Stick for 07 4KV BUS FDR, 0-CS-152-0704.

   d. **CHECK** the Synchroscope **AND** Sync Lights are operating on 1C18B.

   e. **ADJUST** RUNNING VOLTS, 1-EI-4001B, equal to INCOMING VOLTS, 1-EI-4001A, using 0C DG AUTO VOLT CONTR, 0-CS-0704.

   f. **ADJUST** 0C DG frequency so the Synchroscope pointer is rotating slowly in the FAST direction using 0C DG SPEED CONTR, 0-CS-0705.

6.12.B.2 Procedure (Continued)

NOTE
0C DG OUT BKR, 152-0703, should be tripped as soon as 07 4KV BUS FDR, 152-0704, is closed.

CAUTION
Do **NOT** exceed 0.5 MW while paralleled with 07 4KV BUS FDR, 152-0704, to preclude tripping the feeder breaker on excess reverse power. **[B0248]**

g. **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position,
THEN PLACE 07 4KV BUS FDR, 0-CS-152-0704, to CLOSE.

h. **PLACE** 0C DG OUT BKR, 0-CS-152-0703, to TRIP.

i. **REMOVE** the Sync Stick **AND RETURN** to Home Base.

NOTE
0C DG should be stopped within approximately 5 minutes after load is 0.5 MW **OR** less.

3. **IF** 0C DG is powering 07 4KV Bus **AND** a dead-bus transfer of 07 4KV Bus loads to 07 4KV BUS FDR, 152-0704, is desired,
THEN PERFORM the following:

a. **VERIFY** 07 4KV BUS TIE, 0-CS-152-0701, is OPEN.

b. **DEPRESS** 0C DG SLOW START, 0-HS-0708, pushbutton.

c. **INSERT** the Sync Stick for 07 4KV BUS FDR, 0-CS-152-0704.

6.12.B.3 Procedure (Continued)

NOTE

The 0C DG Building Fire Panel annunciator will alarm due to the temporarily de-energized buses.

CAUTION

- Opening the breaker will cause a loss of power to the 0C DG Building **AND** de-energize 0C DG support equipment.
- If the 480V crosstie breaker alignment is in effect the following may occur:
  - 1A DG Building may lose power
  - 1A DG Building Fire Panel annunciator may alarm
- 07 4KV Bus should be re-energized from SITE POWER without delay to restore 0C DG auxiliary equipment operation (radiator fans, lighting, HVAC, etc).

d. **PLACE** 0C DG OUT BKR, 0-CS-152-0703, to TRIP.

e. **PLACE** 07 4KV BUS FDR, 0-CS-152-0704, to CLOSE.

f. **REMOVE** the Sync Stick **AND RETURN** to Home Base.

g. **RESET** the following bus U/V flags:

- 07 4KV Bus
- 07 480V Bus

4. **CHECK** 07 4KV Bus voltage is 4.16KV (4.1KV to 4.35KV) on 07 4KV BUS VOLTS, 0-EI-0702.

5. **VERIFY** 0C DG voltage is 4.16KV (4.16KV to 4.30KV) on 0C DG VOLTS, 0-EI-0701.

6. **CHECK** 0C DG frequency is approximately 60 Hz on 0C DG FREQUENCY, 0-SI-0701.

7. **VERIFY** 1C19C annunciator "0C DG • POT VOLT • FREQ LO" is CLEAR.

8. **VERIFY** that 0C DG has operated at 0.5 MW **OR** less for approximately 5 minutes,
THEN DEPRESS 0C DG STOP, 0-HS-0709, pushbutton.

9. **VERIFY** exciter shutdown as indicated by zero volts on 0C DG VOLTS, 0-EI-0701.

6.12.B Procedure (Continued)

10. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 0C188 **OR** 0C192:

    - 0C1 AC PRELUB PP SEL SW, 0-HS-10161
    - 0C2 AC PRELUB PP SEL SW, 0-HS-10201
    - 0C1 HT PRHT PP SEL SW, 0-HS-10081
    - 0C2 HT PRHT PP SEL SW, 0-HS-10101
    - 0C-F-9 ROOF EXHAUSTER, 0-HS-10584 (if radiator room temp is above 95° F)
    - 0C-F-10 ROOF EXHAUSTER, 0-HS-10586 (if radiator room temp is above 95° F)

11. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 0C188:

    - 0C1 FO B/U PP SEL SW, 0-HS-10051
    - 0C2 FO B/U PP SEL SW, 0-HS-10061

6.12.B Procedure (Continued)

12. **IF** 0C DG was shutdown following parallel operation with a Safety Related 4KV Bus,
THEN PERFORM the following:

a. **OPEN** the selected 0C DG 4KV Bus disconnect by performing the following:

(1) **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch in PULL-TO-LOCK:

4KV BUS	:	HANDSWITCH
11	:	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	:	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	:	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	:	0C DG 24 4KV BUS FDR, 2-CS-152-2406

WARNING

Improper operation of disconnects can result in serious injury. Keep body **AND** head clear of operating arc of handle. DO **NOT** release handle prior to full travel. When disconnect is opened **OR** closed, a very loud bang will be heard **AND** a switch position flag will be visible indicating disconnect position.

(2) In the associated Unit SWGR Room, **OPEN** the selected 0C DG 4KV Bus disconnect by performing the following:

6.12.B.12.a.2 **Procedure (Continued)**

(a) **VERIFY** the selected 0C DG 4KV Bus feeder breaker is OPEN by local indication:

4KV BUS	BREAKER
11	0C DG 11 4KV BUS FDR, 152-1106
14	0C DG 14 4KV BUS FDR, 152-1406
21	0C DG 21 4KV BUS FDR, 152-2106
24	0C DG 24 4KV BUS FDR, 152-2406

(b) **UNLOCK** the selected 0C DG 4KV Bus disconnect **AND REMOVE** the key:

4KV BUS	DISC	KEY
11	189-1106	11940
14	189-1406	11895
21	189-2106	11900
24	189-2406	11898

(c) **OPEN** the selected 0C DG 4KV Bus disconnect.

6.12.B.12.a.2 **Procedure (Continued)**

(d) **LOCK** the selected 0C DG 4KV Bus disconnect in the OPEN position **AND REMOVE** the keys:

4KV BUS	DISC	KEYS
11	189-1106	11893, 11901, 14259
14	189-1406	11896, 11901
21	189-2106	14259, 11903
24	189-2406	11899, 11901, 14259

(3) **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch to NORMAL:

4KV BUS	HANDSWITCH
11	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	0C DG 24 4KV BUS FDR, 2-CS-152-2406

13. **DRAIN** the 0C Dirty Fuel Oil Tank to a suitable container through 0C DIRTY FUEL OIL TANK DRAIN VALVE, 0C-DFO-74.

a. **IF** the 0C Dirty Fuel Oil Tank was drained prior to starting **AND** more than one quart of fuel oil is drained from the 0C Dirty Fuel Oil Tank per hour of run time,
THEN WRITE an Issue Report.

6.12.B Procedure (Continued)

14. **IF** 0C DG has operated one hour **OR** longer,
THEN CHECK the 0C Fuel Oil Day and Auxiliary Tanks for water as follows:
[B0251]

    a. **OBTAIN** a suitable container for collecting the effluent.

    b. **UNLOCK AND CRACK OPEN** 0C FUEL OIL AUX TANK DRAIN/SAMPLE VALVE, 0C-DFO-20.

    c. **WHEN** all water has been removed,
    THEN LOCK SHUT 0C FUEL OIL AUX TANK DRAIN/SAMPLE VALVE, 0C-DFO-20.

    d. UNLOCK **AND CRACK OPEN** 0C FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 0C-DFO-28.

    e. **WHEN** all water has been removed,
    THEN LOCK SHUT 0C FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 0C-DFO-28.

15. **DISPOSE** of ALL waste oil **PER** CH-1-101, Hazardous Waste Management.

16. **CHECK** any existing alarms.

17. **VERIFY** the 0C1 **AND** 0C2 Radiator Fans stop approximately 15 minutes following 0C DG shutdown by observing the associated green indicating light is illuminated on 0C188:

    - 0C1 HT RAD FAN SEL SW, 0-HS-10082
    - 0C2 HT RAD FAN SEL SW, 0-HS-10102

18. **IF** 0C Fuel Oil Day Tank level is below 37 inches,
THEN FILL the 0C Fuel Oil Day Tank **PER** Section 6.16, FILL THE 0C FUEL OIL DAY TANK. **[B0260]**

19. **NOTIFY** Plant Chemistry that 0C DG has been run and coolant sampling may be performed, if desired.

6.12.B Procedure (Continued)

20. **IF** the OC DG was paralleled to 11 4KV bus
THEN ALIGN the Control Room HVAC as follows:

    - **IF** 11 CR HVAC was in operation,
THEN RESTORE the Control Room Chiller Unit **PER** OI-22F
    - **UNBYPASS** the Control Room Vent RMS, 0-RI-5350.
    - **STOP** the Post-LOCI filter fans by placing the handswitches to STOP **AND LOG** the stopping time in the Charcoal Filter Log
        - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352
        - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353
    - **IF** desired,
THEN PLACE the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to ON

21. **IF** the OC DG was paralleled to 24 4KV bus
THEN ALIGN the Control Room HVAC as follows:

    - **IF** 12 CR HVAC was in operation,
THEN RESTORE the Control Room Chiller Unit **PER** OI-22F
    - **UNBYPASS** the Control Room Vent RMS, 0-RI-5350.
    - **STOP** the Post-LOCI filter fans by placing the handswitches to STOP **AND LOG** the stopping time in the Charcoal Filter Log
        - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352
        - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353
    - **IF** desired,
THEN PLACE the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to ON

22. **IF** performing PE 0-24-10-O-2A,
THEN GO TO Section 6.29, TIMED EMERGENCY START AND LOAD OF 0C DG ON 24 4KV BUS (PE 0-24-10-O-2A), STEP 8.

****** END ******

6.13 0C DG NORMAL SHUTDOWN FROM LOCAL CONTROL PANEL 0C188

A. Initial Conditions

1. 07 4KV BUS TIE, 152-0701, is OPEN.
2. Keys for the following switches are available:
   - 0C GEN CONTR MODE SEL SW, 0-HS-10322
   - 0C GEN STRT/STOP CONTR SW, 0-HS-10327
   - 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A
   - 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A

B. Procedure

1. **[PC] VERIFY** 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A, is in LOCAL.
2. **[PC] VERIFY** 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A, is in LOCAL.

NOTE

- With an emergency start signal present, placing 0-HS-10322 to LOCAL causes the following actions to occur:
  - The emergency start signal is cancelled
  - ALL 0C DG trips are enabled
- Annunciator "FIELD FLASHING FAILURE" alarms 3 seconds after selecting LOCAL.

3. **[PC] VERIFY** 0C GEN CONTR MODE SEL SW, 0-HS-10322, is in LOCAL.

6.13.B Procedure (Continued)

NOTE

- The transfer from 0C DG to 07 4KV BUS FDR, 152-0704, (SITE POWER) is by a dead-bus transfer only.
- 0C DG should be stopped within approximately 5 minutes after load is 0.5 MW **OR** less.

4. **[PC] IF** 0C DG is powering 07 4KV Bus,
   THEN TRANSFER 07 4KV Bus to 07 4KV BUS FDR, 152-0704, as follows:

NOTE

The 0C DG Building Fire Panel annunciator will alarm due to the temporarily de-energized buses.

CAUTION

- Opening the breaker may cause a loss of power to the 0C DG Building **AND** de-energize 0C DG support equipment.
- If the 480V crosstie breaker alignment is in effect the following may occur:
  - 1A DG Building may lose power
  - 1A DG Building Fire Panel annunciator may alarm
- 07 4KV Bus should be re-energized from SITE POWER without delay to restore 0C DG auxiliary equipment operation (radiator fans, lighting, HVAC, etc).

   a. **PLACE** 0C DG OUT BKR, 0-HS-152-0703C, to TRIP.

   b. **LOCALLY CLOSE** 07 4KV BUS FDR, 152-0704.

5. **IF** 0C DG is being stopped,
   THEN NOTE the time **AND BEGIN** a 5 minute engine cooldown period prior to 0C DG stop.

6. **CHECK** 07 4KV Bus voltage is 4.16KV (3.75 to 4.35KV) on 0C GEN BUS VOLT IND, 0-EI-10342.

7. **VERIFY** 0C DG voltage is 4.16KV (4.16 to 4.30KV) on ALL three phases:
   - 0C GEN PHASE A VOLT IND, 0-EI-10321
   - 0C GEN PHASE B VOLT IND, 0-EI-10322
   - 0C GEN PHASE C VOLT IND, 0-EI-10323

6.13.B Procedure (Continued)

8. **CHECK** the following local annunciators are CLEAR:

   - GENERATOR OVERVOLTAGE
   - GENERATOR UNDERVOLTAGE
   - GENERATOR UNDRFREQ
   - GENERATOR OVRFREQ

9. **[PC] VERIFY** that 0C DG has operated at 0.5 MW **OR** less for approximately 5 minutes,
   THEN PLACE 0C GEN STRT/STOP CONTR SW, 0-HS-10327, to STOP.

10. **VERIFY** exciter shutdown as indicated by zero volts on 0C GEN PHASE A VOLT IND, 0-EI-10321.

11. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 0C188 **OR** 0C192:

    - 0C1 AC PRELUB PP SEL SW, 0-HS-10161
    - 0C2 AC PRELUB PP SEL SW, 0-HS-10201
    - 0C1 HT PRHT PP SEL SW, 0-HS-10081
    - 0C2 HT PRHT PP SEL SW, 0-HS-10101
    - 0C-F-9 ROOF EXHAUSTER, 0-HS-10584 (if radiator room temp is above 95° F)
    - 0C-F-10 ROOF EXHAUSTER, 0-HS-10586 (if radiator room temp is above 95° F)

12. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 0C188:

    - 0C1 FO B/U PP SEL SW, 0-HS-10051
    - 0C2 FO B/U PP SEL SW, 0-HS-10061

13. **RESET** the following bus U/V flags:

    - 07 4KV Bus
    - 07 480V Bus

6.13.B Procedure (Continued)

14. **IF** 0C DG was shutdown following parallel operation with a Safety Related Bus, **THEN PERFORM** the following:

    a. **OPEN** the selected 0C DG 4KV Bus disconnect by performing the following:

        (1) **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch in PULL-TO-LOCK:

4KV BUS	:	HANDSWITCH
11	:	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	:	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	:	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	:	0C DG 24 4KV BUS FDR, 2-CS-152-2406

WARNING

Improper operation of disconnects can result in serious injury. Keep body **AND** head clear of operating arc of handle. DO **NOT** release handle prior to full travel. When disconnect is opened **OR** closed, a very loud bang will be heard **AND** a switch position flag will be visible indicating disconnect position.

        (2) In the associated Unit SWGR Room, **OPEN** the selected 0C DG 4KV Bus disconnect by performing the following:

6.13.B.14.a.2 **Procedure (Continued)**

(a) **VERIFY** the selected 0C DG 4KV Bus feeder breaker is OPEN by local indication:

4KV BUS	BREAKER
11	0C DG 11 4KV BUS FDR, 152-1106
14	0C DG 14 4KV BUS FDR, 152-1406
21	0C DG 21 4KV BUS FDR, 152-2106
24	0C DG 24 4KV BUS FDR, 152-2406

(b) **UNLOCK** the selected 0C DG 4KV Bus disconnect **AND REMOVE** the key:

4KV BUS	DISC	KEY
11	189-1106	11940
14	189-1406	11895
21	189-2106	11900
24	189-2406	11898

(c) **OPEN** the selected 0C DG 4KV Bus disconnect.

6.13.B.14.a.2 **Procedure (Continued)**

(d) **LOCK** the selected 0C DG 4KV Bus disconnect in the OPEN position **AND REMOVE** the keys:

4KV BUS	DISC	KEYS
11	189-1106	11893, 11901, 14259
14	189-1406	11896, 11901
21	189-2106	14259, 11903
24	189-2406	11899, 11901, 14259

(3) **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch to NORMAL:

4KV BUS	HANDSWITCH
11	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	0C DG 24 4KV BUS FDR, 2-CS-152-2406

15. **DRAIN** the 0C Dirty Fuel Oil Tank to a suitable container through 0C DIRTY FUEL OIL TANK DRAIN VALVE, 0C-DFO-74.

a. **IF** the 0C Dirty Fuel Oil Tank was drained prior to starting **AND** more than one quart of fuel oil is drained from the 0C Dirty Fuel Oil Tank per hour of run time,
THEN WRITE an Issue Report.

6.13.B Procedure (Continued)

16. **IF** 0C DG has operated one hour **OR** longer,
THEN CHECK the 0C Fuel Oil Day and Auxiliary Tanks for water as follows:
[B0251]

    a. **OBTAIN** a suitable container for collecting the effluent.

    b. **CRACK OPEN** 0C FUEL OIL AUX TANK DRAIN/SAMPLE VALVE, 0C-DFO-20.

    c. **WHEN** all water has been removed,
    THEN SHUT 0C FUEL OIL AUX TANK DRAIN/SAMPLE VALVE, 0C-DFO-20.

    d. **CRACK OPEN** 0C FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 0C-DFO-28.

    e. **WHEN** all water has been removed,
    THEN SHUT 0C FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 0C-DFO-28.

17. **DISPOSE** of ALL waste oil **PER** CH-1-101, Hazardous Waste Management.

18. **CHECK** any existing alarms.

19. **VERIFY** the 0C1 **AND** 0C2 Radiator Fans stop approximately 15 minutes following 0C DG shutdown by observing the associated green indicating light is illuminated on 0C188:

    - 0C1 HT RAD FAN SEL SW, 0-HS-10082
    - 0C2 HT RAD FAN SEL SW, 0-HS-10102

20. **IF** 0C Fuel Oil Day Tank level is below 37 inches,
THEN FILL 0C Fuel Oil Day Tank **PER** Section 6.16, FILL THE 0C FUEL OIL DAY TANK. **[B0260]**

21. **NOTIFY** Plant Chemistry that 0C DG has been run and coolant sampling may be performed, if desired.

22. **WHEN** desired,
THEN ALIGN Local Control Panel 0C188 switches **PER** ATTACHMENT 1F, 0C DG SWITCH POSITION VERIFICATION.

6.13.B Procedure (Continued)

23. **WHEN** desired,
THEN REMOVE keys from the following switches:

    - 0C GEN CONTR MODE SEL SW, 0-HS-10322
    - 0C GEN STRT/STOP CONTR SW, 0-HS-10327
    - 07 4KV BUS TIE, 152-0701, remote/local switch, 0-HS-152-0701A
    - 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A
    - 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A

24. **IF** the OC DG was paralleled to 11 4KV bus
THEN ALIGN the Control Room HVAC as follows:

    - **IF** 11 CR HVAC was in operation,
THEN RESTORE the Control Room Chiller Unit **PER** OI-22F
    - **UNBYPASS** the Control Room Vent RMS, 0-RI-5350.
    - **STOP** the Post-LOCI filter fans by placing the handswitches to STOP **AND LOG** the stopping time in the Charcoal Filter Log
        - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352
        - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353
    - **IF** desired,
THEN PLACE the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to ON

6.13.B Procedure (Continued)

25. **IF** the OC DG was paralleled to 24 4KV bus
THEN ALIGN the Control Room HVAC as follows:

- **IF** 12 CR HVAC was in operation,
THEN RESTORE the Control Room Chiller Unit **PER** OI-22F
- **UNBYPASS** the Control Room Vent RMS, 0-RI-5350.
- **STOP** the Post-LOCI filter fans by placing the handswitches to STOP **AND LOG** the stopping time in the Charcoal Filter Log
  - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352
  - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353
- **IF** desired,
THEN PLACE the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to ON

****** END ******

6.14 0C DG LOCAL EMERGENCY SHUTDOWN

A. Initial Conditions

1. 0C DG is operating loaded **OR** unloaded **AND** a condition exists that requires an IMMEDIATE shutdown.

2. **IF** re-energizing the 07 4KV Bus locally,
   THEN keys for the following switches are available:

   - 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A
   - 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A

B. Procedure

NOTE

If all 125 VDC Power **OR** Fuses FUP1A/FUP1B are lost, the DG can **NOT** be shutdown by depressing the emergency stop pushbuttons or engine bay shutdown pushbutton. Two operators are needed to shutdown the DG via engine trip levers. (Ref: Alarm Manual OC188 SL40)

1. **IF** 125 VDC power is available,
   THEN PERFORM the following:

   - **SIMULTANEOUSLY DEPRESS** BOTH local emergency stop pushbuttons.
     - 0C LOCAL EMER STOP PB, 0-HS-10335
     - 0C LOCAL EMER STOP PB, 0-HS-10336

   OR

   - **DEPRESS** 0C DG ENGINE BAY EMERGENCY SHUTDOWN, 0-HS-0711.

2. If all 125 VDC Power **OR** Fuses FUP1A/FUP1B are lost,
   THEN PERFORM the following:

   a. **TRIP** the applicable 4KV Bus feeder from the Control Room:

      - 0C DG 11 4KV BUS FDR, 152-1106
      - 0C DG 14 4KV BUS FDR, 152-1406
      - 0C DG 21 4KV BUS FDR, 152-2106
      - 0C DG 24 4KV BUS FDR, 152-2406

   b. **TRIP** OC DG OUT BKR 152-0703

   c. **PERFORM** actions **PER** Alarm Manual OC188, SL40.

3. **VERIFY** 0C DG OUT BKR, 152-0703, is OPEN.

6.14.B Procedure (Continued)

4. **VERIFY** exciter shutdown as indicated by zero volts on 0C GEN PHASE A VOLT IND, 0-EI-10321.

5. **CHECK** 0C DG speed is decreasing to zero.

6. **IF** 07 4KV Bus is ENERGIZED from a Safety Related 4KV Bus, **THEN PLACE** the following 4KV Bus handswitches to TRIP:

   - 07 4KV BUS TIE, 0-CS-152-0701
   - The selected 0C DG 4KV Bus feeder breaker:

4KV BUS	:	HANDSWITCH
11	:	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	:	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	:	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	:	0C DG 24 4KV BUS FDR, 2-CS-152-2406

6.14.B Procedure (Continued)

7. **IF** 07 4KV Bus is DE-ENERGIZED,
   THEN PERFORM the following to energize 07 4KV Bus:

   - **FROM** the Control Room:

     a. **VERIFY** 07 4KV Bus is DE-ENERGIZED on 07 4KV BUS VOLTS, 0-EI-0702.

     b. **VERIFY** 07 4KV BUS TIE, 152-0701, is OPEN.

     c. **INSERT** the Sync Stick for 07 4KV BUS FDR, 0-CS-152-0704.

     d. **PLACE** 07 4KV BUS FDR, 0-CS-152-0704, to CLOSE.

     e. **REMOVE** the Sync Stick **AND RETURN** to Home Base.

   OR

   - **LOCALLY** at the 07 4KV Bus:

     a. **VERIFY** 07 4KV Bus is DE-ENERGIZED at 0C188 on 0C GEN BUS VOLT IND, 0-EI-10342.

     b. **VERIFY** 07 4KV BUS TIE, 152-0701, is OPEN.

     c. **VERIFY** 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A, is in LOCAL.

     d. **LOCALLY CLOSE** 07 4KV BUS FDR, 152-0704.

8. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 0C188 **OR** 0C192:

   - 0C1 AC PRELUB PP SEL SW, 0-HS-10161
   - 0C2 AC PRELUB PP SEL SW, 0-HS-10201
   - 0C1 HT PRHT PP SEL SW, 0-HS-10081
   - 0C2 HT PRHT PP SEL SW, 0-HS-10101
   - 0C-F-9 ROOF EXHAUSTER, 0-HS-10584 (if radiator room temp is above 95° F)
   - 0C-F-10 ROOF EXHAUSTER, 0-HS-10586 (if radiator room temp is above 95° F)

6.14.B Procedure (Continued)

9. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 0C188:

   - 0C1 FO B/U PP SEL SW, 0-HS-10051
   - 0C2 FO B/U PP SEL SW, 0-HS-10061

10. **RESET** the following bus U/V flags:

    - 07 4KV Bus
    - 07 480V Bus

11. **IF** 0C DG was shutdown following parallel operation with a Safety Related 4KV Bus,
    THEN PERFORM the following:

    a. **OPEN** the selected 0C DG 4KV Bus disconnect by performing the following:

       (1) **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch in PULL-TO-LOCK:

4KV BUS	:	HANDSWITCH
11	:	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	:	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	:	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	:	0C DG 24 4KV BUS FDR, 2-CS-152-2406

6.14.B.11.a **Procedure (Continued)**

WARNING

Improper operation of disconnects can result in serious injury. Keep body **AND** head clear of operating arc of handle. DO **NOT** release handle prior to full travel. When disconnect is opened **OR** closed, a very loud bang will be heard **AND** a switch position flag will be visible indicating disconnect position.

(2) In the associated Unit SWGR Room, **OPEN** the selected 0C DG 4KV Bus disconnect by performing the following:

(a) **VERIFY** the selected 0C DG 4KV Bus feeder breaker is OPEN by local indication:

4KV BUS	BREAKER
11	0C DG 11 4KV BUS FDR, 152-1106
14	0C DG 14 4KV BUS FDR, 152-1406
21	0C DG 21 4KV BUS FDR, 152-2106
24	0C DG 24 4KV BUS FDR, 152-2406

(b) **UNLOCK** the selected 0C DG 4KV Bus disconnect **AND REMOVE** the key:

4KV BUS	DISC	KEY
11	189-1106	11940
14	189-1406	11895
21	189-2106	11900
24	189-2406	11898

(c) **OPEN** the selected 0C DG 4KV Bus disconnect.

6.14.B.11.a.2 **Procedure (Continued)**

(d) **LOCK** the selected 0C DG 4KV Bus disconnect in the OPEN position **AND REMOVE** the keys:

4KV BUS	DISC	KEYS
11	189-1106	11893, 11901, 14259
14	189-1406	11896, 11901
21	189-2106	14259, 11903
24	189-2406	11899, 11901, 14259

(3) **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch to NORMAL:

4KV BUS	HANDSWITCH
11	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	0C DG 24 4KV BUS FDR, 2-CS-152-2406

NOTE

OC DG will start if it was emergency started and the Reset Pushbutton is depressed after the shutdown condition is cleared.

12. **IF** desired **AND** the emergency shutdown signal has cleared, **THEN DEPRESS** 0C GEN EMER S/D RESET PB, 0-HS-10337.

6.14.B Procedure (Continued)

NOTE
If 0C DG was tripped from full load, steam will form around the cylinder liners and heads. Noise caused by coolant boiling is normal under these conditions.

13. **IF** 0C DG was stopped while hot **AND** the cause of the emergency shutdown will **NOT** affect unloaded operation, THEN START 0C DG **AND** RUN unloaded for a minimum of
5 minutes for cooldown **PER** the following applicable section:

    - Section 6.3, 0C DG SLOW START FROM CONTROL ROOM

    OR

    - Section 6.5, 0C DG SLOW START FROM LOCAL CONTROL PANEL 0C188

14. **DRAIN** the 0C Dirty Fuel Oil Tank to a suitable container through 0C DIRTY FUEL OIL TANK DRAIN VALVE, 0C-DFO-74.

    a. **IF** the 0C Dirty Fuel Oil Tank was drained prior to starting **AND** more than one quart of fuel oil is drained from the 0C Dirty Fuel Oil Tank per hour of run time,
    THEN WRITE an Issue Report.

15. **IF** 0C DG has operated one hour **OR** longer,
THEN CHECK the 0C Fuel Oil Day Tanks for water as follows: **[B0251]**

    a. **OBTAIN** a suitable container for collecting the effluent.

    b. **CRACK OPEN** 0C FUEL OIL AUX TANK DRAIN/SAMPLE VALVE, 0C-DFO-20.

    c. **WHEN** all water has been removed,
    THEN SHUT 0C FUEL OIL AUX TANK DRAIN/SAMPLE VALVE, 0C-DFO-20.

    d. **CRACK OPEN** 0C FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 0C-DFO-28.

    e. **WHEN** all water has been removed,
    THEN SHUT 0C FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 0C-DFO-28.

16. **DISPOSE** of ALL waste oil **PER** CH-1-101, Hazardous Waste Management.

17. **CHECK** any existing alarms.

6.14.B Procedure (Continued)

18. **VERIFY** the 0C1 **AND** 0C2 Radiator Fans stop approximately 15 minutes following 0C DG shutdown by observing the associated green indicating light is illuminated on 0C188:

    - 0C1 HT RAD FAN SEL SW, 0-HS-10082
    - 0C2 HT RAD FAN SEL SW, 0-HS-10102

19. IF 0C Fuel Oil Day Tank level is below 37 inches,
    THEN FILL 0C DG Fuel Oil Day Tank **PER** Section 6.16, FILL THE 0C FUEL OIL DAY TANK. **[B0260]**

20. **NOTIFY** Plant Chemistry that 0C DG has been run and coolant sampling may be performed, if desired.

21. IF operation was from Local Control Panel 0C188 **AND** alignment to the Control Room is desired,
    THEN PERFORM the following:

    a. **ALIGN** Local Control Panel 0C188 switches **PER** ATTACHMENT 1F, 0C DG SWITCH POSITION VERIFICATION.

    b. **REMOVE** keys from the following switches:

    - 0C GEN CONTR MODE SEL SW, 0-HS-10322
    - 0C GEN STRT/STOP CONTR SW, 0-HS-10327
    - 07 4KV BUS FDR, 152-0701, remote/local switch, 0-HS-152-0701A
    - 0C DG OUT BKR, 152-0703, remote/local switch, 0-HS-152-0703A
    - 07 4KV BUS FDR, 152-0704, remote/local switch, 0-HS-152-0704A

22. IF the OC DG was paralleled to 11 4KV bus
    THEN ALIGN the Control Room HVAC as follows:

    - IF 11 CR HVAC was in operation,
      THEN RESTORE the Control Room Chiller Unit **PER** OI-22F
    - **UNBYPASS** the Control Room Vent RMS, 0-RI-5350.
    - **STOP** the Post-LOCI filter fans by placing the handswitches to STOP **AND LOG** the stopping time in the Charcoal Filter Log
      - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352
      - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353
    - IF desired,
      THEN PLACE the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to ON

6.14.B Procedure (Continued)

23. **IF** the OC DG was paralleled to 24 4KV bus
THEN ALIGN the Control Room HVAC as follows:

- **IF** 12 CR HVAC was in operation,
THEN RESTORE the Control Room Chiller Unit **PER** OI-22F
- **UNBYPASS** the Control Room Vent RMS, 0-RI-5350.
- **STOP** the Post-LOCI filter fans by placing the handswitches to STOP **AND LOG** the stopping time in the Charcoal Filter Log
  - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352
  - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353
- **IF** desired,
THEN PLACE the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to ON

****** END ******

6.15 REMOVE AND RESTORE 0C DG FROM/TO SERVICE

A. Initial Conditions

1. 0C DG is shutdown **AND** 0C DG OUT BKR, 152-0703, is OPEN.
2. Technical Specification 3.8.1 has been reviewed to determine Diesel Generator availability requirements. **[B0906]**

B. Procedure

1. **REMOVE** 0C DG from service as follows:
   a. **PLACE** 0C DG OUT BKR, 152-0703, in PULL-TO-LOCK.

NOTE
The following annunciators will alarm when the switch is taken out of REMOTE:

- Local annunciator "CONT MODE SEL SWITCH ON LOCAL"
- Control Room annunciators "0C DG" and "0C DG OUT OF SERVICE"

   b. **PLACE** 0C GEN CONTR MODE SEL SW, 0-HS-10322, to LOCAL.
   c. **UNLOCK AND SHUT** the following 0C DG Air Start Header isolation valves:
      - 0C1 STARTING AIR RECEIVER 12 OUTLET VALVE, 0C1-DSA-40
      - 0C1 STARTING AIR RECEIVER 11 OUTLET VALVE, 0C1-DSA-48
      - 0C2 STARTING AIR RECEIVER 12 OUTLET VALVE, 0C2-DSA-40
      - 0C2 STARTING AIR RECEIVER 11 OUTLET VALVE, 0C2-DSA-48

WARNING
Hearing Protection is required while bleeding down the Air Headers.

   d. **OPEN** the following 0C DG Air Start Header filter drain valves:
      - 0C1 FILTER 14 DRAIN VALVE, 0C1-DSA-59
      - 0C1 FILTER 15 DRAIN VALVE, 0C1-DSA-67
      - 0C2 FILTER 14 DRAIN VALVE, 0C2-DSA-59
      - 0C2 FILTER 15 DRAIN VALVE, 0C2-DSA-67

6.15.B Procedure (Continued)

2. **WHEN** desired,
THEN RETURN 0C DG to service as follows:

   a. **SHUT** the following 0C DG Air Start Header filter drain valves:

      - 0C1 FILTER 14 DRAIN VALVE, 0C1-DSA-59
      - 0C1 FILTER 15 DRAIN VALVE, 0C1-DSA-67
      - 0C2 FILTER 14 DRAIN VALVE, 0C2-DSA-59
      - 0C2 FILTER 15 DRAIN VALVE, 0C2-DSA-67

   b. **OPEN AND LOCK** the following 0C DG Air Start Header isolation valves:

      - 0C1 STARTING AIR RECEIVER 12 OUTLET VALVE, 0C1-DSA-40
      - 0C1 STARTING AIR RECEIVER 11 OUTLET VALVE, 0C1-DSA-48
      - 0C2 STARTING AIR RECEIVER 12 OUTLET VALVE, 0C2-DSA-40
      - 0C2 STARTING AIR RECEIVER 11 OUTLET VALVE, 0C2-DSA-48

   c. **PLACE** 0C GEN CONTR MODE SEL SW, 0-HS-10322, to REMOTE/AUTO.

   d. **PLACE** 0C DG OUT BKR, 0-CS-152-0703, to NORMAL.

   e. IF required,
   THEN PERFORM ONE of the following to return 0C DG to service:

      - **PERFORM** PE 0-24-8-O-M

      OR

      - **PERFORM** the following sections to restore 0C DG operation:

         (1) Section 6.3, 0C DG SLOW START FROM CONTROL ROOM

         (2) Section 6.7, PARALLEL 0C DG TO A SAFETY RELATED 4KV BUS

         (3) **WHEN** 0C DG has been loaded for at least one hour,
         THEN STOP 0C DG **PER** Section 6.12, 0C DG NORMAL SHUTDOWN FROM CONTROL ROOM.

****** END ******

6.16 FILL THE 0C FUEL OIL DAY TANK

A. Initial Conditions

1. 11 FOST shall be sampled **AND** verified **PER** the following requirements: **[B0260]**

   - 11 FOST shall be sampled **AND** verified satisfactory for viscosity, water, **AND** sediment within 72 hours PRIOR to transferring fuel oil to the 0C Fuel Oil Day Tank.
   - 11 FOST shall be sampled at least every 72 hours when frequent 0C Fuel Oil Day Tank addition is required.
   - 11 FOST shall be sampled prior to transfer following any addition to 11 FOST.

2. 11 Fuel Oil Storage Tank level is at least four inches above the following level points, except as authorized by the CRS **OR** Shift Manager:

   - At ALL times - Low Level Alarm setpoint at 139" (11 feet, 6 inches)

   OR

   - **WHEN** 21 FOST is out of service between October 1 and March 31 - 208" (17 feet, 4 inches)

3. 0C Fuel Oil Day Tank valves are aligned **PER** the following attachments:

   - ATTACHMENT 1B, 0C FUEL OIL SYSTEM VALVE LINEUP
   - ATTACHMENT 2B, 0C FUEL OIL SYSTEM INSTRUMENT VALVE LINEUP

B. Procedure

1. **UNLOCK AND OPEN** 11 FOST TO 0C FUEL OIL DAY TANK FILL LINE ISOLATION VALVE, 0-DFO-129.

6.16.B Procedure (Continued)

NOTE
The Shift may direct the fuel oil transfer to resume after evaluating the conditions listed below. If 11 FOST level reaches 90 inches (7 feet, 6 inches) **AND** fuel transfer is continued, entry into the T.S. Action Statement should be considered.

2. **IF** any of the following conditions occur,
THEN IMMEDIATELY STOP the 0C Fuel Oil Transfer Pump **AND SHUT** 11 FOST TO 0C FUEL OIL DAY TANK FILL LINE ISOLATION VALVE, 0-DFO-129: **[B0261]**

   - Any Safety Related Diesel Generator automatically starts due to a valid SIAS **OR** U/V signal

   OR

   - 11 FOST level decreases to 90 inches (7 feet, 6 inches) **WHEN** 21 FOST is in service

   OR

   - 11 FOST level decreases to 208 inches (17 feet, 4 inches) **WHEN** 21 FOST is out of service between October 1 and March 31

   OR

   - A seismic event is detected on Control Room instrumentation

3. **OPEN** 0C FUEL OIL DAY TANK FILL LINE ISOLATION VALVE, 0C-DFO-37.

4. **VERIFY** the following valves from 11 FOST to 0C Fuel Oil Transfer Pump are **OPEN:**

   - 0C FUEL OIL TRANSFER FILTER INLET VALVE, 0C-DFO-16

   - 0C FUEL OIL TRANSFER FILTER OUTLET VALVE, 0C-DFO-19

5. **IF** venting of the 0C Fuel Oil Transfer Filter is desired,
THEN PERFORM the following:

   a. **VENT** the filter using 0C FUEL OIL TRANSFER FILTER VENT VALVE, 0C-DFO-71.

   b. **DISPOSE** of any waste oil **PER** CH-1-101, Hazardous Waste Management.

6. **VERIFY** 0C FUEL OIL TRANSFER PUMP DISCHARGE VALVE, 0C-DFO-6, is OPEN approximately two full turns.

7. **IF** the MRD System is available,
THEN SELECT the 0C Fuel Oil Day Tank level for display.

6.16.B Procedure (Continued)

NOTE
Using the AUTO position for the 0C Fuel Oil Transfer Pump provides an auto-stop signal to prevent overfilling 0C Fuel Oil Day Tank.

8. **PLACE** 0C FO XFER PP CONTR SW, 0-HS-10021, to AUTO, to begin the fuel transfer.

9. **THROTTLE** 0C FUEL OIL TRANSFER PUMP DISCHARGE VALVE, 0C-DFO-6, to obtain at least 20 psig discharge pressure on 0C FO XFER PP DISCH PRESS IND, 0-PI-10022.

CAUTION
During the transfer, the day tank level is normally about two inches higher than the auxiliary tank level.

10. **MONITOR** 0C Fuel Oil Day Tank level using the MRD System **OR** local indication.

CAUTION
0C Fuel Oil Day Tank overflows to the Tank Room floor at approximately 44 inches.

11. **WHEN** 0C Fuel Oil Transfer pump stops (approximately 37"), **THEN PERFORM** the following:

    - **IF** the switch is in AUTO, **THEN VERIFY** 0C Fuel Oil Transfer Pump stops **AND PLACE** 0C FO XFER PP CONTR SW, 0-HS-10021 to OFF.

    OR

    - **IF** the switch is in ON, **THEN PLACE** 0C FO XFER PP CONTR SW, 0-HS-10021 to OFF.

12. **VERIFY** 0C Fuel Oil Day Tank level is at **OR** above 37 inches on 0C FODT LVL IND, 0-LI-10023, after the 0C Fuel Oil Day Tank and 0C Fuel Oil Auxiliary Tank levels become equal. **[B0260]**

13. **SHUT** 0C FUEL OIL DAY TANK FILL LINE ISOLATION VALVE, 0C-DFO-37.

14. **SHUT AND LOCK** 11 FOST TO 0C FUEL OIL DAY TANK FILL LINE ISOLATION VALVE, 0-DFO-129. **[B0261]**

6.16.B Procedure (Continued)

15. **IF** portions of the fuel oil system have been drained **OR IF** desired, **THEN** vent the engine driven fuel oil pumps as follows:

    a. **PLACE** a suitable container under 0C1 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE DRAIN VALVE, 0C1-DFO-55 **AND** remove the pipe cap.

    b. **OPEN** 0C1 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE DRAIN VALVE, 0C1-DFO-55 **AND** drain approximately 3 gallons of fuel oil to expel air from the system.

    c. **SHUT** 0C1 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE DRAIN VALVE, 0C1-DFO-55 **AND** replace the pipe cap.

    d. **PLACE** a suitable container under 0C2 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE LINE DRAIN VALVE, 0C2-DFO-3 **AND** remove the pipe cap.

    e. **OPEN** 0C2 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE LINE DRAIN VALVE, 0C2-DFO-3 **AND** drain approximately 3 gallons of fuel oil to expel air from the system.

    f. **SHUT** 0C2 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE DRAIN LINE VALVE, 0C2-DFO-3 **AND** replace the pipe cap.

****** END ******

6.17 SELECT THE STANDBY 0C FUEL OIL DUPLEX FILTER

A. Initial Conditions

1. 0C DG is operating **OR** shutdown.

B. Procedure

1. **IF** the 0C1 **OR** 0C2 Fuel Oil Duplex Filter differential pressure instrument rises to approximately 3\4 of the scale **OR IF** desired,
   THEN PERFORM the following to select the standby Fuel Oil Duplex Filter for service:

NOTE

The following annunciators will alarm if the switch is placed to ON:

- Local annunciator "SEL SWS NOT IN AUTO POSITION"
- Control Room annunciator "0C DG"

a. **IF** 0C DG is **NOT** running,
THEN PLACE the selected fuel oil backup pump handswitch to ON:

DG	HANDSWITCH
0C1	0C1 FO B/U PP SEL SW, 0-HS-10051
0C2	0C2 FO B/U PP SEL SW, 0-HS-10061

b. **CHECK** the selected PDIS cursor position prior to shifting the Fuel Oil Duplex Filters.

DG	PDIS
0C1	0C1 FO DPLX FILT DIFF PRESS IND/SW, 0-PDIS-10055
0C2	0C2 FO DPLX FILT DIFF PRESS IND/SW, 0-PDIS-10065

6.17.B.1 Procedure (Continued)

c. **POSITION** the selected Fuel Oil Duplex Filter valve to BLOW-OFF for the filter to be placed in service:

DG	:	VALVE
0C1	:	0C1 DUPLEX FILTER 3-WAY VALVE, 0C1-DFO-147/148
0C2	:	0C2 DUPLEX FILTER 3-WAY VALVE, 0C2-DFO-147/148

d. **WAIT** approximately 20 seconds,
THEN POSITION the selected Fuel Oil Duplex Filter valve ALL the way to the stop for the filter to be in service:

DG	:	VALVE
0C1	:	0C1 DUPLEX FILTER 3-WAY VALVE, 0C1-DFO-147/148
0C2	:	0C2 DUPLEX FILTER 3-WAY VALVE, 0C2-DFO-147/148

e. **CHECK** the selected PDIS cursor position is less than **OR** equal to the beginning cursor position.

DG	:	PDIS
0C1	:	0C1 FO DPLX FILT DIFF PRESS IND/SW, 0-PDIS-10055
0C2	:	0C2 FO DPLX FILT DIFF PRESS IND/SW, 0-PDIS-10065

f. **IF** necessary,
THEN WRITE a Condition Report to have the dirty Fuel Oil Duplex Filter replaced.

6.17.B.1 Procedure (Continued)

g. **IF** the 0C1 **OR** 0C2 Fuel Oil Backup Pump was manually started, **THEN PERFORM** the following:

(1) **PLACE** the selected fuel oil backup pump handswitch to AUTO:

DG	:	HANDSWITCH
0C1	:	0C1 FO B/U PP SEL SW, O-HS-10051
0C2	:	0C2 FO B/U PP SEL SW, O-HS-10061

(2) **CHECK** annunciator "SEL SWS NOT IN AUTO POSITION" clears.

****** END ******

6.18 SELECT THE STANDBY 0C LUBE OIL DUPLEX FILTER

A. Initial Conditions

1. 0C DG is operating **OR** shutdown.

B. Procedure

1. **IF** a 0C1 **OR** 0C2 Lube Oil Duplex Filter differential pressure high alarm is recieved **OR IF** desired,
   THEN PERFORM the following to select a standby Lube Oil Duplex Filter for service:

   a. **IF** 0C DG is **NOT** running,
      THEN VERIFY the red indicating light on the associated AC prelube pump handswitch is illuminated:

DG :	HANDSWITCH
0C1 :	0C1 AC PRELUB PP SEL SW, 0-HS-10161
0C2 :	0C2 AC PRELUB PP SEL SW, 0-HS-10201

   b. **CHECK** the PDIS cursor position for the selected Lube Oil Duplex Filter:

FILTER :	PDIS
0C1 Filters 1/2 :	0C1-1/2 LO FILT DIFF PRESS IND/SW, 0-PDIS-10171
0C1 Filters 3/4 :	0C1-3/4 LO FILT DIFF PRESS IND/SW, 0-PDIS-10170
0C2 Filters 1/2 :	0C2-1/2 LO FILT DIFF PRESS IND/SW, 0-PDIS-10211
0C2 Filters 3/4 :	0C2-3/4 LO FILT DIFF PRESS IND/SW, 0-PDIS-10210

6.18.B.1 Procedure (Continued)

c. **ROTATE** the selected Lube Oil Duplex Filter cross-tie valve fully counter-clockwise to provide lube oil pressure into the standby filter:

FILTER :	VALVE
0C1 Filters 1/2 :	0C1 LUBE OIL CARTRIDGE FILTERS 1 & 2 CROSS-TIE VALVE, 0C1-DLO-74
0C1 Filters 3/4 :	0C1 LUBE OIL CARTRIDGE FILTERS 3 & 4 CROSS-TIE VALVE, 0C1-DLO-75
0C2 Filters 1/2 :	0C2 LUBE OIL CARTRIDGE FILTERS 1 & 2 CROSS-TIE VALVE, 0C2-DLO-75
0C2 Filters 3/4 :	0C2 LUBE OIL CARTRIDGE FILTERS 3 & 4 CROSS-TIE VALVE, 0C2-DLO-74

d. **CHECK** the standby filter housing for leaks.

e. **FILL** the standby filter **PER** the following time limits:

- **IF** the engine is running,
  THEN FILL the standby filter a minimum of five minutes.

OR

- **IF** the engine prelube pump is operating,
  THEN FILL the standby filter a minimum of 20 minutes.

6.18.B.1 Procedure (Continued)

f. **WHEN** the filling time has elapsed,
THEN LIFT the locking pin **AND POSITION** the following selected valve to the CENTER:

FILTER :	VALVE
0C1 Filters 1/2 :	0C1 LUBE OIL CARTRIDGE FILTERS 1/2 3-WAY VALVE, 0C1-DLO-22/25
0C1 Filters 3/4 :	0C1 LUBE OIL CARTRIDGE FILTERS 3/4 3-WAY VALVE, 0C1-DLO-40/43
0C2 Filters 1/2 :	0C2 LUBE OIL CARTRIDGE FILTERS 1/2 3-WAY VALVE, 0C2-DLO-22/25
0C2 Filters 3/4 :	0C2 LUBE OIL CARTRIDGE FILTERS 3/4 3-WAY VALVE, 0C2-DLO-40/43

g. WAIT approximately two seconds,
THEN LIFT the locking pin **AND POSITION** the selected valve to place the desired duplex filter in service.

6.18.B.1 Procedure (Continued)

h. **ROTATE** the selected Lube Oil Duplex Filter cross-tie valve fully clockwise to SHUT the cross-tie valve:

FILTER :	VALVE
0C1 Filters 1/2 :	0C1 LUBE OIL CARTRIDGE FILTERS 1 & 2 CROSS-TIE VALVE, 0C1-DLO-74
0C1 Filters 3/4 :	0C1 LUBE OIL CARTRIDGE FILTERS 3 & 4 CROSS-TIE VALVE, 0C1-DLO-75
0C2 Filters 1/2 :	0C2 LUBE OIL CARTRIDGE FILTERS 1 & 2 CROSS-TIE VALVE, 0C2-DLO-75
0C2 Filters 3/4 :	0C2 LUBE OIL CARTRIDGE FILTERS 3 & 4 CROSS-TIE VALVE, 0C2-DLO-74

6.18.B.1 Procedure (Continued)

i. **IF** the engine is running,
THEN CHECK the PDIS cursor position is less than **OR** equal to the beginning cursor position for the selected Lube Oil Duplex Filter:

FILTER :	PDIS
0C1 Filters 1/2 :	0C1-1/2 LO FILT DIFF PRESS IND/SW, 0-PDIS-10171
0C1 Filters 3/4 :	0C1-3/4 LO FILT DIFF PRESS IND/SW, 0-PDIS-10170
0C2 Filters 1/2 :	0C2-1/2 LO FILT DIFF PRESS IND/SW, 0-PDIS-10211
0C2 Filters 3/4 :	0C2-3/4 LO FILT DIFF PRESS IND/SW, 0-PDIS-10210

j. **IF** necessary,
THEN WRITE a Condition Report to have the dirty Lube Oil Duplex Filter replaced.

****** END ******

6.19 FILL THE 0C AUXILIARY LUBE OIL TANK

A. Initial Conditions

1. 0C DG Lube Oil System valves are aligned **PER** the following attachments:
   - ATTACHMENT 1C, 0C LUBE OIL SYSTEM VALVE LINEUP
   - ATTACHMENT 2C, 0C LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP

B. Procedure

NOTE
Approved lube oil specification is listed in the Control Room.

1. **DETERMINE** the number of lube oil drums required to fill the 0C Lube Oil Auxiliary Tank to the desired level using TABLE 3, INDICATED 0C AUXILIARY LUBE OIL TANK VOLUME.
2. **VERIFY** lube oil type in the drums with the Oil Control Manual.
3. **CHECK** each lube oil drum is sealed with a factory seal **OR** has a custody seal.
4. **IF** the quality of the lube oil is questioned,
   THEN PERFORM the following:
   a. **REJECT** the drum.
   b. **RETURN** the drum to the warehouse.
   c. **INITIATE** an Issue Report for the rejected drum.
5. **WHEN** lube oil is ready to be transferred,
   THEN MOVE the required number of drums to the 0C DG Building lube oil drum station.
6. **PLACE** drip pans under hose connections.

CAUTION
Inspection of hose is to ensure no contaminants or water are added to the Lube Oil system.

7. **INSPECT AND CONNECT** a temporary hose to the 0C Lube Oil Fill Pump hose connection.

6.19.B Procedure (Continued)

8. **PERFORM** the following for each lube oil drum:

   a. **INSERT** the free end of the temporary hose into a lube oil drum.

   b. **PLACE** 0C LUBE OIL FILL PUMP, 0-HS-10162, to START AND TRANSFER the lube oil.

   c. **WHEN** the lube oil drum is empty,
   THEN PLACE 0C LUBE OIL FILL PUMP, 0-HS-10162, to STOP.

CAUTION Do **NOT** exceed 40 inches of level.

   d. **CHECK** the level of 0C Auxiliary Lube Oil Tank.

9. **WHEN** 0C Auxiliary Lube Oil Tank is at the desired level,
THEN DISCONNECT the temporary hose **AND DRAIN** into the lube oil drum.

10. **STORE** the temporary hose in a leakproof container **PER** the system cleanliness guidelines in NO-1-200, Control Of Shift Activities.

11. **DRAIN** any waste oil from the drip pans **AND DISPOSE** of **PER** CH-1-101, Hazardous Waste Management.

12. **REMOVE** the lube oil drums from the 0C DG Building in preparation for return to the warehouse.

13. **LOG** the amount of lube oil added **AND** information from the drum custody or factory seals in the Safety Related Consumables Log in the Control Room.

****** END ******

6.20 ADD LUBE OIL TO THE 0C DG LUBE OIL SUMPS

A. Initial Conditions

1. 0C DG Lube Oil System valves are aligned **PER** the following attachments:
   - ATTACHMENT 1C, 0C LUBE OIL SYSTEM VALVE LINEUP
   - ATTACHMENT 2C, 0C LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP

B. Procedure

1. **UNLOCK AND OPEN** the selected 0C DG oil sump lube oil inlet valve:

DG :	VALVE
0C1 :	0C LUBE OIL AUX TANK OUTLET TO 0C1 OIL SUMP ISOLATION VALVE, 0C1-DLO-61
0C2 :	0C LUBE OIL AUX TANK OUTLET TO 0C2 OIL SUMP ISOLATION VALVE, 0C2-DLO-61

NOTE
Approximately 30 gallons of lube oil are required to raise 0C DG Engine Lube Oil Sump level from the low mark to the full mark.

2. **THROTTLE OPEN** the selected 0C DG oil sump fill valve to begin adding oil to the sump:

DG :	VALVE
0C1 :	0C1 DIESEL ENGINE OIL SUMP FILL VALVE, 0C1-DLO-60
0C2 :	0C2 DIESEL ENGINE OIL SUMP FILL VALVE, 0C2-DLO-60

6.20.B Procedure (Continued)

3. **WHEN** the desired amount has been added to the selected 0C DG Engine Lube Oil Sump,
THEN SHUT the selected 0C DG oil sump fill valve:

DG :	VALVE
0C1 :	0C1 DIESEL ENGINE OIL SUMP FILL VALVE, 0C1-DLO-60
0C2 :	0C2 DIESEL ENGINE OIL SUMP FILL VALVE, 0C2-DLO-60

4. **SHUT AND LOCK** the selected 0C DG lube oil sump isolation valve:

DG :	VALVE
0C1 :	0C LUBE OIL AUX TANK OUTLET TO 0C1 OIL SUMP ISOLATION VALVE, 0C1-DLO-61
0C2 :	0C LUBE OIL AUX TANK OUTLET TO 0C2 OIL SUMP ISOLATION VALVE, 0C2-DLO-61

5. **LOG** the amount of lube oil added **AND IDENTIFY** the selected 0C DG engine in the Oil Control Log in the Control Room.

****** END ******

6.21 DRAIN AND REFILL THE 0C DG LUBE OIL SYSTEMS

A. Initial Conditions

1. 0C DG is tagged out.
2. The 1A Lube Oil Drain Tank is empty **OR** has adequate capacity to accept approximately 200 gallons **PER** engine (refer to TABLE 5, 1A LUBE OIL DRAIN TANK VOLUME).
3. The selected 0C DG engine has a prelube pump available to pump lube oil to the 1A Lube Oil Drain Tank.
4. 0C Lube Oil System valves are aligned **PER** the following attachments:
   - ATTACHMENT 1C, 0C LUBE OIL SYSTEM VALVE LINEUP
   - ATTACHMENT 2C, 0C LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP

B. Procedure

1. **PERFORM** the following to drain the selected 0C DG lube oil system:
   a. **VERIFY** the selected 0C Prelube Pumps are OFF:

DG :	PUMP
0C1 :	0C1 AC and Pneumatic Prelube Pumps
0C2 :	0C2 AC and Pneumatic Prelube Pumps

   b. **VERIFY** the following valves are **SHUT**:
      - 1A LUBE OIL DRAIN TANK RECIRC LINE ISOL VALVE, 1A-DLO-30
      - 1A LUBE OIL DRAIN SYSTEM RETURN TO 0C DG HDR ISOLATION VALVE, 0C-DLO-2
      - 1A LUBE OIL DRAIN SYSTEM RETURN TO 0C1 DG ISOLATION VALVE, 0C-DLO-19
      - 1A LUBE OIL DRAIN SYSTEM RETURN TO 0C2 DG ISOLATION VALVE, 0C-DLO-18

6.21.B.1 Procedure (Continued)

c. **OPEN** the selected 0C DG valve to provide pressure indication for the lube oil header:

DG :	VALVE
0C1 :	0C1 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE, 0C1-DLO-14
0C2 :	0C2 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE, 0C2-DLO-14

d. **OPEN** the selected 0C DG lube oil system drain isolation valve:

DG :	VALVE
0C1 :	0C1 DIESEL LUBE OIL TO 1A LUBE OIL DRAIN SYSTEM ISOLATION VALVE, 0C1-DLO-73
0C2 :	0C2 DIESEL LUBE OIL TO 1A LUBE OIL DRAIN SYSTEM ISOLATION VALVE, 0C2-DLO-73

e. **IF** 0C DG Lube Oil Cooler draining is required, **THEN UNLOCK AND OPEN** the selected cooler valves:

DG :	VALVE
0C1 :	0C1 NORTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE, 0C1-DLO-16 0C1 SOUTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE, 0C1-DLO-17
0C2 :	0C2 NORTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE, 0C2-DLO-16 0C2 NORTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE, 0C2-DLO-17

6.21.B.1 Procedure (Continued)

f. **UNLOCK AND PLACE** the selected 0C DG lube oil system drain valve in the DRAIN POSITION:

DG :	VALVE
0C1 :	0C1 PRELUBE PUMPS DISCH LINE 3-WAY VALVE, 0C1-DLO-6
0C2 :	0C2 PRELUBE PUMPS DISCH LINE 3-WAY VALVE, 0C2-DLO-6

g. **START** the selected 0C Prelube Pump to commence draining the lube oil:

DG :	PUMP
0C1 :	0C1 AC **OR** Pneumatic Prelube Pump
0C2 :	0C2 AC **OR** Pneumatic Prelube Pump

h. **OBSERVE** the selected pressure instrument for loss of oil pressure, indicating the sump is empty:

DG :	PI
0C1 :	0C1 PNEUMATIC PRELUBE PP DISCHARGE PI, 0-PI-10169
0C2 :	0C2 PNEUMATIC PRELUBE PP DISCHARGE PI, 0-PI-10209

i. **WHEN** the selected 0C DG lube oil sump is empty **OR** at the desired level, **THEN STOP** the running 0C Prelube Pump.

6.21.B.1 Procedure (Continued)

j. **IF** completely draining the sump,
THEN REQUEST Maintenance personnel drain additional oil from the selected 0C DG Lube Oil Sump via the applicable 0C DG lube oil sump isolation valve:

DG :	VALVE
0C1 :	0C1 DIESEL ENGINE OIL SUMP DRAIN VALVE, 0C1-DLO-30
0C2 :	0C2 DIESEL ENGINE OIL SUMP DRAIN VALVE, 0C2-DLO-30

k. **WHEN** the selected 0C DG lube oil system is finished draining,
THEN POSITION AND LOCK the following selected lube oil system valve in the "OPEN TO ENGINE" POSITION:

DG :	VALVE
0C1 :	0C1 PRELUBE PUMPS DISCH LINE 3-WAY VALVE, 0C1-DLO-6
0C2 :	0C2 PRELUBE PUMPS DISCH LINE 3-WAY VALVE, 0C2-DLO-6

l. **IF** 0C DG Lube Oil Cooler draining was performed,
THEN SHUT AND LOCK the selected cooler valves:

DG :	VALVE
0C1 :	0C1 NORTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE, 0C1-DLO-16 0C1 SOUTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE, 0C1-DLO-17
0C2 :	0C2 NORTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE, 0C2-DLO-16 0C2 NORTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE, 0C2-DLO-17

6.21.B.1 Procedure (Continued)

m. **SHUT** the selected 0C DG valve to isolate pressure indication from the lube oil header:

DG :	VALVE
0C1 :	0C1 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE, 0C1-DLO-14
0C2 :	0C2 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE, 0C2-DLO-14

n. **SHUT** the selected 0C DG lube oil system drain isolation valve opened for draining:

DG :	VALVE
0C1 :	0C1 DIESEL LUBE OIL TO 1A LUBE OIL DRAIN SYSTEM ISOLATION VALVE, 0C1-DLO-73
0C2 :	0C2 DIESEL LUBE OIL TO 1A LUBE OIL DRAIN SYSTEM ISOLATION VALVE, 0C2-DLO-73

o. **ENSURE** the applicable 0C DG lube oil sump isolation valve is **LOCKED SHUT**:

DG :	VALVE
0C1 :	0C1 DIESEL ENGINE OIL SUMP DRAIN VALVE, 0C1-DLO-30
0C2 :	0C2 DIESEL ENGINE OIL SUMP DRAIN VALVE, 0C2-DLO-30

6.21.B Procedure (Continued)

NOTE
Two Operators should perform the fill evolution due to the remote location of the 0C DG to the transfer pump controls.

2. IF filling a 0C DG Lube Oil Sump from the 1A Lube Oil Drain Tank is desired, **THEN PERFORM** the following:

   a. **VERIFY** 0C Lube Oil System valves are aligned for the 0C DG engine being filled **PER** the following attachments:

      - ATTACHMENT 1C, 0C LUBE OIL SYSTEM VALVE LINEUP
      - ATTACHMENT 2C, 0C LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP

   b. **VERIFY** 1A LUBE OIL DRAIN TANK TRANSFER PUMP SUCTION VALVE, 1A-DLO-6, is OPEN.

   c. **VERIFY** 1A LUBE OIL DRAIN FILTER OUTLET VALVE, 1A-DLO-16, is OPEN.

   d. **OPEN** 1A LUBE OIL DRAIN TANK RECIRC LINE ISOLATION VALVE, 1A-DLO-30.

   e. **PLACE** 1A LUBE OIL DRAIN TANK TRANSFER PUMP, 1-HS-10001, to **START**.

   f. **CHECK** LO DRAIN TK FILTER D/P GAGE, 1-PDI-10002, indicates less than 20 PSIG.

      (1) IF LO DRAIN TK FILTER D/P GAGE, 1-PDI-10002, indicates greater than or equal to 20 PSIG,
      THEN WRITE an issue report to replace the filter.

   g. **OPEN** 1A LUBE OIL DRAIN SYSTEM RETURN TO 0C DG HDR ISOLATION VALVE, 0C-DLO-2.

6.21.B.2 Procedure (Continued)

h. **OPEN** the selected 0C DG return valve to begin transferring lube oil:

DG :	VALVE
0C1 :	1A LUBE OIL DRAIN SYSTEM RETURN TO 0C1 DG ISOLATION VALVE, 0C-DLO-19
0C2 :	1A LUBE OIL DRAIN SYSTEM RETURN TO 0C2 DG ISOLATION VALVE, 0C-DLO-18

CAUTION
Closing 1A-DLO-32 isolates the recirc path for the 1A Lube Oil Drain Tank Transfer Pump.

i. **SHUT** 1A LUBE OIL DRAIN TANK RECIRC LINE TANK INLET VALVE, 1A-DLO-32.

NOTE
Engine oil sump level should **NOT** exceed the "B" mark on the dipstick when the prelube system is shutdown.

j. **MONITOR** the lube oil level at the selected 0C DG dipstick:

DG :	DIPSTICK
0C1 :	0C1 LO LVL IND, 0-LI-10165
0C2 :	0C2 LO LVL IND, 0-LI-10204

6.21.B.2 Procedure (Continued)

CAUTION
The 1A Lube Oil Drain Tank Transfer Pump shall **NOT** be left unattended while operating with the Bypass Switch in BYPASS.

k. **IF** additional lube oil must be transferred below the 1A Lube Oil Drain Tank Transfer Pump stop interlock,
THEN POSITION the Bypass Switch to BYPASS **AND RESTART** the 1A Lube Oil Drain Tank Transfer Pump.

l. **WHEN** the selected 0C DG lube oil sump reaches the desired level,
THEN STOP the 1A Lube Oil Drain Tank Transfer Pump.

m. **VERIFY** the Bypass Switch is positioned to NORMAL.

n. **SHUT** the selected 0C DG return valve from 1A Lube Oil Drain Tank:

DG :	VALVE
0C1 :	1A LUBE OIL DRAIN SYSTEM RETURN TO 0C1 DG ISOLATION VALVE, 0C-DLO-19
0C2 :	1A LUBE OIL DRAIN SYSTEM RETURN TO 0C2 DG ISOLATION VALVE, 0C-DLO-18

o. **SHUT** 1A LUBE OIL DRAIN SYSTEM RETURN TO 0C DG HDR ISOLATION VALVE, 0C-DLO-2.

p. **OPEN** 1A LUBE OIL DRAIN TANK RECIRC LINE TANK INLET VALVE, 1A-DLO-32.

q. **SHUT** 1A LUBE OIL DRAIN TANK RECIRC LINE ISOLATION VALVE, 1A-DLO-30.

****** END ******

6.22 OPERATE THE 0C PNEUMATIC PRELUBE PUMPS [B0388 & B0255]

A. Initial Conditions

1. 0C Lube Oil System valves are aligned **PER** the following attachments:
   - ATTACHMENT 1C, 0C LUBE OIL SYSTEM VALVE LINEUP
   - ATTACHMENT 2C, 0C LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP

B. Procedure

1. **IF** Pneumatic Prelube pumps are to be run without an engine start, **THEN PERFORM** the following:
   a. **ENSURE** the 0C DG is REMOVED from service **PER** Section 6.15, REMOVE AND RESTORE 0C DG FROM/TO SERVICE.
   b. **SECURE** the AC Prelube pumps by PLACING the following handswitches in OFF:
      - 0C1 AC PRELUBE PP SEL SW, 0-HS-10161
      - 0C2 AC PRELUBE PP SEL SW, 0-HS-10201
2. **OPEN** the following valves:
   - 0C1 PNEUMATIC PRELUBE PUMP SUCTION VALVE, 0C1-DLO-2.
   - 0C1 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE, 0C1-DLO-14.
   - 0C2 PNEUMATIC PRELUBE PUMP SUCTION VALVE, 0C2-DLO-2.
   - 0C2 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE, 0C2-DLO-14.
3. **VERIFY** the following isolation valves are OPEN:
   - 0C PNEUMATIC PRELUBE PUMP AIR BOTTLE ISOLATION VALVE, 0C-DLO-76
   - 0C PNEUMATIC PRELUBE PUMP AIR BOTTLE ISOLATION VALVE, 0C-DLO-77
4. **OPEN** one 0C Pneumatic Prelube Pump Air Bottle outlet valve.

6.22.B Procedure (Continued)

5. **START** the 0C Pneumatic Prelube pumps by **PERFORMING** the following:

   a. **ADJUST** 0C PNEUMATIC PRELUBE AIR BOTTLE PCV, 0-DLO-10180-PCV, to a maximum of 110 PSIG on 0C PNEMATIC PRELUBE PUMP AIR SUPPLY REGULATOR OUTLET PI, 0-PI-10180, to start the Prelube pump turning.

   b. **WHEN** BOTH Prelube pumps have started, **THEN THROTTLE** the 0C PNEUMATIC PRELUBE PUMP AIR BOTTLE PCV, 0-DLO-10180-PCV, to obtain approximately 35 PSIG (30-40 PSIG) on 0C PNEUMATIC PRELUBE PUMP AIR SUPPLY REGULATOR OUTLET PI, 0-PI-10180. **[B0263]**

6. **IF** starting 0C DG, **THEN PERFORM** the following PRIOR to starting 0C DG:

   - **IF** the following conditions apply, **THEN OPERATE** the 0C Pneumatic Prelube Pumps a MINIMUM of 5 minutes:

     - The prelube pumps ran at least 20 continuous minutes prior to stopping.

     AND

     - The prelube pumps have been off less than 40 minutes.

   OR

   - **IF** the above conditions are **NOT** met, **THEN OPERATE** the 0C Pneumatic Prelube Pumps a MINIMUM of 20 minutes.

7. **IF** starting the 0C DG, **THEN RETURN** to the starting section 6.2.B.3 or 6.4.B.3, as appropriate.

8. **IF** the air bottle pressure drops below approximately 100 psig, **THEN PLACE** the standby (full) air bottle into service.

6.22.B Procedure (Continued)

NOTE
The 0C Pneumatic Prelube Pumps should be stopped when 0C DG is running.

9. **WHEN** operation of the 0C Pneumatic Prelube Pumps is **NOT** required, **THEN PERFORM** the following:

   a. **ADJUST** 0C PNEUMATIC PRELUBE PUMP AIR BOTTLE PCV, 0-DLO-10180-PCV, to obtain approximately zero psig on 0C PNEUMATIC PRELUBE PUMP AIR SUPPLY REGULATOR OUTLET PI, 0-PI-10180.

   b. **SHUT** the 0C Pneumatic Prelube Pump Air Bottle(s) outlet valve.

   c. **SHUT** the following valves:

      - 0C1 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE, 0C1-DLO-14.
      - 0C1 PNEUMATIC PRELUBE PUMP SUCTION VALVE, 0C1-DLO-2.
      - 0C2 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE, 0C2-DLO-14.
      - 0C2 PNEUMATIC PRELUBE PUMP SUCTION VALVE, 0C2-DLO-2.

10. **IF** the Pneumatic Prelube pumps were run without starting the 0C DG, **THEN PERFORM** the following:

    a. **START** the AC prelube pumps by placing the following handswithches in AUTO:

       - 0C1 AC PRELUBE PP SEL SW, 0 HS-10161
       - 0C2 AC PRELUBE PP SEL SW, 0-HS-10201

    b. **VERIFY** the AC PRELUBE PUMP FAILURE alarm clear on 0C188.

    c. **IF** desired, **RESTORE** the 0C DG to service **PER** Section 6.15, REMOVE AND RESTORE 0C DG FROM/TO SERVICE.

6.22.B Procedure (Continued)

11. **VERIFY** both 0C Pneumatic Prelube Pump Air Bottle pressures are at least 2000 psig **AND REPLACE** any deficient air bottle(s).

    a. **ENSURE** 0-DLO-10180-PCV black regulator knob is backed out a few turns to release pressure from the regulator diaphragm.

    b. **ENSURE** OC PNEUMATIC PRELUBE PUMP AIR BOTTLE ISOLATION VALVES, OC-DLO-76 and OC-DLO-77 are OPEN.

    c. **CHECK** the first OC Pneumatic Prelube Pump Air Bottle pressure:

        (1) **OPEN** the first OC Pneumatic Prelube Pump Air Bottle outlet valve.

        (2) **NOTE** the pressure on 0C PNEUMATIC PRELUBE PUMP AIR SUPPLY REGULATOR INLET PI, 0-PI-10183 high pressure gauge.

        (3) **SHUT** the first OC Pneumatic Prelube Pump Air Bottle outlet valve.

    d. **CHECK** the second OC Pneumatic Prelube Pump Air Bottle pressure:

        (1) **OPEN** the second OC Pneumatic Prelube Pump Air Bottle outlet valve.

        (2) Allow the pressure to equalize and **NOTE** the pressure on 0C PNEUMATIC PRELUBE PUMP AIR SUPPLY REGULATOR INLET PI, 0-PI-10183 high pressure gauge.

        (3) **SHUT** the second OC Pneumatic Prelube Pump Air Bottle outlet valve.

12. **WHEN** both 0C Pneumatic Prelube Pump Air Bottle pressures are less than 2000 psig,
    THEN REPLACE any deficient air bottle(s):

    a. **SHUT** the OC Pneumatic Prelube Pump Air Bottle outlet valve.

    b. **SHUT** the desired OC PNEUMATIC PRELUBE PUMP AIR BOTTLE ISOLATION VALVE, OC-DLO-76 (OC-DLO-77).

    c. **REPLACE** the OC Pneumatic Prelube Pump Air Bottle.

    d. **ENSURE** OC PNEUMATIC PRELUBE PUMP AIR BOTTLE ISOLATION VALVES, OC-DLO-76 and OC-DLO-77 are OPEN.

    e. **CHECK** both 0C Pneumatic Prelube Pump Air Bottle pressures are at least 2000 psig.

****** END ******

6.23 MAKEUP TO THE 0C HT/LT COOLANT EXPANSION TANKS AND THE 1A COOLANT MIXING TANK

A. Initial Conditions

1. 0C HT/LT Coolant System valves are aligned **PER** the following attachments:
   - ATTACHMENT 1D, 0C HT/LT COOLANT SYSTEM VALVE LINEUP
   - ATTACHMENT 2D, 0C HT/LT COOLANT SYSTEM INSTRUMENT VALVE LINEUP
2. The 1A Coolant Mixing Tank is available.
3. **IF** used,
   THEN the propylene glycol barrel is sealed **OR** locked prior to use.

6.23 MAKEUP TO THE 0C HT/LT COOLANT EXPANSION TANKS AND THE 1A COOLANT MIXING TANK (Continued)

B. Procedure

NOTE

- The 0C HT/LT Expansion Tanks hold 2.5 gal/inch (0 - 32 inches = 80 gallons).
- The 1A Coolant Mixing Tank holds 4.3 gal/inch (0 - 40 inches = 172 gallons. Approximately 29 additional gallons remain below indicated zero).
- Sampling of the 1A Coolant Mixing Tank is **NOT** required if all of the following conditions are met:
  a. Latest Chemistry sample results are posted including Date, Sample percentage and Tank Level.
  b. Tank Level is **NOT** higher than the posted result
  c. Glycol or DI makeup to Mixing Tank is **NOT** required.

CAUTION

Mixtures with less than 40% propylene glycol should not be used due to potential freezing of fill piping in unheated areas.

1. **IF** makeup to the 1A Coolant Mix Tank is necessary, **THEN NOTIFY** Plant Chemistry of the amount of makeup required **AND REQUEST** Plant Chemistry recommend amounts of DI water **AND** propylene glycol to be mixed for the required concentration.

   a. **WHEN** the recommended mixture volumes have been identified, **THEN PERFORM** the following:

      (1) **IF** DI water is required, **THEN PERFORM** the following:

         (a) **VERIFY OPEN** DEMINERALIZED WATER TO 1A DIESEL GENERATOR BUILDING ISOLATION VALVE, 0-DW-500.

         (b) **OPEN** 1A COOLANT MIXING TANK DEMIN WATER INLET VALVE, O-DW-501 **AND ADD** the required amount of DI water to the 1A Coolant Mixing Tank.

         (c) **SHUT** 1A COOLANT MIXING TANK DEMIN WATER INLET VALVE, O-DW-501.

         (d) **SHUT** DEMINERALIZED WATER TO 1A DIESEL GENERATOR BUILDING ISOLATION VALVE, 0-DW-500.

6.23.B.1.a **Procedure (Continued)**

(2) **IF** Propylene Glycol addition is required
THEN PERFORM the following:

(a) **CONNECT** a hose to the 1A Glycol Fill Pump hose connection.

(b) **PLACE** a catch pan **OR** absorbant material under the hose connection to receive any spills. 02300

(c) **PLACE** the free end of the hose into the Propylene Glycol barrel.

(d) **OPEN** 1A COOLANT MIXING TANK GLYCOL FILL LINE INLET VALVE, 1A-DCW-6.

(e) **PLACE** 1A COOLANT FILL PP, 1-HS-10074, to START.

(f) **WHEN** the required amount has been transferred,
THEN PLACE 1A COOLANT FILL PP, 1-HS-10074, to STOP.

(g) **SHUT** 1A COOLANT MIXING TANK GLYCOL FILL LINE INLET VALVE, 1A-DCW-6

(h) **DISCONNECT** the hose from the 1A Glycol Fill Pump hose connection **AND** Drain the hose into the Glycol barrel.

(i) **REMOVE** the hose from the Propylene Glycol barrel **AND** STORE in a leak-proof container **PER** the system cleanliness guidelines of NO-1-200 CONTROL OF SHIFT ACTIVITIES.

(j) **IF NOT** empty,
THEN SHUT AND LOCK the Propylene Glycol barrel to prevent contamination.

(k) **RECORD** Propylene Glycol barrel tracking information in the Outside Operators log.

(l) **REMOVE** the drip pans **AND DISPOSE** of any leaked Propylene Glycol **PER** CNG-EV-1.01-2000, CHEMICAL CONTROL PROGRAM.

6.23.B Procedure (Continued)

2. **IF** the mixture volume in the 1A Coolant Mixing Tank is adequate,
   THEN PLACE the tank in recirculation as follows:

   a. **ENSURE OPEN** 1A COOLANT MIXING TANK OUTLET VALVE, 1A-DCW-7.

   b. **ENSURE SHUT** 1A COOLANT MIXING TANK PUMP DISCHARGE VALVE, 1A-DCW-38.

> **NOTE**
> The 1A Coolant Mixing Tank Pump will automatically stop at a level of approximately 13 inches indicated in the tank.

   c. **PLACE** 1A COOLANT MIXING TANK PP, 1-HS-10073, to START, to begin recirculating the 1A Coolant Mixing Tank.

   d. **RECIRCULATE** for 30 minutes

   e. **IF** required,
      THEN REQUEST Plant Chemistry sample the 1A Coolant Mixing Tank contents. 02300

3. **WHEN** any required sample has been obtained, **AND** it is desired to secure the recirc,
   THEN PLACE the 1A COOLANT MIXING TANK PP, 1-HS-10073, to STOP. 02300

4. **IF** desired,
   THEN CONTINUE with this procedure. 02300

5. **VERIFY** the following valves are SHUT:

   - 0C1 LT EXPANSION TANK FILL VALVE, 0C-DCW-11
   - 0C1 HT EXPANSION TANK FILL VALVE, 0C-DCW-12
   - 0C2 LT EXPANSION TANK FILL VALVE, 0C-DCW-13
   - 0C2 HT EXPANSION TANK FILL VALVE, 0C-DCW-14
   - 1A1 LT EXPANSION TANK FILL VALVE, 1A-DCW-11
   - 1A1 HT EXPANSION TANK FILL VALVE, 1A-DCW-12
   - 1A2 LT EXPANSION TANK FILL VALVE, 1A-DCW-13
   - 1A2 HT EXPANSION TANK FILL VALVE, 1A-DCW-14

6.23.B Procedure (Continued)

NOTE
Two Operators should perform the filling operation.

6. **WHEN** the 1A Coolant Mixing Tank contents are ready to be transferred, **THEN**: 02300

   a. **ENSURE** 1A COOLANT MIXING TANK PP, 1-HS-10073, in START.

   b. **OPEN** 1A COOLANT MIXING TANK PUMP DISCHARGE VALVE, 1A-DCW-38.

7. **THROTTLE OPEN** approximately one turn, the selected 0C HT/LT Expansion Tank isolation valve to commence filling:

EXP TK :	VALVE
0C1 HT :	0C1 HT EXPANSION TANK FILL VALVE, 0C-DCW-12
0C1 LT :	0C1 LT EXPANSION TANK FILL VALVE, 0C-DCW-11
0C2 HT :	0C2 HT EXPANSION TANK FILL VALVE, 0C-DCW-14
0C2 LT :	0C2 LT EXPANSION TANK FILL VALVE, 0C-DCW-13

6.23.B Procedure (Continued)

CAUTION

- The 0C HT/LT Expansion Tanks overflow into the building sump at approximately 35.5 inches.
- The expansion tanks should **NOT** be filled above 24 inches.

8. **WHEN** level in the 0C HT/LT Expansion Tank rises to the desired level, **THEN SHUT** the selected expansion tank isolation valve:

EXP TK :	VALVE
0C1 HT :	0C1 HT EXPANSION TANK FILL VALVE, 0C-DCW-12
0C1 LT :	0C1 LT EXPANSION TANK FILL VALVE, 0C-DCW-11
0C2 HT :	0C2 HT EXPANSION TANK FILL VALVE, 0C-DCW-14
0C2 LT :	0C2 LT EXPANSION TANK FILL VALVE, 0C-DCW-13

9. **PLACE** 1A COOLANT MIXING TANK PP, 1-HS-10073, to STOP.

10. **SHUT** 1A COOLANT MIXING TANK PUMP DISCHARGE VALVE, 1A-DCW-38.

11. **CHECK** the 0C DG Building sump for blue dye.

    a. **IF** Propylene Glycol mixture (blue dye) is evident in the sump, **THEN PERFORM** the following:

        (1) **PLACE** the 0C DG Building sumps pumps to OFF.

        (2) **NOTIFY** the CRS **OR** Shift Manager.

        (3) **INITIATE** action to pump the sump to suitable containers for disposal **PER** CNG-EV-1.01-2000, CHEMICAL CONTROL PROGRAM.

        (4) **LOG** in shift turnover short term notes to maintain sumps in off until notified by Chemistry Environmental Services.

****** END ******

6.24 DRAIN THE 0C HT/LT COOLANT SYSTEMS TO THE 1A COOLANT DRAIN TANK

A. Initial Conditions

1. 0C DG is tagged out for maintenance.

2. **IF** a 0C HT Coolant System is being drained,
   THEN the associated 0C DG equipment is tagged out:

   - 0C1 Electric Water Preheater **AND** 0C1 Preheat Pump
   - 0C2 Electric Water Preheater **AND** 0C2 Preheat Pump

3. The 0C HT/LT Coolant System valves are aligned **PER** the following attachments:

   - ATTACHMENT 1D, 0C HT/LT COOLANT SYSTEM VALVE LINEUP
   - ATTACHMENT 2D, 0C HT/LT COOLANT SYSTEM INSTRUMENT VALVE LINEUP

4. The expected maintenance requires draining one **OR** more 0C HT/LT Coolant Systems.

5. Since the 1A Coolant Drain Tank will **NOT** hold all four HT/LT coolant circuits, the 1A Coolant Drain Tank is empty **OR** has adequate capacity to accept the expected volume to be drained (refer to TABLE 4, 1A COOLANT DRAIN TANK VOLUME).

   - HT loop - ≈800 gal. each
   - LT loop - ≈1100 gal. each
   - Engine Block - ≈150 gal. each

6. A portable pump with hose connections dedicated for propylene glycol use is available.

7. **IF** a 0C HT Coolant System is being drained,
   THEN, the HT Coolant temperature is less than or equal to 110° F as indicated at the Aux desk gage.

B. Procedure

1. **PERFORM** the following to install hoses in the 1A DG Building:

   a. **CONNECT** one end of a temporary hose to the quick disconnect located on top of the 1A Coolant Drain Tank.

   b. **CONNECT** the other end of the temporary hose to the Glycol Transfer Hose Connection (39' elevation South wall).

6.24.B Procedure (Continued)

2. **PERFORM** the following to install hoses in the 0C DG Building:

   a. **CONNECT** a second temporary hose from the Glycol Transfer Hose Connection (39' elevation North wall) to the portable pump discharge quick disconnect.

   b. **CONNECT** a third temporary hose to the portable pump suction quick disconnect.

   c. **ATTACH** a temporary valve to the third temporary hose free end.

6.24.B.2 *Procedure* (Continued)

NOTE
Depending on the reason for draining the selected 0C HT/LT Coolant System, one **OR** both sides of the AMOT Thermostatic (TCV) valve may require draining.

d. **CONNECT** the third temporary hose and valve to the selected 0C HT/LT Coolant System drain valve:

CLG SYS :	VALVE
0C1 HT :	0C1 HT RADIATOR FILL AND DRAIN VALVE, 0C1-DCW-1 **OR** 0C1 HT COOLANT DRAIN/SAMPLE VALVE, 0C1-DCW-57
0C1 LT :	0C1 LT RADIATOR FILL AND DRAIN VALVE, 0C1-DCW-14 **OR** 0C1 LT COOLANT DRAIN/SAMPLE VALVE, 0C1-DCW-58
0C2 HT :	0C2 HT RADIATOR FILL AND DRAIN VALVE, 0C2-DCW-1 **OR** 0C2 HT COOLANT DRAIN/SAMPLE VALVE, 0C2-DCW-57
0C2 LT :	0C2 LT RADIATOR FILL AND DRAIN VALVE, 0C2-DCW-14 **OR** 0C2 LT COOLANT DRAIN/SAMPLE VALVE, 0C2-DCW-58
0C1 ENGINE BLOCK :	0C1 DIESEL ENGINE HT COOLANT BLOCK DRAIN VALVE, 0C1-DCW-30 **AND** 0C1 DIESEL ENGINE HT COOLANT BLOCK DRAIN VALVE, 0C1-DCW-42
0C2 ENGINE BLOCK :	0C2 DIESEL ENGINE HT COOLANT BLOCK DRAIN VALVE, 0C2-DCW-30 **AND** 0C2 DIESEL ENGINE HT COOLANT BLOCK DRAIN VALVE, 0C2-DCW-42

3. **PLACE** drip pans **OR** absorbent material at hose connections to catch any leaked propylene glycol.

4. **VERIFY** the temporary valve is OPEN.

6.24.B Procedure (Continued)

5. **OPEN** the selected 0C HT/LT Coolant System drain valve:

CLG SYS :	VALVE
0C1 HT :	0C1 HT RADIATOR FILL AND DRAIN VALVE, 0C1-DCW-1 OR 0C1 HT COOLANT DRAIN/SAMPLE VALVE, 0C1-DCW-57
0C1 LT :	0C1 LT RADIATOR FILL AND DRAIN VALVE, 0C1-DCW-14 OR 0C1 LT COOLANT DRAIN/SAMPLE VALVE, 0C1-DCW-58
0C2 HT :	0C2 HT RADIATOR FILL AND DRAIN VALVE, 0C2-DCW-1 OR 0C2 HT COOLANT DRAIN/SAMPLE VALVE, 0C2-DCW-57
0C2 LT :	0C2 LT RADIATOR FILL AND DRAIN VALVE, 0C2-DCW-14 OR 0C2 LT COOLANT DRAIN/SAMPLE VALVE, 0C2-DCW-58
0C1 ENGINE BLOCK :	0C1 DIESEL ENGINE HT COOLANT BLOCK DRAIN VALVE, 0C1-DCW-30 AND 0C1 DIESEL ENGINE HT COOLANT BLOCK DRAIN VALVE, 0C1-DCW-42
0C2 ENGINE BLOCK :	0C2 DIESEL ENGINE HT COOLANT BLOCK DRAIN VALVE, 0C2-DCW-30 AND 0C2 DIESEL ENGINE HT COOLANT BLOCK DRAIN VALVE, 0C2-DCW-42

6. **START** the portable pump to commence draining the selected 0C HT/LT Coolant System.

7. **MONITOR** the 1A Coolant Drain Tank level while draining the selected 0C HT/LT Coolant System.

6.24.B Procedure (Continued)

8. **WHEN** draining is complete,
THEN PERFORM the following:

   a. **STOP** the portable pump.

   b. **SHUT** the selected 0C HT/LT Coolant System drain valve:

CLG SYS :	VALVE
0C1 HT :	0C1 HT RADIATOR FILL AND DRAIN VALVE, 0C1-DCW-1 **OR** 0C1 HT COOLANT DRAIN/SAMPLE VALVE, 0C1-DCW-57
0C1 LT :	0C1 LT RADIATOR FILL AND DRAIN VALVE, 0C1-DCW-14 **OR** 0C1 LT COOLANT DRAIN/SAMPLE VALVE, 0C1-DCW-58
0C2 HT :	0C2 HT RADIATOR FILL AND DRAIN VALVE, 0C2-DCW-1 **OR** 0C2 HT COOLANT DRAIN/SAMPLE VALVE, 0C2-DCW-57
0C2 LT :	0C2 LT RADIATOR FILL AND DRAIN VALVE, 0C2-DCW-14 **OR** 0C2 LT COOLANT DRAIN/SAMPLE VALVE, 0C2-DCW-58
0C1 ENGINE BLOCK :	0C1 DIESEL ENGINE HT COOLANT BLOCK DRAIN VALVE, 0C1-DCW-30 **AND** 0C1 DIESEL ENGINE HT COOLANT BLOCK DRAIN VALVE, 0C1-DCW-42
0C2 ENGINE BLOCK :	0C2 DIESEL ENGINE HT COOLANT BLOCK DRAIN VALVE, 0C2-DCW-30 **AND** 0C2 DIESEL ENGINE HT COOLANT BLOCK DRAIN VALVE, 0C2-DCW-42

   c. **SHUT** the temporary valve.

9. **IF** additional draining is desired,
THEN CONTINUE to drain using Steps 2.d through 8.c.

6.24.B Procedure (Continued)

NOTE

IF the following conditions are met,
THEN the hoses installed for draining may remain in place:

- The portable pump is removed.
- The coolant will be returned to the same 0C DG coolant system.
- The hoses are marked **AND** routed to prevent tripping hazards.

10. **REMOVE** the portable pump by performing the following:

    a. **COLLECT** any propylene glycol from hose connections in drip pans **OR** absorbent material.

    b. **DISCONNECT** the discharge hose from the pump.

    c. **DISCONNECT** the suction hose from the pump.

    d. **IF** hoses are to remain in place,
    THEN CONNECT the two hoses together.

    e. **REMOVE** the portable pump **AND STORE** in a leak-proof container **PER** the system cleanliness guidelines of NO-1-200, Control Of Shift Activities.

11. **IF** refilling the 0C HT/LT Coolant System from the 1A Coolant Drain Tank is desired,
THEN GO TO Section 6.25, FILL THE 0C HT/LT COOLANT SYSTEMS FROM THE 1A COOLANT DRAIN TANK.

12. **IF** removal of the hoses is desired,
THEN PERFORM the following:

    a. **DISCONNECT** the temporary hoses **AND** valve installed for draining.

    b. **DRAIN** the hoses into a bucket **OR** collection device.

    c. **REMOVE** the drip pans and absorbent material **AND DISPOSE** of ALL waste propylene glycol **PER** CNG-EV-1.01-2000, CHEMICAL **CONTROL** PROGRAM.

    d. **STORE** the draining equipment **AND** temporary hoses in a leak-proof container **PER** the system cleanliness guidelines of NO-1-200, Control Of Shift Activities.

6.24.B Procedure (Continued)

NOTE
The following step can be skipped if **NO** coolant was spilled during the evolution.

13. **CHECK** the 0C DG Building sump for blue dye.

    a. **IF** Propylene Glycol mixture (blue dye) is evident in the sump, **THEN PERFORM** the following:

        (1) **PLACE** the 0C DG Building sumps pumps to OFF.

        (2) **NOTIFY** the CRS **OR** Shift Manager.

        (3) **INITIATE** action to pump the sump to suitable containers for disposal **PER** CNG-EV-1.01-2000, CHEMICAL **CONTROL** PROGRAM.

        (4) **LOG** in shift turnover short term notes to maintain sumps in off until notified by Chemistry Environmental Services.

14. **EVALUATE** the 1A COOLANT MIXING TANK level for adequate volume to support refill of the drained coolant systems, **AND** makeup to the 1A Coolant Mix Tank as necessary, **PER** Section 6.23, MAKEUP TO THE 0C HT/LT COOLANT EXPANSION TANKS AND THE 1A COOLANT MIXING TANK, steps 6.23.B.1 through 6.23.B.3. 02300

****** END ******

6.25 FILL THE 0C HT/LT COOLANT SYSTEMS FROM THE 1A COOLANT DRAIN TANK

A. Initial Conditions

1. The selected 0C HT/LT Coolant System has been drained **PER** Section 6.24, DRAIN THE 0C HT/LT COOLANT SYSTEMS TO THE 1A COOLANT DRAIN TANK.

2. The 1A Coolant Drain Tank is available to provide makeup coolant (refer to TABLE 4, 1A COOLANT DRAIN TANK VOLUME).

B. Procedure

1. **EVALUATE** the 1A COOLANT MIXING TANK level for adequate volume to support refill of the drained coolant systems, **AND** makeup to the 1A Coolant Mix Tank as necessary, **PER** Section 6.23, MAKEUP TO THE 0C HT/LT COOLANT EXPANSION TANKS AND THE 1A COOLANT MIXING TANK, steps 6.23.B.1 through 6.23.B.3. 02300

NOTE
Two Operators should perform the filling process due to the remote location of the 0C HT/LT Expansion Tanks to the 1A Coolant Drain Pump controls.

2. **VERIFY** 1A COOLANT DRAIN TANK OUTLET VALVE, 1A-DCW-20, is OPEN.

NOTE
Steps 3 through 5 may be performed concurrently. 02300

3. **PLACE** 1A COOLANT DRAIN PP, 1-HS-10071, to ON **AND RECIRCULATE** the 1A Coolant Drain Tank for 30 minutes.

4. **IF**, **PER** Section 6.24, a temporary hose was left installed between the quick disconnect located on top of the 1A COOLANT DRAIN TANK and the Glycol Transfer Hose Connection (39' elevation South wall), 02300
THEN PERFORM the following:

   a. **VERIFY SHUT** 1A COOLANT DRAIN FILTER OUTLET HOSE CONN ISOL VALVE, 1A-DCW-42.

   b. **DISCONNECT** the hose from the quick disconnect located on top of the 1A COOLANT DRAIN TANK.

   c. **CONNECT** the hose to the quick disconnect located at 1A-DCW-42.

6.25.B Procedure (Continued)

5. **IF** a temporary hose was **NOT** left installed between the quick disconnect located on top of the 1A COOLANT DRAIN TANK and the Glycol Transfer Hose Connection (39' elevation South wall), **THEN PERFORM** the following: 02300

   a. **VERIFY SHUT** 1A COOLANT DRAIN FILTER OUTLET HOSE CONN ISOL VALVE, 1A-DCW-42.

   b. **CONNECT** a temporary hose to the quick disconnect located at 1A-DCW-42.

   c. **CONNECT** the other end of the temporary hose to the Glycol Transfer Hose Connection (39' elevation South wall).

CAUTION
Mixtures with less than 40% propylene glycol should not be used due to potential freezing of fill piping in unheated areas.

6. **IF** desired by the System Engineer, **THEN REQUEST** Plant Chemistry sample the 1A Coolant Drain Tank **AND ADD** chemicals as directed by the System Engineer. 02300

7. **VERIFY** the hose installation in the 0C DG Building:

   a. **VERIFY** a temporary hose is connected to the Glycol Transfer Hose Connection (39' elevation North wall).

6.25.B.7 Procedure (Continued)

NOTE
The selected 0C HT/LT Coolant System will be filled through both associated drain valves.

b. **VERIFY** the other end of the temporary hose has a temporary valve attached **AND** is connected to the selected 0C HT/LT Coolant System drain valve quick disconnect:

CLG SYS :	VALVE
0C1 HT :	0C1 HT RADIATOR FILL AND DRAIN VALVE, 0C1-DCW-1 OR 0C1 HT COOLANT DRAIN/SAMPLE VALVE, 0C1-DCW-57
0C1 LT :	0C1 LT RADIATOR FILL AND DRAIN VALVE, 0C1-DCW-14 OR 0C1 LT COOLANT DRAIN/SAMPLE VALVE, 0C1-DCW-58
0C2 HT :	0C2 HT RADIATOR FILL AND DRAIN VALVE, 0C2-DCW-1 OR 0C2 HT COOLANT DRAIN/SAMPLE VALVE, 0C2-DCW-57
0C2 LT :	0C2 LT RADIATOR FILL AND DRAIN VALVE, 0C2-DCW-14 OR 0C2 LT COOLANT DRAIN/SAMPLE VALVE, 0C2-DCW-58

8. **PLACE** drip pans **OR** absorbent material at hose connections to catch any leaked propylene glycol.

9. **OPEN** 1A COOLANT DRAIN FILTER OUTLET HOSE CONN ISOL VALVE, 1A-DCW-42.

10. **VERIFY** the temporary valve is OPEN.

6.25.B Procedure (Continued)

11. **OPEN** the selected 0C HT/LT Coolant System drain valve to commence filling:

CLG SYS :	VALVE
0C1 HT :	0C1 HT RADIATOR FILL AND DRAIN VALVE, 0C1-DCW-1 **OR** 0C1 HT COOLANT DRAIN/SAMPLE VALVE, 0C1-DCW-57
0C1 LT :	0C1 LT RADIATOR FILL AND DRAIN VALVE, 0C1-DCW-14 **OR** 0C1 LT COOLANT DRAIN/SAMPLE VALVE, 0C1-DCW-58
0C2 HT :	0C2 HT RADIATOR FILL AND DRAIN VALVE, 0C2-DCW-1 **OR** 0C2 HT COOLANT DRAIN/SAMPLE VALVE, 0C2-DCW-57
0C2 LT :	0C2 LT RADIATOR FILL AND DRAIN VALVE, 0C2-DCW-14 **OR** 0C2 LT COOLANT DRAIN/SAMPLE VALVE, 0C2-DCW-58

12. **CHECK** COOLANT DRAIN FILTER D/P GAGE, 1-PDI-10075, indicates less than 20 PSIG.

    a. **IF** COOLANT DRAIN FILTER D/P GAGE, 1-PDI-10075, indicates greater than or equal to 20 PSIG,
    THEN WRITE an issue report to replace the filter.

CAUTION

The 0C HT/LT Expansion Tanks overflow into the building sump at approximately 35.5 inches.

13. Frequently **MONITOR** the selected 0C HT/LT Coolant System fill at the 0C HT/LT Expansion Tank **AND CHECK** the engine for leaks.

    - 0C1 HT EXP TK LVL IND, 0-LI-10081
    - 0C2 HT EXP TK LVL IND, 0-LI-10101
    - 0C1 LT EXP TK LVL IND, 0-LI-10121
    - 0C2 LT EXP TK LVL IND, 0-LI-10141

6.25.B Procedure (Continued)

NOTE
System may be vented using low point vents while filling to expedite the fill process.

14. **WHEN** the selected 0C HT/LT Expansion Tank level reaches approximately 15 inches or as required,
THEN SHUT the temporary valve at the selected 0C HT/LT Coolant System drain valve.

6.25.B Procedure (Continued)

15. **ALTERNATELY FILL AND VENT** the selected 0C HT/LT Coolant System to maintain expansion tank level indication **AND** fill the piping **PER** the following:

    a. **CONNECT** a temporary hose from the associated vent valve to an appropriate catchment device. 02300

> **NOTE**
> Ensure all vented propylene glycol is contained. 02300

    b. **CRACK OPEN** each vent valve, one at a time, associated with the selected 0C HT/LT Coolant System drain valve until all air is removed **OR** the associated expansion tank level lowers to approximately 5 inches, **THEN SHUT** the associated vent valve:

CLG SYS	HOSE CONNECTED TO DRAIN VALVE	VENT USING ASSOCIATED VENT VALVE(S)
0C1 HT	0C1-DCW-1	0C1-DCW-2
	0C1-DCW-57	0C1-DCW-3 0C1-DCW-53
0C1 LT	0C1-DCW-14	0C1-DCW-29
	0C1-DCW-58	0C1-DCW-50
0C2 HT	0C2-DCW-1	0C2-DCW-2
	0C2-DCW-57	0C2-DCW-3 0C2-DCW-53
0C2 LT	0C2-DCW-14	0C2-DCW-29
	0C2-DCW-58	0C2-DCW-50

    c. **IF** necessary,
    THEN OPERATE the temporary valve to maintain the selected 0C HT/LT Expansion Tank level between 5 and 15 inches.

6.25.B Procedure (Continued)

16. **WHEN** all air is removed from the piping being filled **AND IF** both sides of the selected 0C HT/LT Coolant System TCV have **NOT** been filled, **THEN PERFORM** the following:

    a. **SHUT** the selected 0C HT/LT Coolant System drain valve:

CLG SYS :	VALVE
0C1 HT :	0C1 HT RADIATOR FILL AND DRAIN VALVE, 0C1-DCW-1 **OR** 0C1 HT COOLANT DRAIN/SAMPLE VALVE, 0C1-DCW-57
0C1 LT :	0C1 LT RADIATOR FILL AND DRAIN VALVE, 0C1-DCW-14 **OR** 0C1 LT COOLANT DRAIN/SAMPLE VALVE, 0C1-DCW-58
0C2 HT :	0C2 HT RADIATOR FILL AND DRAIN VALVE, 0C2-DCW-1 **OR** 0C2 HT COOLANT DRAIN/SAMPLE VALVE, 0C2-DCW-57
0C2 LT :	0C2 LT RADIATOR FILL AND DRAIN VALVE, 0C2-DCW-14 **OR** 0C2 LT COOLANT DRAIN/SAMPLE VALVE, 0C2-DCW-58

    b. **VERIFY** the temporary valve at the selected 0C HT/LT Coolant Drain System valve is SHUT.

    c. **SHUT** 1A COOLANT DRAIN FILTER OUTLET HOSE CONN ISOL VALVE, 1A-DCW-42.

    d. **DISCONNECT** the temporary hose and valve **AND RE-CONNECT** to the selected 0C HT/LT Coolant System drain valve on the opposite side of the TCV.

    e. **PERFORM** Steps 9 through 15.c to fill the second part of the selected 0C HT/LT Coolant System.

6.25.B Procedure (Continued)

NOTE

- Filling may be stopped to check for level indicator stabilization.
- The expansion tank should **NOT** be filled above 24 inches.

17. **WHEN** all air is removed from the piping being filled **AND** both sides of the selected 0C HT/LT Coolant System TCV have been filled,
THEN OPEN the temporary valve to raise the selected 0C HT/LT Expansion Tank level to between 20 and 22 inches. 02300

18. **WHEN** the selected 0C HT/LT Expansion Tank is at the desired level,
THEN SHUT the selected 0C HT/LT Coolant System drain valve.

CLG SYS :	VALVE
0C1 HT :	0C1 HT RADIATOR FILL AND DRAIN VALVE, 0C1-DCW-1 OR 0C1 HT COOLANT DRAIN/SAMPLE VALVE, 0C1-DCW-57
0C1 LT :	0C1 LT RADIATOR FILL AND DRAIN VALVE, 0C1-DCW-14 OR 0C1 LT COOLANT DRAIN/SAMPLE VALVE, 0C1-DCW-58
0C2 HT :	0C2 HT RADIATOR FILL AND DRAIN VALVE, 0C2-DCW-1 OR 0C2 HT COOLANT DRAIN/SAMPLE VALVE, 0C2-DCW-57
0C2 LT :	0C2 LT RADIATOR FILL AND DRAIN VALVE, 0C2-DCW-14 OR 0C2 LT COOLANT DRAIN/SAMPLE VALVE, 0C2-DCW-58

19. **VERIFY** the temporary valve at the selected 0C HT/LT Coolant Drain System valve is SHUT.

20. **ENSURE SHUT** 1A COOLANT DRAIN FILTER OUTLET HOSE CONN ISOL VALVE, 1A-DCW-42.

21. **IF** filling another 0C HT/LT Coolant System,
THEN REPEAT Steps 7.b through 20.

6.25.B Procedure (Continued)

22. **IF** 0C HT/LT Coolant System filling is complete, **THEN PERFORM** the following:

    a. **PLACE** 1A COOLANT DRAIN PP, 0-HS-10071, to OFF.

    b. **REMOVE** the hoses by performing the following:

CAUTION
The temporary valve must remain shut while disconnecting.

    (1) **DISCONNECT** the temporary hose **AND** valve from the selected 0C HT/LT Coolant System drain valve.

    (2) **PLACE** the temporary valve into a bucket **AND** SLOWLY **OPEN** the valve to relieve pressure from the hoses.

    (3) **DISCONNECT** the temporary hoses installed for draining **AND DRAIN** into a bucket **OR** collection device.

    (4) **REMOVE** the drip pans and absorbent material **AND DISPOSE** of ALL waste propylene glycol **PER** CNG-EV-1.01-2000, CHEMICAL **CONTROL** PROGRAM.

    (5) **STORE** the draining equipment **AND** temporary hoses in a leak-proof container **PER** the system cleanliness guidelines in NO-1-200, Control Of Shift Activities.

23. **CHECK** the 0C DG Building sump for blue dye.

    a. **IF** Propylene Glycol mixture (blue dye) is evident in the sump, **THEN PERFORM** the following:

    (1) **PLACE** the 0C DG Building sumps pumps to OFF.

    (2) **NOTIFY** the CRS **OR** Shift Manager.

    (3) **INITIATE** action to pump the sump to suitable containers for disposal **PER** CNG-EV-1.01-2000, CHEMICAL **CONTROL** PROGRAM.

    (4) **LOG** in shift turnover short term notes to maintain sumps in off until notified by Chemistry Environmental Services.

24. **IF** additional makeup to the 0C HT/LT Expansion Tanks is necessary, **THEN GO TO** Section 6.23, MAKEUP TO THE 0C HT/LT COOLANT EXPANSION TANKS AND THE 1A COOLANT MIXING TANK.

****** END ******

6.26 WASH THE 0C DG TURBOCHARGERS (PE 0-24-11-O-2A)

A. Initial Conditions

1. 0C DG turbocharger performance indicates blade fouling,
   OR
   The Responsible System Engineer recommends washing the 0C DG turbocharger,
   OR
   Scheduled PE.

2. 0C DG is running at **OR** above 3.24 MW load.

B. Procedure

CAUTION
The 0C DG turbochargers shall be washed with Demin Water only. Do **NOT** use solvents of any kind.

WARNING
The turbocharger Water Wash Tanks may be pressurized with air.

1. **CAREFULLY REMOVE** the selected turbocharger Water Wash Tank lid **AND FILL** the tank with 1/2 quart of demin water.

2. **REPLACE AND HAND TIGHTEN** the selected turbocharger Water Wash Tank lid.

3. **OPEN** the corresponding turbocharger Water Wash Tank outlet valve:

TURBO :	VALVE
0C1 DG :	0C1 INBOARD WATER WASH TANK ISOLATION VALVE, 0C1-SCA-1 OR 0C1 OUTBOARD WATER WASH TANK ISOLATION VALVE, 0C1-SCA-2
0C2 DG :	0C2 INBOARD WATER WASH TANK ISOLATION VALVE, 0C2-SCA-1 OR 0C2 OUTBOARD WATER WASH TANK ISOLATION VALVE, 0C2-SCA-2

4. **DEPRESS AND HOLD** the actuator pushbutton on the tank to commence turbocharger cleaning.

5. **WAIT** approximately 30 seconds,
   THEN RELEASE the pushbutton.

6.26.B Procedure (Continued)

6. **OPERATE** 0C DG loaded for a minimum of three minutes.

7. **SHUT** the corresponding turbocharger Water Wash Tank outlet valve:

TURBO :	VALVE
0C1 DG :	0C1 INBOARD WATER WASH TANK ISOLATION VALVE, 0C1-SCA-1 OR 0C1 OUTBOARD WATER WASH TANK ISOLATION VALVE, 0C1-SCA-2
0C2 DG :	0C2 INBOARD WATER WASH TANK ISOLATION VALVE, 0C2-SCA-1 OR 0C2 OUTBOARD WATER WASH TANK ISOLATION VALVE, 0C2-SCA-2

NOTE
Following the second cleaning, 0C DG shall be loaded a MINIMUM of 30 minutes at greater than or equal to 3.24 MW prior to performing additional cleaning cycles.

8. **IF** a second cleaning is desired,
THEN OPERATE 0C DG a minimum of 10 minutes before repeating this section.

WARNING
The turbocharger Water Wash Tank will be pressurized with air.

9. **WHEN** turbocharger cleaning is complete,
THEN PERFORM the following:

   a. **CAREFULLY UNSCREW** the selected Water Wash Tank lid wheel to relieve pressure in the tank.

   b. **HAND TIGHTEN** the tank lid wheel.

****** END ******

6.27 MONTHLY SLOW START (PE 0-24-8-O-M)

A. Initial Conditions

1. 0C Diesel Generator aligned **PER** Section 6.1, 0C DG NORMAL STANDBY.
2. 07 480V Bus is powering 0C DG auxiliary equipment from 07 4KV bus.
3. The AC prelube pump on each engine is operating for the prelube oil pressure start permissive. **[B0255]**
4. Manual speed control below 1176 rpm (58.8 Hz) due to maintenance or testing is **NOT** required.

NOTE

0C DG should be loaded to the available 4KV buses in the rotation as follows, but may be loaded to any 4KV bus as necessary due to plant limitations:

- 11 4KV Bus - January, May, September
- 14 4KV Bus - February, June, October
- 21 4KV Bus - March, July, November
- 24 4KV Bus - April, August, December

5. The selected 4KV Bus Safety Related DG is **NOT** operating:

4KV Bus	:	DG
11	:	1A DG
14	:	1B DG
21	:	2A DG
24	:	2B DG

6. SIAS **AND** U/V actuation signals on the selected 4KV Bus are reset.

6.27.A Initial Conditions (Continued)

7. Kirk keys for the selected 4KV Bus 0C DG disconnect are available:

4KV BUS	DISC	KEYS
11	189-1106	11893, 11901, 11940, 14259
14	189-1406	11895, 11896, 11901
21	189-2106	11900, 11903, 14259
24	189-2406	11898, 11899, 11901, 14259

8. Chemistry Analytical Services has sampled 11 FOST and obtained a satisfactory analysis **PER** Section 6.16, FILL THE 0C FUEL OIL DAY TANK, requirements. **[B0260]**

9. The following has been obtained from the designated Oil Sample Locker in the Machine Shop:
(The SM may direct this step intial condition be N/A'd)

   - For Generator bearing oil samples:
     - Two oil sample bottles **AND** two labels
     - Two lengths of clean sample tubing, each approximately 24 inches long
   - For DG engine crankcase samples:
     - Four oil sample bottles **AND** four labels
       (2 for the 0C1 crankcase)
       (2 for the 0C2 crankcase)
     - Four lengths of clean sample tubing, each approximately 48 inches long
       (2 for the 0C1 crankcase)
       (2 for the 0C2 crankcase)

B. Procedure **INITIALS**

1. **PERFORM** 0C DG system checks **PER** Section 6.1, 0C DG NORMAL STANDBY, Subsection B. ____

6.27.B Procedure (Continued) **INITIALS**

2. **PERFORM** a slow speed start of 0C DG.

NOTE

- The following local annunciators may momentarily alarm when 0C DG is slow started and then clear:
  - (1) SL-20, "SPEED SIGNAL FAIL ENG 1 or 2"
  - (2) SL-25, "ENG LOAD UNBALANCED FAILURE"
- The following annunciators will alarm when 0C DG is slow started:
  - (1) Local annunciators "GENERATOR UNDRFREQ" and "GENERATOR UNDERVOLTAGE"
  - (2) Control Room annunciator "0C DG"

a. **DEPRESS** 0C DG SLOW START, 0-HS-0708, pushbutton. _____

b. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 0C188:

- 0C1 HT RAD FAN SEL SW, 0-HS-10082 _____
- 0C2 HT RAD FAN SEL SW, 0-HS-10102 _____
- 0C1 FO B/U PP SEL SW, 0-HS-10051 _____
- 0C2 FO B/U PP SEL SW, 0-HS-10061 _____

c. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 0C188 **AND** 0C192:

- 0C1 AC PRELUB PP SEL SW, 0-HS-10161 _____
- 0C2 AC PRELUB PP SEL SW, 0-HS-10201 _____
- 0C1 HT PRHT PP SEL SW, 0-HS-10081 _____
- 0C2 HT PRHT PP SEL SW, 0-HS-10101 _____
- 0C-F-9 ROOF EXHAUSTER, 0-HS-10584 _____
- 0C-F-10 ROOF EXHAUSTER, 0-HS-10586 _____

6.27.B.2 Procedure (Continued) **INITIALS**

d. **PERFORM** the following to vent the fuel oil piping and test the Engine driven Fuel Oil Pump as follows:

(1) **PLACE** OC1 FO B/U PP SEL SW, 0-HS-10051, to OFF. _____

(2) **OBSERVE** OC1 FO FEED PRESS, 0-PI-10052, for indication of normal fuel oil pressure. _____

(3) **PLACE** OC2 FO B/U PP SEL SW, 0-HS-10061, to OFF. _____

(4) **OBSERVE** OC2 FO FEED PRESS, 0-PI-10062, for indication of normal fuel oil pressure. _____

e. **PERFORM** the following at 1C19C:

(1) **CHECK** 0C DG generator phase voltages are balanced (highest to lowest phase voltage difference is less than 400 volts). **[B0248]** _____

- 0C DG VOLTS, 0-EI-0701

(2) **CHECK** 0C DG is at rated frequency (58.8 to 61.2 Hz) **AND** voltage (3.74KV to 4.58KV). _____

- 0C DG FREQUENCY, 0-SI-0701
- 0C DG VOLTS, 0-EI-0701

f. **IF** flags are dropped **AND** the associated 0C188 alarm is clear,
THEN RESET the following relay flags in Panel 0C188 Cabinet 5: (N/A if flags are not dropped or alarm is not clear.) _____

ALARM:	"GENERATOR UNDERVOLTAGE [27]"
RELAY:	UNDERVOLTAGE PROTECTIVE RELAY, OESL 0997-27
ALARM:	"GENERATOR UNDERFREQ [81/U]"
RELAY:	UNDERFREQUENCY PROTECTIVE RELAY, OSSL 0998-81.U

6.27.B Procedure (Continued) **INITIALS**

NOTE

0C DG should be loaded to the available 4KV buses in the rotation as follows, but may be loaded to any 4KV bus as necessary due to plant limitations:

- 11 4KV Bus - January, May, September
- 14 4KV Bus - February, June, October
- 21 4KV Bus - March, July, November
- 24 4KV Bus - April, August, December

3. **LOAD** the 0C DG:

   a. **PARALLEL** the 0C DG with 07 4KV BUS FDR, 152-0704.

      (1) **INSERT** the Sync Stick for 0C DG OUT BKR, 0-CS-152-0703, to put the governor in the parallel mode. _____

      (2) **MOMENTARILY PLACE** 0C DG SPEED CONTR, 0-CS-0705, to RAISE **OR** LOWER. _____

      (3) **CHECK** the Synchroscope **AND** Sync Lights are operating on 1C18B. _____

      (4) **ADJUST** INCOMING VOLTS, 1-EI-4001A, equal to RUNNING VOLTS, 1-EI-4001B, using 0C DG AUTO VOLT CONTR, 0-CS-0704. _____

      (5) **ADJUST** 0C DG speed so the Synchroscope pointer is rotating slowly in the FAST direction using 0C DG SPEED CONTR, 0-CS-0705. _____

NOTE

SITE POWER breaker 152-0704 should be tripped as soon as 0C DG Output breaker 152-0703 is closed.

CAUTION

Do **NOT** exceed 0.5 MW while paralleled with 07 4KV BUS FDR, 152-0704, to preclude tripping 152-0704 on excess reverse current. **[B0248]**

      (6) **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position, **THEN PLACE** 0C DG OUT BKR, 0-CS-152-0703, to CLOSE. _____

6.27.B.3.a **Procedure (Continued)** **INITIALS**

(7) **PLACE** 07 4KV BUS FDR, 0-CS-152-0704, to TRIP. _____

(8) **ADJUST** 0C DG SPEED CONTR, 0-CS-0705, to obtain approximately 60 Hz on 0C DG FREQUENCY, 0-SI-0701. _____

(9) **REMOVE** the Sync Stick **AND RETURN** to Home Base. _____

b. **PARALLEL** the 0C DG to the selected Safety Related Bus:

CAUTION
When the DG is paralleled to 11 or 24 bus, the Shutdown Sequencer will start 11 and 12 Post-LOCI Filter fans and stop the Kitchen/Toilet Exhaust fan.

(1) **IF** desired, **ALIGN** the Control Room HVAC as follows:

- **VERIFY** 1C22, 0-RI-5350 "CONTR RM VENT" is clear. _____
- **PLACE** the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to OFF _____
- **START** the Post-LOCI filter fans by placing the handswitches to START **AND LOG** the starting time in the Charcoal Filter Log _____
  - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352 _____
  - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353 _____
- **IF** aligning to 11 Bus, Control Room HVAC Units in the following alignment: _____
  - **PREFERRED ALIGNMENT** - 12 CR HVAC in operation

  OR

  - 11 CR HVAC in operation with the Control Room chiller Unit secured.

6.27.B.3.b.1 **Procedure (Continued)** **INITIALS**

- **IF** aligning to 24 Bus, Control Room HVAC Units in the following alignment: _____

  - **PREFERRED ALIGNMENT** - 11 CR HVAC in operation

  OR

  - 12 CR HVAC in operation with the Control Room chiller Unit secured.

CAUTION
0C DG should **NOT** be paralleled with a 4KV Bus during periods when power is suspect (for example, during a severe storm).

(2) **PLACE** the selected 4KV Bus 0C DG feeder breaker handswitch in PULL-TO-LOCK: _____

4KV BUS	:	HANDSWITCH
11	:	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	:	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	:	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	:	0C DG 24 4KV BUS FDR, 2-CS-152-2406

6.27.B.3.b **Procedure (Continued)** **INITIALS**

WARNING

Improper operation of disconnects can result in serious injury. Keep body **AND** head clear of operating arc of handle. DO **NOT** release handle prior to full travel. When disconnect is opened **OR** closed, a very loud bang will be heard **AND** a switch position flag will be visible indicating disconnect position.

(3) In the associated Unit SWGR Room, **CLOSE** the selected 0C DG 4KV Bus disconnect by performing the following: **(P0035)**

(a) **VERIFY** the selected 4KV Bus 0C DG feeder breaker is OPEN by local indication. _____

4KV BUS	BREAKER
11	0C DG 11 4KV BUS FDR, 152-1106
14	0C DG 14 4KV BUS FDR, 152-1406
21	0C DG 21 4KV BUS FDR, 152-2106
24	0C DG 24 4KV BUS FDR, 152-2406

(b) **INSERT** keys **AND UNLOCK** the selected 0C DG 4KV Bus disconnect: _____

4KV BUS	DISC	KEYS
11	189-1106	11893, 11901, 14259
14	189-1406	11896, 11901
21	189-2106	11903, 14259
24	189-2406	11899, 11901, 14259

(c) **CLOSE** the selected 0C DG 4KV Bus disconnect. _____

6.27.B.3.b.3 **Procedure (Continued)** **INITIALS**

(d) **INSERT** key **AND LOCK** the selected 0C DG 4KV Bus disconnect in the CLOSED position: _____

4KV BUS	DISC	KEY
11	189-1106	11940
14	189-1406	11895
21	189-2106	11900
24	189-2406	11898

(4) **PLACE** 07 4KV BUS TIE, 0-CS-152-0701, to CLOSE. _____

(5) **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch to NORMAL: _____

4KV BUS	HANDSWITCH
11	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	0C DG 24 4KV BUS FDR, 2-CS-152-2406

(6) **INSERT** the Sync Stick for the selected 0C DG 4KV Bus feeder breaker. _____

6.27.B.3.b **Procedure (Continued)** **INITIALS**

(7) **ADJUST** INCOMING VOLTS equal to RUNNING VOLTS using 0C DG AUTO VOLT CONTR, 0-CS-0704. _____

4KV BUS	:	METERS
11/14	:	INCOMING VOLTS, 1-EI-4001A RUNNING VOLTS, 1-EI-4001B
21/24	:	INCOMING VOLTS, 2-EI-4001A RUNNING VOLTS, 2-EI-4001B

(8) **ADJUST** 0C DG frequency so the Synchroscope pointer is rotating slowly in the FAST direction using 0C DG SPEED CONTR, 0-CS-0705. _____

6.27.B.3.b Procedure (Continued) **INITIALS**

NOTE
0C DG load must be adjusted immediately after closing the breaker to ensure minimum 0C DG load is obtained.

CAUTION
TABLE 1, SHUTDOWN SEQUENCER LOADS, lists equipment that receives an auto-start signal from the Shutdown Sequencer when the selected 0C DG 4KV Bus feeder breaker is closed.

(9) **WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position, **THEN PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch to CLOSE: _____

4KV BUS	HANDSWITCH
11	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	0C DG 24 4KV BUS FDR, 2-CS-152-2406

(10) **IMMEDIATELY ADJUST** 0C DG load using 0C DG SPEED CONTR, 0-CS-0705, to obtain between 0.45 MW **AND** 1.0 MW load on 0C DG VAR/WATT, 0-JI-0701B. _____

(11) **CHECK** annunciator "SEQUENCER INITIATED" alarm is received. _____

4KV BUS	PANEL
11/14	1C08
21/24	2C08

6.27.B.3.b **Procedure (Continued)** **INITIALS**

(12) **IF** aligned to 11 or 24 Bus, **THEN CHECK** 1C17 annunciator "RAD MON PANEL 1C22" alarms. (N/A if 0-RI-5350 is bypassed) _____

NOTE
The Control Room Vent RMS alarm, 0-RI-5350, may **NOT** be lit.

- **BYPASS** 1C22, 0-RI-5350 "CONTR RM VENT" _____

(13) **REMOVE** the Sync Stick **AND RETURN** to Home Base. _____

c. **LOAD** 0C DG to between 4.86 and 5.4 MW **AND MAINTAIN** 1.0 to 0.8 Lagging Power Factor as follows: _____

CAUTION
Do **NOT** exceed limits of 5.4 MW, 500 KVARs, **AND** 752 amps.

(1) **REFER** to FIGURE 1, 0C DIESEL GENERATOR ELECTRICAL LIMITS **AND PERFORM** the following:

(a) **RAISE** MW load by approximately 1.0 MW, using 0C DG SPEED CONTR, 0-CS-0705.

(b) **MAINTAIN** 0 to 500 KVARs using 0C DG AUTO VOLT CONTR, 0-CS-0704 **AND** FIGURE 1, 0C DIESEL GENERATOR ELECTRICAL LIMITS.

(c) **MONITOR** the selected 4KV Bus voltage between 4.1KV and 4.35KV. **[B0120]**

(d) **WAIT** approximately 5 minutes, **THEN REPEAT** Steps (a) through (d) until 0C DG reaches the desired load. **[B0254]**

6.27.B Procedure (Continued) **INITIALS**

4. **IF** 0C DG OUT BKR, 152-0703, trips while aligned to a Safety Related 4KV bus,
THEN PERFORM the following: **[B0267]**

   a. **PLACE** 07 4KV BUS TIE, 0-CS-152-0701, to TRIP.

   b. **INSERT** the Sync Stick for 07 4KV BUS FDR, 0-CS-152-0704.

   c. **CHECK** the Synchroscope pointer on 1C18B is **NOT** rotating.

   d. **PLACE** 07 4KV BUS FDR, 0-CS-152-0704, to CLOSE.

   e. **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch to TRIP:

4KV BUS	:	HANDSWITCH
11	:	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	:	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	:	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	:	0C DG 24 4KV BUS FDR, 2-CS-152-2406

   f. **EVALUATE** whether to continue load testing.

   g. **RESET** the following bus U/V flags:

      - 07 4KV Bus
      - 07 480V Bus

6.27.B Procedure (Continued) **INITIALS**

5. **OPERATE** 0C DG for at least one hour. _____

   - **MONITOR** 0C DG while loaded to maintain between 4.86 and 5.4 MW **AND** KVAR 1.0 to 0.8 Lagging Power Factor.

   - **PERFORM** the following to check Engine Driven Fuel Oil Pumps:

     a. **VERIFY** OC1 FO B/U PP SEL SW, 0-HS-10051, in OFF. _____

     b. **OBSERVE** OC1 FO FEED PRESS, 0-PI-10052, for indication of normal fuel oil pressure. _____

     c. **PLACE** OC1 FO B/U PP SEL SW, 0-HS-10051, to AUTO. _____

     d. **VERIFY** OC2 FO B/U PP SEL SW, 0-HS-10061, to OFF. _____

     e. **OBSERVE** OC2 FO FEED PRESS, 0-PI-10062, for indication of normal fuel oil pressure. _____

     f. **PLACE** OC2 FO B/U PP SEL SW, 0-HS-10061, to AUTO. _____

   - **RECORD** equipment operating data 15 minutes after reaching the desired load **AND** at least one set after 0C DG reaches stable operating temperatures. _____

6.27.B.5 Procedure (Continued) **INITIALS**

- **OBTAIN** the 0C1 **AND** 0C2 DG Engine Crankcase oil samples as follows: _____

  a. **LABEL** each oil sample bottle as follows:
  (2 for the 0C1 crankcase)
  (2 for the 0C2 crankcase)

  - Equipment ID: - DG Engine number (0C1 **OR** 0C2)
  (2 for the 0C1 crankcase)
  (2 for the 0C2 crankcase)
  - Date: -
  - Location: - Crankcase
  - OC Engine Hours reading: -

  b. **MARK** each approximately 48 inches long clean sample tube in the middle, about 24 inches from one end.

  c. **SAMPLE** the 0C1 DG crankcase engine oil as follows:

  (1) **REMOVE** the crankcase dipstick.

  (2) **INSERT** one end of the clean sample tubing into the dipstick tube up to the 24 inch mark.

  (3) **FILL** the bottle until it is approximately 3/4 to full.

  (4) **WHEN** bottle is 3/4 to full,
  THEN REMOVE the sample tubing from the dipstick tube.

  (5) Carefully **CAP** the bottle.

  (6) **REPEAT** steps (2) through (5) **AND OBTAIN** a second sample of the 0C1 DG crankcase.

  (7) **INSTALL** the crankcase dipstick.

  (8) **ENSURE** any spilled oil is cleaned up.

  d. **SAMPLE** the 0C2 DG crankcase engine oil as follows:

  (1) **REMOVE** the crankcase dipstick.

  (2) **INSERT** one end of the clean sample tube into the dipstick up to the 24 inch mark.

  (3) **FILL** the bottle until it is approximately 3/4 to full.

  (4) **WHEN** bottle is 3/4 to full,
  THEN REMOVE the sample tube from the dipstick.

6.27.B.5.d **Procedure (Continued)** **INITIALS**

(5) Carefully **CAP** the bottle.

(6) **REPEAT** steps (2) through (5) **AND OBTAIN** a second sample of the 0C2 DG crankcase.

(7) **INSTALL** the crankcase dipstick.

(8) **ENSURE** any spilled oil is cleaned up.

6. **WHEN** 0C DG has operated at least one hour at greater than 4.86 MW,
THEN UNLOAD AND STOP 0C DG **PER** Section 6.12, 0C DG NORMAL SHUTDOWN FROM CONTROL ROOM. _____

7. **OBTAIN** the 0C1 **AND** 0C2 DG Generator Bearing oil samples as follows: _____

a. **LABEL** each oil sample bottle as follows:
(1 for the 0C1 end)
(1 for the 0C2 end)

- Equipment ID: - 0C DG GEN. BRG.
- Date: -
- Location: - (0C1 end **OR** 0C2 end)

b. **SAMPLE** the 0C1 end generator bearing oil as follows:

(1) **REMOVE** the bearing breather cap.

(2) **INSERT** one end of the clean sample tube into the breather cap hole deep enough to obtain an oil sample.

(3) **FILL** the bottle until it is approximately 3/4 to full.

(4) **WHEN** the bottle is 3/4 to full,
THEN REMOVE the sample tube from the breather cap hole.

(5) Carefully **CAP** the bottle.

(6) **RESTORE** generator bearing oil level to the required level, as necessary, **PER** the Oil Control Log.

(7) **INSTALL** the bearing breather cap.

(8) **ENSURE** any spilled oil is cleaned up.

6.27.B.7 Procedure (Continued) **INITIALS**

c. **SAMPLE** the 0C2 end generator bearing oil as follows:

(1) **REMOVE** the bearing breather cap.

(2) **INSERT** one end of the clean sample tube into the breather cap hole deep enough to obtain an oil sample.

(3) **FILL** the bottle until it is approximately 3/4 to full.

(4) **WHEN** the bottle is 3/4 to full,
THEN REMOVE the sample tube from the breather cap hole.

(5) Carefully **CAP** the bottle.

(6) **RESTORE** generator bearing oil level to the required level, as necessary, **PER** the Oil Control Log.

(7) **INSTALL** the bearing breather cap.

(8) **ENSURE** any spilled oil is cleaned up.

8. **RETURN** Crankcase and Generator oil samples to Drop Point One. _____

****** END ******

6.28 QUARTERLY 0C FODT FILL LINE GUARD PIPE LEAKAGE CHECK (PE 0-24-9-O-Q)

A. Initial Conditions

1. Checking the 0C Fuel Oil Day Tank fill line guard pipe for leaks is scheduled. **[B0261]**

B. Procedure

1. **OBTAIN** a collection pan **OR** other device that fits under the guard pipe drain valve.

2. **PLACE** the collection pan under 0C FUEL OIL DAY TANK FILL LINE LEAK DETECTION DRAIN VALVE, 0C-DFO-81.

3. **REMOVE** the pipe cap **AND SLOWLY OPEN** 0C FUEL OIL DAY TANK FILL LINE LEAK DETECTION DRAIN VALVE, 0C-DFO-81.

NOTE
Any fluid drained from the guard pipe should be inspected to determine its source.

4. **IF** liquid is present,
   THEN PERFORM the following:

   a. **DRAIN** one quart **OR** less from the guard pipe as a representative sample.

   b. **PLACE** the drained liquid in a sample bottle.

   c. **CONTACT** the CRS **OR** Shift Manager for additional guidance.

5. **SHUT** 0C FUEL OIL DAY TANK FILL LINE LEAK DETECTION DRAIN VALVE, 0C-DFO-81.

6. **INSTALL** the pipe cap on 0C FUEL OIL DAY TANK FILL LINE LEAK DETECTION DRAIN VALVE, 0C-DFO-81.

7. **IF** desired,
   THEN REMOVE the collection pan **OR** device.

8. **DISPOSE** of any waste oil **PER** CH-1-101, Hazardous Waste Management.

9. **IF** liquid was present,
   THEN WRITE an Issue Report.

****** END ******

6.29 TIMED EMERGENCY START AND LOAD OF 0C DG ON 24 4KV BUS (PE 0-24-10-O-2A) [B0388]

A. Initial Conditions

NOTE
This section satisfies SBO testing requirements by demonstrating that the 0C DG can be locally emergency started (with pneumatic prelube), aligned and loaded to 24 4KV bus. This section also demonstrates AVR 2 is functional.

1. 0C DG system checks have been completed **PER** Section 6.1, 0C DG NORMAL STANDBY, Subsection B.
2. Calibrated stopwatch is available.
3. Key to 0-HS-10326, AUTO VOLT REGULATOR SW4 for AER Panel 0G25 has been obtained.

B. *Procedure*

1. **OBTAIN** a copy of APPENDIX 1, 0C DG TIMED EMERGENCY START AND LOAD ON 24 4KV BUS (PE-0-24-10-O-R) PLACEKEEPER.
2. **ESTABLISH** communications between the 0C DG Control Room and the Main Control Room.
3. **COMMENCE** simulated Loss of Offsite Power to 07 4KV Bus as follows:
   a. **COMMENCE** a descending countdown from the count of (5), **THEN DEENERGIZE** 07 4KV Bus from the Control Room as follows:
      (1) **OPEN** 07 4KV BUS FDR, 152-0704 **AND START** the stopwatch for the elapsed time to recover from a "Station Blackout".
      (2) **ENSURE** 07 4KV Bus power available white indicating light is extinguished.

6.29.B Procedure (Continued)

NOTE

- It is assumed that the 07 4KV Bus has been deenergized for greater than five minutes. Consequently, the 0C DG requires pneumatic prelube before starting.
- Step 6.29.B.4.a. may be performed concurrently with steps 6.29.B.4.b. and 6.29.B.4.c.

4. **COMMENCE** "Station Blackout" Recovery as follows:

   a. **DIRECT** an Outside Operator to perform an Emergency Start of 0C DG from the local panel in accordance with Section 6.4, 0C DG FAST/EMERGENCY START FROM LOCAL CONTROL PANEL 0C188 with pneumatic prelube.

   b. **PLACE** 0C DG 24 4KV BUS FDR, 152-2406, in PULL-TO-LOCK.

   c. **DISPATCH** an Operator to operate disconnects as follows:

      (1) **OBTAIN** the 189-2406 diconnect keys from the CR key locker.

      (2) **CLOSE** disconnect 189-2406 as follows:

WARNING

Improper operation of disconnects can result in SERIOUS INJURY. Keep body and head clear of operating arc of disconnect handle. Do not release handle prior to full travel. When the disconnect is opened or closed, a loud bang will be heard and a switch position flag will be visible, indicating disconnect position.

(a) **VERIFY** 0C DG 24 4KV BUS FDR, 152-2406 is OPEN by local indication:

- OPEN indicating light is on.
- Mechanical position indicator is GREEN.

(b) **UNLOCK** 0C DG 24 4KV BUS DISC, 189-2406, from the OPEN position.

- 189-2406 keys - 11901, 14259, 11899

(c) **LOCK** 0C DG 24 4KV BUS DISC, 189-2406, in the CLOSED position.

- 189-2406 key - 11898

6.29.B.4 Procedure (Continued)

NOTE
The 0C DG is **NOT** considered out of service, if the elapsed time exceeds 37 min.

d. **WHEN** disconnect 189-2406 is CLOSED, **AND** breaker 152-0703 is CLOSED, with voltage and frequency stabilized,
THEN STOP the stopwatch **AND RECORD** the elapsed time on the PE sheet. (*max time is less than 37 minutes.*) **[B0387]**

e. **RECORD** the following 0C DG operating parameters on the PE sheet:

(1) 07 4KV Bus voltage

(2) 07 4KV Bus frequency

(3) 0C DG Load

(4) 0C DG Vars

5. **TRANSFER** Voltage Control by placing 0-HS-10326 AUTO VOLT REGULATOR SW4 to AVR2 ON in AER Panel 0G25. (Window SL38 on Panel 0C188 will alarm).

NOTE
The step in OI-21C Section 6.7. which closes 189-2406 Disconnect can be omitted because it was closed in this Section.

6. **PARALLEL AND LOAD** 0C DG to 24 4KV BUS in accordance with OI-21C Section 6.7. while maintaining the following:

- **MAINTAIN** 24 4KV Bus voltage between 4.1 KV and 4.35 KV

AND

- **LOAD** the 0C DG to between 4.86 and 5.4 MW **AND MAINTAIN** 1.0 to 0.8 Lagging Power Factor

AND

- **OPERATE** 0C DG for at least ONE HOUR.

7. **SHUT DOWN** 0C DG in accordance with OI-21C Section 6.12.

8. **TRANSFER** Voltage control by placing 0-HS-10326 AUTO VOLT REGULATOR SW4 to AVR1 ON in AER Panel 0G25. (Window SL38 on Panel 0C188 will clear.)

****** END ******

6.30 PUMPING DOWN THE 0C DG FUEL OIL DAY TANK

A. Initial Conditions

1. 0C DG is to be removed from service.
2. Sufficient capacity exists in 11 FOST to receive fuel oil.
3. No fuel oil transfers in progress to the 0C DG.
4. Clean temporary pump available.
5. Clean and Fuel Oil compatible, non-collapsible hoses available.
6. 0C FODT shall be sampled **AND** verified satisfactory for viscosity, water, **AND** sediment within 72 hours **PRIOR** to transferring fuel oil to 11 FOST.

B. Procedure

1. **REMOVE** the 0C DG from service **PER** Section 6.15, REMOVE AND RESTORE 0C DG FROM/TO SERVICE.

NOTE
Drip pans should be placed under hose connections to catch any leakage.

2. **INSTALL** a non-collapsible hose from 0C1 ENGINE DRIVEN FUEL OIL PUMP SUCTION LINE DRAIN VALVE, 0C1-DFO-83, to the temporary pump suction.
3. **INSTALL** a hose from the temporary pump discharge to 0C FUEL OIL TRANSFER FILTER INLET SAMPLE VALVE, 0C-DFO-159.
4. **INDEPENDENTLY VERIFY** that the hoses were correctly installed in steps 2 **AND** 3.
5. **SHUT** 0C FUEL OIL TRANSFER FILTER INLET VALVE, 0C-DFO-16.
6. **IF** only pumping down the 0C DG Fuel Oil Day Tank and not the 0C Fuel Oil Auxiliary Tank,
   THEN UNLOCK AND SHUT 0C FUEL OIL AUX TANK TO 0C FUEL DAY TANK CROSS-CONNECT VALVE, 0C-DFO-29.
7. **OPEN** 0C DG DAY TANK FILL LINE ISOLATION VALVE, 0C-DFO-37.
8. **UNLOCK AND OPEN** 11 FOST TO PORTABLE PUMP CONN AND 0C DG FILL LINE ISOLATION VALVE, 0-DFO-129.

6.30.B Procedure (Continued)

9. **IF** any of the following conditions occur,
THEN IMMEDIATELY STOP the Temporary Pump **AND SHUT** 11 FOST TO 0C FUEL OIL DAY TANK FILL LINE ISOLATION VALVE, 0-DFO-129: **[B0261]**

   - Any Safety Related Diesel Generator automatically starts due to a valid SIAS **OR** U/V signal

   OR

   - A seismic event is detected on Control Room instrumentation

10. **OPEN** 0C1 ENGINE DRIVEN FUEL OIL PUMP SUCTION LINE DRAIN VALVE, 0C1-DFO-83.

11. **OPEN** 0C FUEL OIL TRANSFER FILTER INLET SAMPLE VALVE, 0C-DFO-159.

12. **START** the temporary pump.

13. **MONITOR** Fuel Oil Day Tank level.

14. **WHEN** the desired Fuel Oil Day Tank level is reached,
THEN STOP the temporary pump.

15. **LOCK SHUT** 11 FOST TO PORTABLE PUMP CONN AND 0C DG FILL LINE ISOLATION VALVE, 0-DFO-129.

16. **SHUT** 0C DG DAY TANK FILL LINE ISOLATION VALVE, 0C-DFO-37.

17. **SHUT** 0C1 ENGINE DRIVEN FUEL OIL PUMP SUCTION LINE DRAIN VALVE, 0C1-DFO-83.

18. **SHUT** 0C FUEL OIL TRANSFER FILTER INLET SAMPLE VALVE, 0C-DFO-159.

19. **OPEN** 0C FUEL OIL TRANSFER FILTER INLET VALVE, 0C-DFO-16.

20. **DISCONNECT** the hoses installed in steps 2 **AND** 3.

21. **INDEPENDENTLY VERIFY** hoses removed.

22. **DISPOSE** of waste oil **PER** CH-1-101, Hazardous Waste Management.

****** END ******

6.31 OPERATION OF THE 0C DG RADIATOR FANS

A. Initial Conditions

1. None

B. Procedure

1. **START** the desired 0C DG Radiator Fans by placing the associated handswitch to ON:
   - 0C1 HT RAD FAN SEL SW, 0-HS-10082
   - 0C2 HT RAD FAN SEL SW, 0-HS-10102
2. **WHEN** it is desired to secure the Radiator Fan, **THEN** perform the following:

NOTE

Checking Radiator Fan breakers closed before securing fans ensures that if a breaker is found open after securing the Radiator Fan that the open breaker was due to the known handswitch configuration issue and not a motor malfunction.

a. **IF** 0C1 HT RAD FAN SEL SW, 0-HS-10082 was operated **THEN CHECK CLOSED** the following breakers:
   - 0C1 RADIATOR FAN 11, 52-02317
   - 0C1 RADIATOR FAN 12, 52-02318
   - 0C1 RADIATOR FAN 13, 52-02319

b. **IF** 0C2 HT RAD FAN SEL SW, 0-HS-10102 was operated **THEN CHECK CLOSED** the following breakers:
   - 0C2 RADIATOR FAN 11, 52-02322
   - 0C2 RADIATOR FAN 12, 52-02321
   - 0C2 RADIATOR FAN 13, 52-02320

c. **SECURE** the 1A DG Radiator Fans started in step 1 by placing the associated handswitch to AUTOMATIC:
   - 0C1 HT RAD FAN SEL SW, 0-HS-10082
   - 0C2 HT RAD FAN SEL SW, 0-HS-10102

6.31.B Procedure (Continued)

NOTE
Taking the Radiator Fan handswitch from ON to AUTOMATIC may cause the Radiator Fan breakers to trip.

3. **IF** 0C1 HT RAD FAN SEL SW, 0-HS-10082 was operated
THEN ENSURE CLOSED the following breakers:

   - 0C1 RADIATOR FAN 11, 52-02317
   - 0C1 RADIATOR FAN 12, 52-02318
   - 0C1 RADIATOR FAN 13, 52-02319

4. **IF** 0C2 HT RAD FAN SEL SW, 0-HS-10102 was operated
THEN ENSURE CLOSED the following breakers:

   - 0C2 RADIATOR FAN 11, 52-02322
   - 0C2 RADIATOR FAN 12, 52-02321
   - 0C2 RADIATOR FAN 13, 52-02320

5. **IF** any breaker was found tripped
THEN INITIATE a condition report for tracking purposes.

****** END ******

6.32 OPERATION OF THE 0C DG STARTING AIR COMPRESSORS

A. Initial Conditions

1. Desired to run the 0C Starting Air Compressor

B. Procedure

1. **IF** starting 0C Starting Air Compressor,
   THEN PERFORM the following:

   a. **VERIFY** 0C Starting Air Compressor handswitch , 0-HS-10241 is in AUTO.

   b. **IF** lowering pressure using 0C1 Starting Air Receiver 11,
   THEN PERFORM the following:

      (1) **REMOVE** pipe cap downstream of 0C1 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE, 0C1-DSA-53.

      (2) **OPEN** 0C1 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE, 0C1-DSA-53.

NOTE
The 0C Starting Air Compressor should start at approximately 507 PSIG.

      (3) **THROTTLE OPEN** 0C1 STARTING AIR RECEIVER 11 DRAIN VALVE, 0C1-DSA-52 to lower 0C1 Starting Air Receiver 11 pressure enough to start the 0C Starting Air Compressor.

      (4) **ADJUST** throttle position of 0C1 STARTING AIR RECEIVER 11 DRAIN VALVE, 0C1-DSA-52 to maintain pressure on 0-PI-10271 between 507-570 PSIG.

      (5) **WHEN** desired to **SECURE** the 0C Starting Air Compressor,
      THEN SHUT 0C1 STARTING AIR RECEIVER 11 DRAIN VALVE, 0C1-DSA-52

      (6) **SHUT** 0C1 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE, 0C1-DSA-53.

      (7) **REINSTALL** pipe cap downstream of 0C1 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE, 0C1-DSA-53.

      (8) **ENSURE** 0C Starting Air Compressor SECURES at approximately 580 PSIG.

6.32.B.1 Procedure (Continued)

c. **IF** lowering pressure using 0C2 Starting Air Receiver 12, **THEN PERFORM** the following:

(1) **REMOVE** pipe cap downstream of 0C2 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE, 0C2-DSA-45.

(2) **OPEN** 0C2 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE, 0C2-DSA-45.

NOTE
The 0C Starting Air Compressor should start at approximately 507 PSIG.

(3) **THROTTLE OPEN** 0C2 STARTING AIR RECEIVER 12 DRAIN VALVE, 0C2-DSA-44 to lower 0C2 Starting Air Receiver 12 pressure enough to start the 0C Starting Air Compressor.

(4) **ADJUST** throttle position of 0C2 STARTING AIR RECEIVER 12 DRAIN VALVE, 0C2-DSA-44 to maintain pressure on 0-PI-10272 between 507-570 PSIG.

(5) **WHEN** desired to **SECURE** the 0C Starting Air Compressor, **THEN SHUT** 0C2 STARTING AIR RECEIVER 12 DRAIN VALVE, 0C2-DSA-44.

(6) **SHUT** 0C2 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE, 0C2-DSA-45.

(7) **REINSTALL** pipe cap downstream of 0C2 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE, 0C2-DSA-45.

(8) **ENSURE** 0C Starting Air Compressor SECURES at approximately 580 PSIG.

****** END ******

6.33 VENT THE 0C DG FUEL OIL PUMP PIPING

A. Initial Conditions

1. 0C DG is shutdown.
2. Fuel Oil Pump piping was drained.

B. Procedure

1. **REMOVE** the cap **AND ATTACH** hose to the following valves as required:
   - 0C1 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE DRAIN VALVE, 0C1-DFO-55
   - 0C1 DUPLEX FILTER OUTLET LINE DRAIN VALVE, 0C1-DFO-56
   - 0C2 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE LINE DRAIN VALVE, 0C2-DFO-3
   - 0C2 DUPLEX FILTER OUTLET LINE DRAIN VALVE, 0C2-DFO-9
2. Using the selected valves, **VENT** the selected piping to a suitable container by draining at least one quart of oil.
   - 0C1 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE DRAIN VALVE, 0C1-DFO-55
   - 0C1 DUPLEX FILTER OUTLET LINE DRAIN VALVE, 0C1-DFO-56
   - 0C2 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE LINE DRAIN VALVE, 0C2-DFO-3
   - 0C2 DUPLEX FILTER OUTLET LINE DRAIN VALVE, 0C2-DFO-9
3. **REMOVE** the hose **AND REPLACE** the cap on the selected valves:
   - 0C1 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE DRAIN VALVE, 0C1-DFO-55
   - 0C1 DUPLEX FILTER OUTLET LINE DRAIN VALVE, 0C1-DFO-56
   - 0C2 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE LINE DRAIN VALVE, 0C2-DFO-3
   - 0C2 DUPLEX FILTER OUTLET LINE DRAIN VALVE, 0C2-DFO-9
4. **START** the selected Fuel Oil Backup Pump:
   - **PLACE** 0C1 FO B/U PP SEL SW, 0-HS-10051, to ON.
   - **PLACE** 0C2 FO B/U PP SEL SW, 0-HS-10061, to ON.

6.33.B Procedure (Continued)

NOTE
The pressure requirement only checks a sufficient rise in pressure to verify the pump is **NOT** air bound.

5. **VERIFY** the selected fuel oil feed pressure at least 10 PSIG greater than suction pressure:

   - 0C1 FO FEED PP DISCH PRESS, 0-PI-10052
   - 0C1 FO B/U PP SUCT PRESS, 0-PI-10051

   - 0C2 FO FEED PP DISCH PRESS, 0-PI-10062
   - 0C2 FO B/U PP SUCT PRESS, 0-PI-10061

6. **STOP** the selected Fuel Oil Backup Pump:

   - **PLACE** 0C1 FO B/U PP SEL SW, 0-HS-10051, to AUTO.

   - **PLACE** 0C2 FO B/U PP SEL SW, 0-HS-10061, to AUTO.

7. **DISPOSE** of drained oil **PER** CNG-EV-1.01-2000, CHEMICAL **CONTROL** PROGRAM.

****** END ******

6.34 RAPID SHUTDOWN OF THE 0C DIESEL

A. Initial Conditions

1. 0C DG is operating paralleled **OR** unloaded **OR** powering 07 4KV Bus **AND** a condition exists that requires an rapid shutdown.

2. The 0C DG is **NOT** in Local.

B. Procedure

1. **IF** 0C DG is in parallel operation with a Safety Related 4KV Bus, **THEN REMOVE** 0C DG from the 4KV Bus by performing the following:

CAUTION
MW load should **NOT** be reduced below 0.3 MW to preclude tripping 0C DG OUT BKR, 152-0703, on reverse power.

a. **LOWER** MW **AND** KVAR loads concurrently to approximately 0.45 MW **AND** zero KVARs **PER** the following:

NOTE
Load may be lowered as rapidly as necessary.

(1) **LOWER** MW load using 0C DG SPEED CONTR, 0-CS-0705. **[B0254]**

(2) **MAINTAIN** 0 to 500 KVARs using 0C DG AUTO VOLT CONTR, 0-CS-0704 **AND** FIGURE 1, 0C DIESEL GENERATOR ELECTRICAL LIMITS.

(3) **MONITOR** the selected 4KV Bus voltage between 4.1KV and 4.35KV **[B0120]**

6.34.B.1 Procedure (Continued)

b. **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch to TRIP:

4KV BUS	:	HANDSWITCH
11	:	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	:	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	:	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	:	0C DG 24 4KV BUS FDR, 2-CS-152-2406

CAUTION
0C DG OUT BKR, 152-0703, trips on underfrequency at 59.5 Hz when in the parallel **OR** transfer modes, unless bypassed.

c. **VERIFY** 0C DG frequency **AND** voltage are stable **AND** 07 4KV Bus is energized at approximately 60 Hz:

- 0C DG FREQUENCY, 0-SI-0701
- 0C DG VOLTS, 0-EI-0701
- 07 4KV BUS VOLTS, 0-EI-0702

d. **PLACE** 07 4KV BUS TIE, 0-CS-152-0701, to TRIP.

6.34.B Procedure (Continued)

NOTE
The next step will perform a dead bus transfer of the 07 4 KV bus.

2. **IF** 0C DG is powering 07 4KV Bus,
   THEN PERFORM the following:

   a. **VERIFY** 07 4KV BUS TIE, 0-CS-152-0701, is OPEN.

   b. **DEPRESS** 0C DG SLOW START pushbutton, 0-HS-0708.

   c. **INSERT** the Sync Stick for 07 4KV BUS FDR, 0-CS-152-0704.

NOTE
The 0C DG Building Fire Panel annunciator will alarm due to the temporarily de-energized buses.

CAUTION
- Opening the breaker will cause a loss of power to the 0C DG Building **AND** de-energize 0C DG support equipment.
- 07 4KV Bus should be re-energized from SITE POWER without delay to restore 0C DG auxiliary equipment operation (radiator fans, lighting, HVAC, etc).
- If the 480V crosstie breaker alignment is in effect the following may occur:
  - 1A DG Building may lose power
  - 1A DG Building Fire Panel annunciator may alarm

   d. **PLACE** 0C DG OUT BKR, 0-CS-152-0703, to TRIP.

   e. **PLACE** 07 4KV BUS FDR, 0-CS-152-0704, to CLOSE.

   f. **REMOVE** the Sync Stick **AND RETURN** to Home Base.

   g. **RESET** the following bus U/V flags:
      - 07 4KV Bus
      - 07 480V Bus

3. **CHECK** 07 4KV Bus voltage is 4.16KV (4.1KV to 4.35KV) on 07 4KV BUS VOLTS, 0-EI-0702.

4. **VERIFY** 0C DG voltage is 4.16KV (4.16KV to 4.30KV) on 0C DG VOLTS, 0-EI-0701.

6.34.B Procedure (Continued)

5. **CHECK** 0C DG frequency is approximately 60 Hz on 0C DG FREQUENCY, 0-SI-0701.

6. **VERIFY** 1C19C annunciator "0C DG • POT VOLT • FREQ LO" is CLEAR.

7. **DEPRESS** 0C DG STOP, 0-HS-0709, pushbutton.

8. **VERIFY** exciter shutdown as indicated by zero volts on 0C DG VOLTS, 0-EI-0701.

9. **VERIFY** the following equipment RUNNING by observing the associated red indicating light is illuminated on 0C188 **OR** 0C192:

   - 0C1 AC PRELUB PP SEL SW, 0-HS-10161
   - 0C2 AC PRELUB PP SEL SW, 0-HS-10201
   - 0C1 HT PRHT PP SEL SW, 0-HS-10081
   - 0C2 HT PRHT PP SEL SW, 0-HS-10101
   - 0C-F-9 ROOF EXHAUSTER, 0-HS-10584 (if radiator room temp is above 95° F)
   - 0C-F-10 ROOF EXHAUSTER, 0-HS-10586 (if radiator room temp is above 95° F)

10. **VERIFY** the following equipment OFF by observing the associated green indicating light is illuminated on 0C188:

    - 0C1 FO B/U PP SEL SW, 0-HS-10051
    - 0C2 FO B/U PP SEL SW, 0-HS-10061

6.34.B Procedure (Continued)

11. **IF** 0C DG was shutdown following parallel operation with a Safety Related 4KV Bus,
THEN PERFORM the following:

    a. **OPEN** the selected 0C DG 4KV Bus disconnect by performing the following:

        (1) **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch in PULL-TO-LOCK:

4KV BUS	:	HANDSWITCH
11	:	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	:	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	:	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	:	0C DG 24 4KV BUS FDR, 2-CS-152-2406

WARNING

Improper operation of disconnects can result in serious injury. Keep body **AND** head clear of operating arc of handle. DO **NOT** release handle prior to full travel. When disconnect is opened **OR** closed, a very loud bang will be heard **AND** a switch position flag will be visible indicating disconnect position.

        (2) In the associated Unit SWGR Room, **OPEN** the selected 0C DG 4KV Bus disconnect by performing the following:

6.34.B.11.a.2 **Procedure (Continued)**

(a) **VERIFY** the selected 0C DG 4KV Bus feeder breaker is OPEN by local indication:

4KV BUS	BREAKER
11	0C DG 11 4KV BUS FDR, 152-1106
14	0C DG 14 4KV BUS FDR, 152-1406
21	0C DG 21 4KV BUS FDR, 152-2106
24	0C DG 24 4KV BUS FDR, 152-2406

(b) **UNLOCK** the selected 0C DG 4KV Bus disconnect **AND REMOVE** the key:

4KV BUS	DISC	KEY
11	189-1106	11940
14	189-1406	11895
21	189-2106	11900
24	189-2406	11898

(c) **OPEN** the selected 0C DG 4KV Bus disconnect.

6.34.B.11.a.2 **Procedure (Continued)**

(d) **LOCK** the selected 0C DG 4KV Bus disconnect in the OPEN position **AND REMOVE** the keys:

4KV BUS	DISC	KEYS
11	189-1106	11893, 11901, 14259
14	189-1406	11896, 11901
21	189-2106	14259, 11903
24	189-2406	11899, 11901, 14259

(3) **PLACE** the selected 0C DG 4KV Bus feeder breaker handswitch to NORMAL:

4KV BUS	HANDSWITCH
11	0C DG 11 4KV BUS FDR, 1-CS-152-1106
14	0C DG 14 4KV BUS FDR, 1-CS-152-1406
21	0C DG 21 4KV BUS FDR, 2-CS-152-2106
24	0C DG 24 4KV BUS FDR, 2-CS-152-2406

12. **DRAIN** the 0C Dirty Fuel Oil Tank to a suitable container through 0C DIRTY FUEL OIL TANK DRAIN VALVE, 0C-DFO-74.

a. **IF** the 0C Dirty Fuel Oil Tank was drained prior to starting **AND** more than one quart of fuel oil is drained from the 0C Dirty Fuel Oil Tank per hour of run time,
THEN SUBMIT a Condition Report.

6.34.B Procedure (Continued)

13. **IF** 0C DG has operated one hour **OR** longer,
THEN CHECK the 0C Fuel Oil Day and Auxiliary Tanks for water as follows:
[B0251]

    a. **OBTAIN** a suitable container for collecting the effluent.

    b. **UNLOCK AND CRACK OPEN** 0C FUEL OIL AUX TANK DRAIN/SAMPLE VALVE, 0C-DFO-20.

    c. **WHEN** all water has been removed,
    THEN LOCK SHUT 0C FUEL OIL AUX TANK DRAIN/SAMPLE VALVE, 0C-DFO-20.

    d. **UNLOCK AND CRACK OPEN** 0C FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 0C-DFO-28.

    e. **WHEN** all water has been removed,
    THEN LOCK SHUT 0C FUEL OIL DAY TANK DRAIN/SAMPLE VALVE, 0C-DFO-28.

14. **DISPOSE** of ALL waste oil **PER** CH-1-101, Hazardous Waste Management.

15. **CHECK** any existing alarms.

16. **VERIFY** the 0C1 **AND** 0C2 Radiator Fans stop approximately 15 minutes following 0C DG shutdown by observing the associated green indicating light is illuminated on 0C188:

    - 0C1 HT RAD FAN SEL SW, 0-HS-10082
    - 0C2 HT RAD FAN SEL SW, 0-HS-10102

17. **IF** 0C Fuel Oil Day Tank level is below 37 inches,
THEN FILL the 0C Fuel Oil Day Tank **PER** Section 6.16, FILL THE 0C FUEL OIL DAY TANK. **[B0260]**

18. **NOTIFY** Plant Chemistry that 0C DG has been run and coolant sampling may be performed, if desired.

19. **NOTIFY** CPS Generation Dispatcher (normally via the Red Control Room phone) that the Diesel Generator has been removed from the Grid.

6.34.B Procedure (Continued)

20. **IF** the OC DG was paralleled to 11 4KV bus
THEN ALIGN the Control Room HVAC as follows:

    - **IF** 11 CR HVAC was in operation,
THEN RESTORE the Control Room Chiller Unit **PER** OI-22F
    - **UNBYPASS** the Control Room Vent RMS, 0-RI-5350.
    - **STOP** the Post-LOCI filter fans by placing the handswitches to STOP **AND LOG** the stopping time in the Charcoal Filter Log
        - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352
        - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353
    - **IF** desired,
THEN PLACE the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to ON

21. **IF** the OC DG was paralleled to 24 4KV bus
THEN ALIGN the Control Room HVAC as follows:

    - **IF** 12 CR HVAC was in operation,
THEN RESTORE the Control Room Chiller Unit **PER** OI-22F
    - **UNBYPASS** the Control Room Vent RMS, 0-RI-5350.
    - **STOP** the Post-LOCI filter fans by placing the handswitches to STOP **AND LOG** the stopping time in the Charcoal Filter Log
        - 11 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5352
        - 12 Post-LOCI Filter Fan & Damper handswitch, 0-HS-5353
    - **IF** desired,
THEN PLACE the Kitchen/Toilet Exhaust Fan handswitch, 0-HS-5359, to ON

****** END ******

7.0 POST-PERFORMANCE ACTIVITIES

1. Upon completion of procedure, forward the original(s) to the Operations Senior Administrative Assistant for retention **PER** CNG-PR-3.01-1000, Records Management.

8.0 BASES

[B0120] Memo from R. A. Buttner of the Design Basis Unit, DBU-92-059, subject: "Plant Operating Voltage Ranges", lists the new 13KV, 4KV, and 480V Bus voltage limits. Previous calculations did not ensure adequate voltage at load terminals.

[B0248] BGE DGP engineering memo DGP-EN-95-0019, dated March 7, 1995, from A.J. Birmingham specifies the excess reverse power trip relay setting at approximately 0.35 MW into the SMECO/SITE POWER feeder through 152-0704. Also included is the basis for checking the 0C DG phase voltages following startup of the DG.

[B0251] Reg Guide 1.137, Rev 1, October 1979, lists the requirement for sampling the diesel fuel oil day tank for water at least monthly **AND** following any DG operation of one hour or greater.

[B0254] SACM Diesel, Inc. fax 03039502 from Chris Muller, dated February 28, 1995, specifies the recommended monthly test loading method of increasing load by approximately 1.0 MW then waiting five minutes before adding more load. Unloading at 1.0 MW per minute reduces engine fouling due to operation at lower loads.

[B0255] SACM users manual rev. 2, Requires prelube of the 0C Diesel engine prior to start. ASEU memo dated 6/21/99 allows up to 30 minutes without prelube under casualty conditions. This is limited to ONE start per year and requires engine inspection within FIVE years.

[B0257] SACM users manual rev. 2, The 0C Diesel should be loaded within 1 hour of start. Unloaded operation beyond 1 hour should be minimized. Prevent excessive buildup of soot and oil in the engine cylinders and turbocharger turbine.

[B0260] NUMARC 87-00, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors, Appendix B, Alternate AC Power Criteria, lists the minimum required fuel in the 0C Fuel Oil Day Tank and specifies sampling requirements prior to transferring fuel oil to the day tank. CCNPP interpretation of the sampling requirement time limit is contained in a memo from B. Nuse to M. Lewis dated May 28, 1996.

[B0261] FCR 89-0079, Supplement 20, Submittal FF-1, Attachment 25, Operational Impact of Design Change or Modification, lists the requirements for maintaining the 11 FOST supply valves to the 0C Fuel Oil Day Tank closed. Also included are criteria requiring isolation of 11 FOST from 0C Fuel Oil Day Tank during the filling operation. Additionally, routine checking of the fill line guard pipe for leakage is required.

8.0 BASES (Continued)

[B0263] FCR 89-0079, Startup Problem Report, SPR 95-289M, disposition establishes pneumatic prelube pump air pressure at 35 psig, ± 5 psig, to allow engine lubrication for greater than or equal to 20 minutes as required by SACM.

[B0267] Memo from L. G. Getz of the Diesel Generator Project. Subject is procedure actions after a 0C DG output breaker trip during parallel operation. Actions placed in the OI give clear direction for response to 07 4KV Bus being back-fed from a Safety Related 4KV bus.

[B0154] AOP/EOP cross reference per NUREG 1358: The following EOPs and AOPs reference this OI for the 0C DG fast/emergency start from local control panel 0C188.

- EOP 2, LOSS OF OFFSITE POWER
- EOP 3, LOSS OF ALL FEEDWATER
- EOP 4, EXCESS STEAM DEMAND EVENT
- EOP 5, LOSS OF COOLANT ACCIDENT
- EOP 6, STEAM GENERATOR TUBE RUPTURE
- EOP 7, STATION BLACKOUT
- EOP 8, FUNCTIONAL RECOVERY PROCEDURE
- AOP 3B, ABNORMAL SHUTDOWN COOLING OPERATIONS
- AOP 7I, LOSS OF 4KV, 480V, OR 208/120V INSTRUMENT BUS POWER.

[B0387] PES Memo dated 9-11-96 (PES\960910-100) Establishment of Acceptance Criteria for 0C DG Time Start. (ETP 96-056R)

[B0388] Safety Evaluation by the Office of Nuclear Reactor Regulation, ACC Power Source Design Report, (NRC Letter dated 10-3-94).

[B0513] Engineering memo PES\990621-200 stating calculation D-M-95-010 indicates the 1A and 0C DGs can operate at 100% load with ONE radiator fan out of service and radiators in a dirty condition if outside air temperature is LESS THAN 59.5° F.

[B0698] Engineering memo PES\1129-200 stating requirements for SACM DG Standby temperatures.

9.0 RECORDS

A. Records generated by this procedure shall be processed by Records Management **PER** CNG-PR-3.01-1000, Records Management.

10.0 ATTACHMENTS

A. TABLE 1, SHUTDOWN SEQUENCER LOADS

B. TABLE 2, INDICATED 0C FUEL OIL DAY TANK VOLUME

C. TABLE 3, INDICATED 0C AUXILIARY LUBE OIL TANK VOLUME

D. TABLE 4, 1A COOLANT DRAIN TANK VOLUME

10.0 ATTACHMENTS (Continued)

E. TABLE 5, 1A LUBE OIL DRAIN TANK VOLUME

F. FIGURE 1, 0C DIESEL GENERATOR ELECTRICAL LIMITS

G. APPENDIX 1, 0C DG TIMED EMERGENCY START AND LOAD ON 24 4KV BUS (PE-0-24-10-O-R) PLACEKEEPER

H. ATTACHMENT 1A, 0C STARTING AIR SYSTEM VALVE LINEUP

I. ATTACHMENT 1B, 0C FUEL OIL SYSTEM VALVE LINEUP

J. ATTACHMENT 1C, 0C LUBE OIL SYSTEM VALVE LINEUP

K. ATTACHMENT 1D, 0C HT/LT COOLANT SYSTEM VALVE LINEUP

L. ATTACHMENT 1E, 0C COMBUSTION AIR INTAKE SYSTEM VALVE LINEUP

M. ATTACHMENT 1F, 0C DG SWITCH POSITION VERIFICATION

N. ATTACHMENT 1G, 0C LOCAL BREAKER POSITION VERIFICATION

O. ATTACHMENT 2A, 0C STARTING AIR SYSTEM INSTRUMENT VALVE LINEUP

P. ATTACHMENT 2B, 0C FUEL OIL SYSTEM INSTRUMENT VALVE LINEUP

Q. ATTACHMENT 2C, 0C LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP

R. ATTACHMENT 2D, 0C HT/LT COOLANT SYSTEM INSTRUMENT VALVE LINEUP

SHUTDOWN SEQUENCER LOADS

UNIT 1 SHUTDOWN SEQUENCER LOADS

The following table lists loads that receive a start signal from the Unit 1 Shutdown Sequencer (SDS). The SDS operates on the bus that has the Diesel Generator breaker closed to it.

11 SDS
11 4KV Bus

11 HVAC ESFAS TIMER light illuminates (1C34)

11 CONTR RM FRESH AIR damper, 0-HVAC-5350, shuts

12 CONTR RM FRESH AIR damper, 0-HVAC-5351, shuts

11 & 12 Post-LOCI Filter Fans

11 Control Room A/C Compr**

11 SWGR A/C Compr\\#

11 Inst Air Compr\\#

11 Salt Water Pump

13 Salt Water Pump*

11 Service Water Pump

13 Service Water Pump*

13 Aux Feedwater Pump\\#

14 SDS
14 4KV Bus

12 SWGR A/C Compr\\#

12 Instr Air Compr\\#

12 Salt Water Pump

13 Salt Water Pump*

12 Service Water Pump

13 Service Water Pump*

* 13 Saltwater and 13 Service Water Pumps will receive a start signal from the SDS only if the associated 11 or 12 pump (whichever is powered from the same 4KV bus as the 13 pump) fails to start after receiving an SDS start signal.

\\# These components receive a start permissive signal from the SDS.

** 11 Control Room HVAC will receive a start signal from the SDS only if its associated supply fan is running.

SHUTDOWN SEQUENCER LOADS

UNIT 2 SHUTDOWN SEQUENCER LOADS

The following table lists loads that receive a start signal from the Unit 2 Shutdown Sequencer (SDS). The SDS operates on the bus that has the Diesel Generator breaker closed to it.

21 SDS 4KV Bus 21	24 SDS 4KV Bus 24
21 SWGR A/C Compr\\\#	12 HVAC ESFAS TIMER light illuminates (1C34)
21 Instr Air Compr\\\#	11 CONTR RM FRESH AIR damper, 0-HVAC-5350, shuts
21 Salt Water Pump	12 CONTR RM FRESH AIR damper, 0-HVAC-5351, shuts
23 Salt Water Pump*	11 & 12 Post-LOCI filter fans
21 Service Water Pump	12 Control Room A/C Compr**
23 Service Water Pump*	22 SWGR A/C Compr\\\#
	22 Inst Air Compr\\\#
	22 Salt Water Pump
	23 Salt Water Pump*
	22 Service Water Pump
	23 Service Water Pump*
	23 Aux Feedwater Pump\\\#

* 23 Saltwater and 23 Service Water Pumps will receive a start signal from the SDS only if the associated 21 or 22 pump (whichever is powered from the same 4KV bus as the 23 pump) fails to start after receiving an SDS start signal.

\\\# These components receive a start permissive signal from the SDS.

** 12 Control Room A/C Compressor will receive a start signal from the SDS only if the associated supply fan is operating.

INDICATED 0C FUEL OIL DAY TANK VOLUME

Inches	Gallons	Inches	Gallons
0*	0	21	860
1	21	22	911
2	46	23	961
3	74	24	1012
4	105	25	1062
5	138	26	1112
6	174	27	1161
7	211	28	1211
8	250	29	1259
9	291	30	1307
10	334	31	1354
11	378	32	1400
12	422	33	1445
13	468	34	1489
14	515	35	1531
15	563	36	1572
16	611	37	1612
17	660	38	1649
18	710	39	1685
19	760	40	1719
20	810	41	1750
		42	1778

* - Approximately 25 gallons remain in the tank below the level gauge zero (zero on the above table). This fuel is unusable.

Note: Includes 0C Auxiliary Fuel Oil Tank volume.

INDICATED 0C AUXILIARY LUBE OIL TANK VOLUME

Inches	Gallons	Inches	Gallons
0	12*	21	448
1	22*	22	474
2	35*	23	500
3	49	24	526
4	64	25	552
5	81	26	577
6	99	27	603
7	118	28	628
8	138	29	653
9	158	30	677
10	180	31	701
11	202	32	725
12	225	33	748
13	248	34	770
14	272	35	792
15	296	36	813
16	321	37	834
17	346	38	853
18	371	39	872
19	397	40	889
20	423	41	905
		42	920

* Unusable lube oil in tank.

(To calculate usable volume, subtract 35 gallons from indicated volume.)

1A COOLANT DRAIN TANK VOLUME

Inches	Gallons	Inches	Gallons	Inches	Gallons
0*	0	25	1041	50	2402
1	22	26	1095	51	2453
2	47	27	1148	52	2503
3	74	28	1203	53	2553
4	104	29	1257	54	2602
5	136	30	1312	55	2650
6	170	31	1367	56	2697
7	205	32	1422	57	2744
8	242	33	1477	58	2789
9	281	34	1533	59	2833
10	321	35	1588	60	2876
11	362	36	1644	61	2918
12	405	37	1699	62	2959
13	449	38	1755	63	2998
14	493	39	1810	64	3036
15	539	40	1865	65	3073
16	586	41	1921	66	3107
17	634	42	1975	67	3140
18	682	43	2030	68	3171
19	732	44	2084	69	3199
20	782	45	2138	70	3226
21	833	46	2192	71	3249
22	884	47	2245	72	3270
23	936	48	2298	73	3286
24	988	49	2350	74	3298

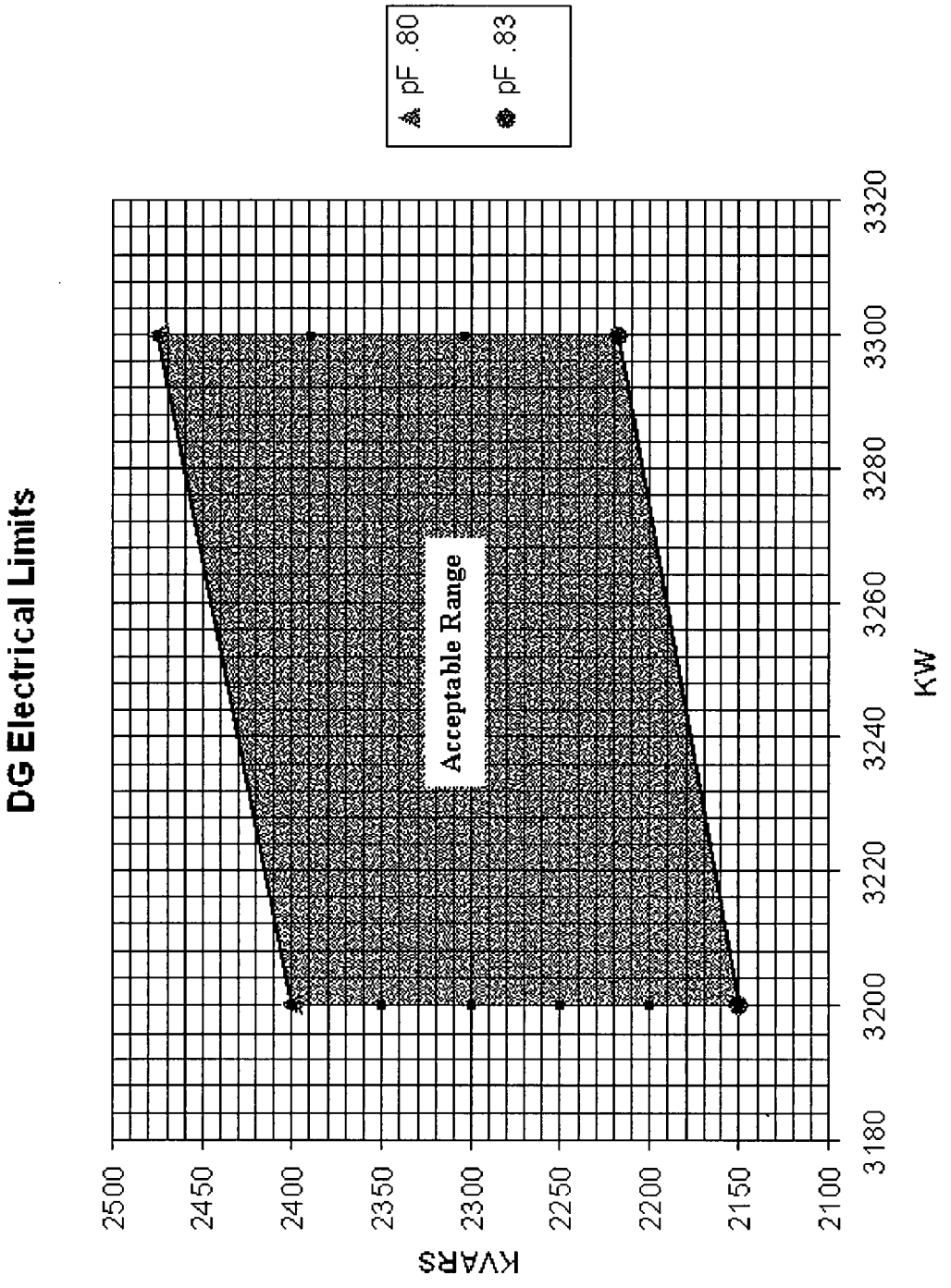
* - Approximately 41 gallons remain in the tank below the pump suction pipe centerline (zero on the above table).

1A LUBE OIL DRAIN TANK VOLUME

Inches	Gallons
0	50
2	63
4	76
6	89
8	102
10	115
12	128
14	141
16	154
18	167
20	180
22	193
24	206
26	219
28	232
30	245
32	258
34	270
36	283
38	296
40	309
42	322
44	335
46	348
48	361
50	374
52	387
54	399

* - Approximately 50 gallons remain in the tank below the sightglass zero. A suction pipe elbow allows removal of lube oil below indication.

0C DIESEL GENERATOR ELECTRICAL LIMITS



0C DG TIMED EMERGENCY START AND LOAD ON 24 4KV BUS (PE-0-24-10-O-R) PLACEKEEPER

NOTE
This is to be used as a placekeeping aid only.

- ☐ Section 4.0, PREREQUISITES met.
- ☐ Section 5.0, PRECAUTIONS reviewed.
- ☐ 0C DG checks **PER** Section 6.1, 0C DG NORMAL STANDBY.
- ☐ **ESTABLISH** communications between 0C DG Control Room and Main Control Room **PER** Section 6.29, TIMED EMERGENCY START AND LOAD OF 0C DG ON 24 4KV BUS (PE 0-24-10-O-2A).
- ☐ **DEENERGIZE** the 07 4KV Bus **PER** Section 6.29, TIMED EMERGENCY START AND LOAD OF 0C DG ON 24 4KV BUS (PE 0-24-10-O-2A).
- ☐ **DIRECT** the OSO to perform an Emergency Start **PER** Section 6.4, 0C DG FAST/EMERGENCY START FROM LOCAL CONTROL PANEL 0C188.
- ☐ **IF** required, prelube with the 0C pneumatic prelube pumps **PER** Section 6.22, OPERATE THE 0C PNEUMATIC PRELUBE PUMPS.
- ☐ **ALIGN** disconnect 189-2406 **PER** Section 6.29, TIMED EMERGENCY START AND LOAD OF 0C DG ON 24 4KV BUS (PE 0-24-10-O-2A).
- ☐ **VERIFY** 07 4KV Bus deenergized **PER** Section 6.4, 0C DG FAST/EMERGENCY START FROM LOCAL CONTROL PANEL 0C188.
- ☐ **PERFORM** an Emergency Start and reset U/V flags **PER** Section 6.4, 0C DG FAST/EMERGENCY START FROM LOCAL CONTROL PANEL 0C188.
- ☐ **VERIFY** equipment response **PER** Section 6.4, 0C DG FAST/EMERGENCY START FROM LOCAL CONTROL PANEL 0C188.
- ☐ **SECURE** the pneumatic prelube **PER** Section 6.22, OPERATE THE 0C PNEUMATIC PRELUBE PUMPS.
- ☐ **RECORD** the time it took until disconnect 189-2406 **AND** breaker 152-0703 are CLOSED with voltage and frequency stabilized **PER** Section 6.29, TIMED EMERGENCY START AND LOAD OF 0C DG ON 24 4KV BUS (PE 0-24-10-O-2A).
- ☐ **PLACE** AVR2 in service **PER** Section 6.29, TIMED EMERGENCY START AND LOAD OF 0C DG ON 24 4KV BUS (PE 0-24-10-O-2A).

0C DG TIMED EMERGENCY START AND LOAD ON 24 4KV BUS (PE-0-24-10-O-R) PLACEKEEPER

☐ **PARALLEL** and load the 0C DG to 24 4KV Bus for one hour **PER** Section 6.7, PARALLEL 0C DG TO A SAFETY RELATED 4KV BUS.

☐ **SHUTDOWN** the 0C DG **PER** Section 6.12, 0C DG NORMAL SHUTDOWN FROM CONTROL ROOM.

☐ **RETURN** AVR1 to service **PER** Section 6.29, TIMED EMERGENCY START AND LOAD OF 0C DG ON 24 4KV BUS (PE 0-24-10-O-2A).

ATTACHMENT 1A
OC STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC-DSA-2	OPEN	OC STARTING AIR COMPR CONTROL OIL OUTLET VALVE	OC STARTING AIR COMPRESSOR SKID		
OC-DSA-3	OPEN	OC STARTING AIR COMPR CONTROL OIL 0-PS-10256 ROOT VALVE	OC STARTING AIR COMPRESSOR SKID		
OC-DSA-4	OPEN	OC STARTING AIR COMPR CONTROL OIL 0-PI-10250 ROOT VALVE	OC STARTING AIR COMPRESSOR SKID		
OC-DSA-7	OPEN	OC INTERCOOLER 11 DISCH 0-PI-10252 ROOT VALVE	OC STARTING AIR COMPRESSOR SKID		
OC-DSA-10	OPEN	OC WATER SEPARATOR 12 0-PI-10251 ROOT VALVE	OC STARTING AIR COMPRESSOR SKID		
OC-DSA-13	OPEN	OC WATER SEPARATOR 13 0-PI-10253 ROOT VALVE	OC STARTING AIR COMPRESSOR SKID		
OC-DSA-14	-----	OC STARTING AIR COMPR DISCHARGE CHECK VALVE	OC STARTING AIR COMPRESSOR SKID		

ATTACHMENT 1A
OC STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC-DSA-19	-----	OC OIL SEPARATORS 11 AND 12 OUTLET CHECK VALVE	OC STARTING AIR COMPRESSOR SKID		
OC-DSA-23	OPEN	OC AIR DRYER 11 OUTLET 0-PI-10249 ROOT VALVE	OC STARTING AIR COMPRESSOR SKID		
OC-DSA-24	OPEN	OC AIR DRYER 12 OUTLET 0-PI-10248 ROOT VALVE	OC STARTING AIR COMPRESSOR SKID		
OC-DSA-25	-----	OC AIR DRYER 11 REGEN LINE CHECK VALVE	OC STARTING AIR COMPRESSOR SKID		
OC-DSA-26	-----	OC AIR DRYER 12 REGEN LINE CHECK VALVE	OC STARTING AIR COMPRESSOR SKID		
OC-DSA-27	-----	OC AIR DRYER 11 OUTLET CHECK VALVE	OC STARTING AIR COMPRESSOR SKID		INTERNAL TO DRYER
OC-DSA-28	-----	OC AIR DRYER 12 OUTLET CHECK VALVE	OC STARTING AIR COMPRESSOR SKID		INTERNAL TO DRYER
OC-DSA-31	-----	OC AIR DRYER REGEN LINE 0-PCV-10258 OUTLET CHECK VALVE	OC STARTING AIR COMPRESSOR SKID		

ATTACHMENT 1A
OC STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC-DSA-32	-----	OC AIR DRYER REGEN LINE O-PCV-10258 OUTLET REGULATING VALVE	OC STARTING AIR COMPRESSOR SKID		
OC-DSA-33	OPEN	OC AIR DRYER REGEN LINE O-PCV-10258 OUTLET O-PI-10247 ROOT VALVE	OC STARTING AIR COMPRESSOR SKID		
OC-DSA-80	LOCKED OPEN	OC AIR COMPRESSOR SKID OUTLET VALVE	OC AIR COMPRESSOR SKID WEST SIDE OF STANCHION		
O-DSA-10251-CV	-----	OC WATER SEPARATOR 12 AUTOMATIC DRAIN VALVE	OC STARTING AIR COMPRESSOR SKID		
O-DSA-10252-CV	-----	OC INTERCOOLER 11 AUTOMATIC DRAIN VALVE	OC STARTING AIR COMPRESSOR SKID		
O-DSA-10253-CV	-----	OC WATER SEPARATOR 13 AUTOMATIC DRAIN VALVE	OC STARTING AIR COMPRESSOR SKID		
O-DSA-10258-CV	-----	OC AIR DRYER 11 AND 12 INLET 4-WAY CONTROL VALVE	OC STARTING AIR COMPRESSOR SKID		

ATTACHMENT 1A
OC STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
0-DSA-10257-PCV	-----	OC STARTING AIR COMPR SKID OUTLET PRESS CONTROL VALVE	OC STARTING AIR COMPRESSOR SKID		
0-DSA-10258-PCV	-----	OC AIR DRYER REGEN LINE PRESS CONTROL VALVE	OC STARTING AIR COMPRESSOR SKID		
0-DSA-10245-RV	-----	OC OILER 13 RELIEF VALVE	OC STARTING AIR COMPRESSOR SKID		
0-DSA-10251-RV	-----	OC WATER SEPARATOR 12 RELIEF VALVE	OC STARTING AIR COMPRESSOR SKID		
0-DSA-10252-RV	-----	OC INTERCOOLER 11 RELIEF VALVE	OC STARTING AIR COMPRESSOR SKID		
0-DSA-10253-RV	-----	OC WATER SEPARATOR 13 RELIEF VALVE	OC STARTING AIR COMPRESSOR SKID		
0-DSA-10244-SV	-----	OC AIR DRYER REGEN LINE SOLENOID VALVE	OC STARTING AIR COMPRESSOR SKID		
0-DSA-10245-SV	-----	OC AIR DRYER CONTROL AIR TO 0-DSA-10258-CV SOLENOID VALVE	OC STARTING AIR COMPRESSOR SKID		

ATTACHMENT 1A
OC STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
0-DSA-10246-SV	-----	OC AIR DRYER REGEN CONTROL AIR TO 0-DSA-10258-CV SOLENOID VALVE	OC STARTING AIR COMPRESSOR SKID		
0-DSA-10247-SV	-----	OC AIR DRYER REGEN LINE OUTLET SOLENOID VALVE	OC STARTING AIR COMPRESSOR SKID		
0-DSA-10248-SV	-----	OC OIL SEPARATOR 11 DRAIN SOLENOID VALVE	OC STARTING AIR COMPRESSOR SKID		
0-DSA-10249-SV	-----	OC OIL SEPARATOR 12 DRAIN SOLENOID VALVE	OC STARTING AIR COMPRESSOR SKID		
OC1-DSA-38	-----	OC1 STARTING AIR RECEIVER 12 INLET CHECK VALVE	OC1 STARTING AIR RECEIVER 12 INLET LINE		
OC1-DSA-39	OPEN	OC1 STARTING AIR RECEIVER 12 INLET VALVE	OC1 STARTING AIR RECEIVER 12 INLET LINE		
OC1-DSA-40	LOCKED OPEN	OC1 STARTING AIR RECEIVER 12 OUTLET VALVE	OC1 STARTING AIR RECEIVER 12 OUTLET LINE		

ATTACHMENT 1A
OC STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DSA-42	LOCKED OPEN	OC1 STARTING AIR RECEIVER 12 O-PS-10245/10246 ROOT VALVE	OC1 STARTING AIR RECEIVER 12		
OC1-DSA-43	OPEN	OC1 STARTING AIR RECEIVER 12 O-PI/PT-10242 ROOT VALVE	OC1 STARTING AIR RECEIVER 12		
OC1-DSA-44	SHUT	OC1 STARTING AIR RECEIVER 12 DRAIN VALVE	BELOW OC1 STARTING AIR RECEIVER 12		
OC1-DSA-45	SHUT	OC1 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE	BELOW OC1 STARTING AIR RECEIVER 12		
OC1-DSA-46	-----	OC1 STARTING AIR RECEIVER 11 INLET CHECK VALVE	OC1 STARTING AIR RECEIVER 11 INLET LINE		
OC1-DSA-47	OPEN	OC1 STARTING AIR RECEIVER 11 INLET VALVE	OC1 STARTING AIR RECEIVER 11 INLET LINE		
OC1-DSA-48	LOCKED OPEN	OC1 STARTING AIR RECEIVER 11 OUTLET VALVE	OC1 STARTING AIR RECEIVER 11 OUTLET LINE		

ATTACHMENT 1A
OC STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DSA-50	LOCKED OPEN	OC1 STARTING AIR RECEIVER 11 0-PS-10244/10243 ROOT VALVE	OC1 STARTING AIR RECEIVER 11		
OC1-DSA-51	OPEN	OC1 STARTING AIR RECEIVER 11 0-PI/PT-10241 ROOT VALVE	OC1 STARTING AIR RECEIVER 11		
OC1-DSA-52	SHUT	OC1 STARTING AIR RECEIVER 11 DRAIN VALVE	OC1 STARTING AIR RECEIVER 11		
OC1-DSA-53	SHUT	OC1 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE	OC1 STARTING AIR RECEIVER 11		
OC1-DSA-54	LOCKED OPEN	OC STARTING AIR COMPR SKID TO OC1 STARTING AIR SYSTEM ISOLATION VALVE	35' BY OC1 STARTING AIR RECEIVERS IN OVHD		
OC1-DSA-59	SHUT	OC1 FILTER 14 DRAIN VALVE	NE CORNER BY OC1 DIESEL		
OC1-DSA-62	-----	OC1 CENTRIFUGAL SENSOR 12 INLET CHECK VALVE	NE CORNER BY OC1 DIESEL		

ATTACHMENT 1A
OC STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DSA-63	-----	OC1 INJECTION LIMITER JACK O-SV-10243 INLET CHECK VALVE	SE CORNER BY OC1 DIESEL		
OC1-DSA-64	OPEN	OC1 ENGINE START AIR O-PS-10255 ROOT VALVE	NE CORNER BY OC1 DIESEL		
OC1-DSA-65	OPEN	OC1 AIR DISTRIBUTOR 12 O-PT-10258 ROOT VALVE	PT MANIFOLD		
OC1-DSA-66	-----	OC1 GOVERNOR BOOSTER INLET CHECK VALVE	NE CORNER BY OC1 DIESEL		
OC1-DSA-67	SHUT	OC1 FILTER 15 DRAIN VALVE	SE CORNER BY OC1 DIESEL		
OC1-DSA-70	-----	OC1 CENTRIFUGAL SENSOR 11 INLET CHECK VALVE	SE CORNER BY OC1 DIESEL		
OC1-DSA-71	-----	OC1 INJECTION LIMITER JACK O-SV-10243 INLET CHECK VALVE	SE CORNER BY OC1 DIESEL		

ATTACHMENT 1A
OC STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DSA-72	OPEN	OC1 ENGINE START AIR 0-PS-10254 ROOT VALVE	SE CORNER BY OC1 DIESEL		
OC1-DSA-73	OPEN	OC1 AIR DISTRIBUTOR 11 0-PT-10257 ROOT VALVE	PT MANIFOLD		
OC1-DSA-74	-----	OC1 GOVERNOR BOOSTER INLET CHECK VALVE	NE CORNER BY OC1 DIESEL		
OC1-DSA-76	THROTTLED	OC1 GOVERNOR BOOSTER AIR LINE VENT VALVE	NE CORNER BY OC1 DIESEL		
OC1-DSA-81	SHUT	OC1 TO OC2 FUEL RACK STOPPING JACK 12 CROSSCONNECT LINE DRAIN VALVE	35' S SIDE OC PEDESTAL		
OC1-DSA-82	SHUT	OC1 TO OC2 FUEL RACK STOPPING JACK 12 CROSSCONNECT LINE BACKUP DRAIN VALVE	35' S SIDE OC PEDESTAL		

ATTACHMENT 1A
OC STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DSA-83	SHUT	OC1 TO OC2 FUEL RACK STOPPING JACK 11 CROSSCONNECT LINE DRAIN VALVE	35' S SIDE OC PEDESTAL		
OC1-DSA-84	SHUT	OC1 TO OC2 FUEL RACK STOPPING JACK 11 CROSSCONNECT LINE BACKUP DRAIN VALVE	35' S SIDE OC PEDESTAL		
0-DSA-10243-RV	-----	OC1 STARTING AIR RECEIVER 11 RELIEF VALVE	OC1 STARTING AIR RECEIVER 11		
0-DSA-10246-RV	-----	OC1 STARTING AIR RECEIVER 12 RELIEF VALVE	OC1 STARTING AIR RECEIVER 12		
0-DSA-10241-SV	-----	OC1 AIR DISTRIBUTOR 11 INLET SOLENOID VALVE	SE CORNER BY OC1 DIESEL		
0-DSA-10242-SV	-----	OC1 AIR DISTRIBUTOR 12 INLET SOLENOID VALVE	NE CORNER BY OC1 DIESEL		

ATTACHMENT 1A
OC STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
0-DSA-10243-SV	-----	OC1 INJECTION LIMITER JACK INLET SOLENOID VALVE	SE CORNER BY OC1 DIESEL		
OC2-DSA-38	-----	OC2 STARTING AIR RECEIVER 12 INLET CHECK VALVE	OC2 STARTING AIR RECEIVER 12 INLET LINE		
OC2-DSA-39	OPEN	OC2 STARTING AIR RECEIVER 12 INLET VALVE	OC2 STARTING AIR RECEIVER 12 INLET LINE		
OC2-DSA-40	LOCKED OPEN	OC2 STARTING AIR RECEIVER 12 OUTLET VALVE	OC2 STARTING AIR RECEIVER 12 OUTLET LINE		
OC2-DSA-42	LOCKED OPEN	OC2 STARTING AIR RECEIVER 12 0-PS-10276/10275 ROOT VALVE	E SIDE STARTING AIR RECEIVER 12		
OC2-DSA-43	OPEN	OC2 STARTING AIR RECEIVER 12 0-PI/PT-10272 ROOT VALVE	W SIDE STARTING AIR RECEIVER 12		
OC2-DSA-44	SHUT	OC2 STARTING AIR RECEIVER 12 DRAIN VALVE	OC2 STARTING AIR RECEIVER 12		

ATTACHMENT 1A
OC STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DSA-45	SHUT	OC2 STARTING AIR RECEIVER 12 BACKUP DRAIN VALVE	OC2 STARTING AIR RECEIVER 12		
OC2-DSA-46	-----	OC2 STARTING AIR RECEIVER 11 INLET CHECK VALVE	OC2 STARTING AIR RECEIVER 11 INLET LINE		
OC2-DSA-47	OPEN	OC2 STARTING AIR RECEIVER 11 INLET VALVE	OC2 STARTING AIR RECEIVER 11 INLET LINE		
OC2-DSA-48	LOCKED OPEN	OC2 STARTING AIR RECEIVER 11 OUTLET VALVE	OC2 STARTING AIR RECEIVER 11 OUTLET LINE		
OC2-DSA-50	LOCKED OPEN	OC2 STARTING AIR RECEIVER 11 O-PS-10274/10273 ROOT VALVE	E SIDE OC2 STARTING AIR RECEIVER 11		
OC2-DSA-51	OPEN	OC2 STARTING AIR RECEIVER 11 O-PI/PT-10271 ROOT VALVE	W SIDE OC2 STARTING AIR RECEIVER 11		
OC2-DSA-52	SHUT	OC2 STARTING AIR RECEIVER 11 DRAIN VALVE	BELOW OC2 STARTING AIR RECEIVER 11		

ATTACHMENT 1A
OC STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DSA-53	SHUT	OC2 STARTING AIR RECEIVER 11 BACKUP DRAIN VALVE	BELOW OC2 STARTING AIR RECEIVER 11		
OC2-DSA-54	LOCKED OPEN	OC STARTING AIR COMPR SKID TO OC2 STARTING AIR SYSTEM ISOLATION VALVE	35' BY OC1 STARTING AIR RECEIVERS IN OVHD		
OC2-DSA-59	SHUT	OC2 FILTER 14 DRAIN VALVE	NW CORNER OC2 DIESEL		
OC2-DSA-62	-----	OC2 CENTRIFUGAL SENSOR 12 INLET CHECK VALVE	NW CORNER OC2 DIESEL		
OC2-DSA-63	-----	OC2 INJECTION LIMITER JACK O-SV-10273 INLET CHECK VALVE	NW CORNER OC2 DIESEL		
OC2-DSA-64	OPEN	OC2 ENGINE START AIR O-PS-10285 ROOT VALVE	NW CORNER OC2 DIESEL		
OC2-DSA-65	OPEN	OC2 AIR DISTRIBUTOR 12 O-PT-10288 ROOT VALVE	PT MANIFOLD		

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DSA-66	-----	OC2 GOVERNOR BOOSTER INLET CHECK VALVE	SW CORNER OC2 DIESEL		
OC2-DSA-67	SHUT	OC2 FILTER 15 DRAIN VALVE	SW CORNER OC2 DIESEL		
OC2-DSA-70	-----	OC2 CENTRIFUGAL SENSOR 11 INLET CHECK VALVE	SW CORNER OC2 DIESEL		
OC2-DSA-71	-----	OC2 INJECTION LIMITER JACK O-SV-10273 INLET CHECK VALVE	NW CORNER OC2 DIESEL		
OC2-DSA-72	OPEN	OC2 ENGINE START AIR O-PS-10284 ROOT VALVE	SW CORNER OC2 DIESEL		
OC2-DSA-73	OPEN	OC2 AIR DISTRIBUTOR 11 O-PT-10287 ROOT VALVE	PT MANIFOLD		
OC2-DSA-74	-----	OC2 GOVERNOR BOOSTER INLET CHECK VALVE	SW CORNER OC2 DIESEL		

ATTACHMENT 1A
OC STARTING AIR SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DSA-76	THROTTLED	OC2 GOVERNOR BOOSTER AIR LINE VENT VALVE	SW CORNER OC2 DIESEL		
0-DSA-10273-RV	-----	OC2 STARTING AIR RECEIVER 11 RELIEF VALVE	OC2 STARTING AIR RECEIVER 11		
0-DSA-10276-RV	-----	OC2 STARTING AIR RECEIVER 12 RELIEF VALVE	OC2 STARTING AIR RECEIVER 12		
0-DSA-10271-SV	-----	OC2 AIR DISTRIBUTOR 11 INLET SOLENOID VALVE	SW CORNER OC2 DIESEL		
0-DSA-10272-SV	-----	OC2 AIR DISTRIBUTOR 12 INLET SOLENOID VALVE	NW CORNER OC2 DIESEL		
0-DSA-10273-SV	-----	OC2 INJECTION LIMITER JACK INLET SOLENOID VALVE	NW CORNER OC2 DIESEL		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC-DFO-2	OPEN	OC FUEL OIL TRANSFER PUMP SUCTION O-PI-10021 ROOT VALVE	35' OC BLDG SE CORNER		
OC-DFO-4	OPEN	OC FUEL OIL TRANSFER PUMP DISCHARGE O-PI-10022 ROOT VALVE	35' OC BLDG SE CORNER		
OC-DFO-5	-----	OC FUEL OIL TRANSFER PUMP DISCHARGE CHECK VALVE	35' OC BLDG SE CORNER		
OC-DFO-6	THROTTLE TO 2 TURNS OPEN	OC FUEL OIL TRANSFER PUMP DISCHARGE VALVE	35' OC BLDG SE CORNER		
OC-DFO-15	OPEN	OC FUEL OIL TRANSFER FILTER O-PDIS-10029 HP ROOT VALVE	35' OC BLDG SE CORNER		
OC-DFO-16	OPEN	OC FUEL OIL TRANSFER FILTER INLET VALVE	35' OC BLDG SE CORNER		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC-DFO-18	OPEN	OC FUEL OIL TRANSFER FILTER O-PDIS-10029 LP ROOT VALVE	35' OC BLDG SE CORNER		
OC-DFO-19	OPEN	OC FUEL OIL TRANSFER FILTER OUTLET VALVE	35' OC BLDG SE CORNER		
OC-DFO-20	LOCKED SHUT	OC FUEL OIL AUX TANK DRAIN/SAMPLE VALVE	66' TANK RM ON OC AUX FO TK		
OC-DFO-21	SHUT	OC FUEL OIL TRANSFER FILTER DRAIN VALVE	35' OC BLDG SE CRNR BOT OF FILT		
OC-DFO-22	LOCKED SHUT	OC FUEL OIL AUX TANK SAMPLE VALVE	66' TANK RM ON OC AUX FO TK		
OC-DFO-23	SHUT	OC FUEL OIL DAY TANK O-LS-10021 VENT VALVE	66' TK RM ON OC AUX FO TK LG		
OC-DFO-24	SHUT	OC FUEL OIL DAY TANK O-LS-10021 DRAIN VALVE	66' TANK RM ON O-LS-10021		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC-DFO-25	SHUT	OC FUEL OIL DAY TANK O-LS-10022 DRAIN VALVE	66' TANK RM ON O-LS-10022		
OC-DFO-26	LOCKED OPEN	OC FUEL OIL DAY TANK O-LS-10022 UPPER ROOT VALVE	66' TANK RM ON OC FO DAY TANK		
OC-DFO-27	LOCKED OPEN	OC FUEL OIL DAY TANK O-LS-10022 LOWER ROOT VALVE	66' TANK RM ON OC FO DAY TK		
OC-DFO-28	LOCKED SHUT	OC FUEL OIL DAY TANK DRAIN/SAMPLE VALVE	66' TANK RM ON OC FO DAY TK		
OC-DFO-29	LOCKED OPEN	OC FUEL OIL AUX TANK TO OC FUEL OIL DAY TANK CROSSCONNECT VALVE	66' TANK RM BETWN OC FO DAY TKS		
OC-DFO-31	SHUT	OC FUEL OIL TRANSFER FILTER INLET SIDE DRAIN VALVE	35' OC BLDG SE CORNER ON FILTER		
OC-DFO-37	SHUT	OC FUEL OIL DAY TANK FILL LINE ISOLATION VALVE	E OF 11 FOST IN VALVE PIT		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC-DFO-54	SHUT	OC FUEL OIL DAY TANK FILL LINE SAMPLE VALVE	E OF 11 FOST IN VALVE PIT		
OC-DFO-63	SHUT	OC FUEL OIL DAY TANK FILL LINE LEAK DETECTION VENT VALVE	E OF 11 FOST IN VALVE PIT		
OC-DFO-65	OPEN	OC DIRTY FUEL OIL TANK O-LG-10051 UPPER ISOLATION VALVE	35' OC BLDG S OF DIRTY FO TK		
OC-DFO-71	SHUT	OC FUEL OIL TRANSFER FILTER VENT VALVE	35' OC BLDG SE CRNR TOP OF FILT		
OC-DFO-74	SHUT	OC DIRTY FUEL OIL TANK DRAIN VALVE	35' OC BLDG S OF DIRTY FO TK		
OC-DFO-75	OPEN	OC DIRTY FUEL OIL TANK O-LG-10051 LOWER ISOLATION VALVE	35' OC BLDG S OF DIRTY FO TK		
OC-DFO-79	LOCKED SHUT	OC FUEL OIL DAY TANK SAMPLE VALVE	66' TANK RM ON OC FO DAY TANK		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC-DFO-80	OPEN	OC FUEL OIL DAY TANK O-LI/LT-10023 ROOT VALVE	66' TANK RM ON OC FO DAY TANK		
OC-DFO-81	SHUT	OC FUEL OIL DAY TANK FILL LINE LEAK DETECTION DRAIN VALVE	35' OC BLDG SE CORNER		
OC-DFO-82	SHUT	OC FUEL OIL DAY TANK INLET LINE VENT VALVE	OC BLDG TANK ROOM		
OC-DFO-83	SHUT	OC FUEL OIL TRANSFER PUMP DISCHARGE LINE DRAIN VALVE	35' OC BLDG BY FO TRANSFER PP		
OC-DFO-84	SHUT	OC FUEL OIL DAY TANK INLET LINE DRAIN VALVE	35' OC BDG NW CNR OC2 PED OVHD		
OC-DFO-151	SHUT	OC FUEL OIL DAY TANK ALTERNATE FILL VALVE	E OF 11 FOST IN VALVE PIT		
OC-DFO-159	SHUT	OC FUEL OIL TRANSFER FILTER INLET SAMPLE VALVE	35' OC BLDG SE CORNER		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC-DFO-168	SHUT	OC1 MOTOR DRIVEN FUEL OIL PUMP SUCTION LINE DRAIN VALVE	35' OC BDG NW CNR OC2 PED OVHD		
OC-DFO-169	SHUT	OC1 MOTOR DRIVEN FUEL OIL PUMP SUCTION LINE DRAIN VALVE	35' OC BDG O/SIDE STAIRWLL OVHD		
OC-DFO-175	OPEN	OC DIRTY FUEL OIL TANK 0-LG-10051 LOWER ISOLATION VALVE	35' OC BLDG S OF DIRTY FO TK		
OC-DFO-176	OPEN	OC DIRTY FUEL OIL TANK 0-LG-10051 UPPER ISOLATION VALVE	35' OC BLDG S OF DIRTY FO TK		
OC1-DFO-55	SHUT	OC1 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE DRAIN VALVE	35' OC BDG NE CRNR OC1 ENG OVHD		
OC1-DFO-56	SHUT	OC1 DUPLEX FILTER OUTLET LINE DRAIN VALVE	35' OC BDG NE CRNR OC1 ENG OVHD		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DFO-82	LOCKED OPEN	OC1 ENGINE DRIVEN FUEL OIL PUMP SUCTION VALVE	35' OC BLDG 10' W OF BATT RM DR		
OC1-DFO-83	SHUT	OC1 ENGINE DRIVEN FUEL OIL PUMP SUCTION LINE DRAIN VALVE	35' OC BLDG NE CRNR OC2 ENG		
OC1-DFO-84	SHUT	OC1 FUEL OIL EXCESS FLOW RETURN LINE DRAIN VALVE	35' OC BDG NE CRNR OC1 ENG OVHD		
OC1-DFO-85	SHUT	OC1 FUEL OIL PUMPS DISCHARGE RETURN LINE DRAIN VALVE	35' OC BLDG BELOW OC1 AUX DESK		
OC1-DFO-86	SHUT	OC1 MOTOR DRIVEN FUEL OIL PUMP SUCTION LINE DRAIN VALVE	35' OC BLDG BELOW OC1 AUX DESK		
OC1-DFO-101	OPEN	OC1 MOTOR DRIVEN FUEL OIL PUMP SUCTION VALVE	45' OC1 AUX DESK		
OC1-DFO-102	-----	OC1 MOTOR DRIVEN FUEL OIL PUMP DISCHARGE CHECK VALVE	45' OC1 AUX DESK		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DFO-103	-----	OC1 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE CHECK VALVE	45' OC1 AUX DESK		
OC1-DFO-106	OPEN	OC1 ENGINE DRIVEN FUEL OIL PUMP SUCTION O-PI-10054 ROOT VALVE	PT MANIFOLD		
OC1-DFO-107	OPEN	OC1 ENGINE FUEL OIL MANIFOLD O-PS-10056 ROOT VALVE	PT MANIFOLD		
OC1-DFO-108	OPEN	OC1 MOTOR DRIVEN FUEL OIL PUMP SUCTION O-PI-10051 ROOT VALVE	45' OC1 AUX DESK		
OC1-DFO-109	OPEN	OC1 DUPLEX FILTER INLET O-PI-10052 ROOT VALVE	45' OC1 AUX DESK		
OC1-DFO-110	OPEN	OC1 DUPLEX FILTER OUTLET O-PI-10053 ROOT VALVE	45' OC1 AUX DESK		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DFO-120	OPEN	OC1 DUPLEX FILTER O-PDIS-10055 HP ROOT VALVE	45' OC1 AUX DESK		
OC1-DFO-121	OPEN	OC1 DUPLEX FILTER O-PDIS-10055 LP ROOT VALVE	45' OC1 AUX DESK		
OC1-DFO-125	OPEN	OC1 MOTOR DRIVEN FUEL OIL PUMP DISCHARGE VALVE	45' OC1 AUX DESK		
OC1-DFO-131	OPEN	OC1 ENGINE FUEL INJECTOR 1 ISOLATION VALVE	OC1 ENGINE NORTH SIDE		
OC1-DFO-132	OPEN	OC1 ENGINE FUEL INJECTOR 2 ISOLATION VALVE	OC1 ENGINE NORTH SIDE		
OC1-DFO-133	OPEN	OC1 ENGINE FUEL INJECTOR 3 ISOLATION VALVE	OC1 ENGINE NORTH SIDE		
OC1-DFO-134	OPEN	OC1 ENGINE FUEL INJECTOR 4 ISOLATION VALVE	OC1 ENGINE NORTH SIDE		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DFO-135	OPEN	OC1 ENGINE FUEL INJECTOR 5 ISOLATION VALVE	OC1 ENGINE NORTH SIDE		
OC1-DFO-136	OPEN	OC1 ENGINE FUEL INJECTOR 6 ISOLATION VALVE	OC1 ENGINE NORTH SIDE		
OC1-DFO-137	OPEN	OC1 ENGINE FUEL INJECTOR 7 ISOLATION VALVE	OC1 ENGINE NORTH SIDE		
OC1-DFO-138	OPEN	OC1 ENGINE FUEL INJECTOR 8 ISOLATION VALVE	OC1 ENGINE NORTH SIDE		
OC1-DFO-139	OPEN	OC1 ENGINE FUEL INJECTOR 9 ISOLATION VALVE	OC1 ENGINE SOUTH SIDE		
OC1-DFO-140	OPEN	OC1 ENGINE FUEL INJECTOR 10 ISOLATION VALVE	OC1 ENGINE SOUTH SIDE		
OC1-DFO-141	OPEN	OC1 ENGINE FUEL INJECTOR 11 ISOLATION VALVE	OC1 ENGINE SOUTH SIDE		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DFO-142	OPEN	OC1 ENGINE FUEL INJECTOR 12 ISOLATION VALVE	OC1 ENGINE SOUTH SIDE		
OC1-DFO-143	OPEN	OC1 ENGINE FUEL INJECTOR 13 ISOLATION VALVE	OC1 ENGINE SOUTH SIDE		
OC1-DFO-144	OPEN	OC1 ENGINE FUEL INJECTOR 14 ISOLATION VALVE	OC1 ENGINE SOUTH SIDE		
OC1-DFO-145	OPEN	OC1 ENGINE FUEL INJECTOR 15 ISOLATION VALVE	OC1 ENGINE SOUTH SIDE		
OC1-DFO-146	OPEN	OC1 ENGINE FUEL INJECTOR 16 ISOLATION VALVE	OC1 ENGINE SOUTH SIDE		
OC1-DFO-147/148	NOT IN MID POSITION	OC1 DUPLEX FILTER 3-WAY VALVE	45' OC1 AUX DESK		
OC1-DFO-150	SHUT	OC1 FUEL OIL PUMPS DISCHARGE RETURN LINE DRAIN VALVE	35' OC BLDG BELOW OC1 AUX DESK		
OC1-DFO-165	SHUT	OC1 FUEL OIL EXCESS FLOW RETURN LINE VENT VALVE	OC BLDG TANK RM ABOVE TK		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DFO-166	SHUT	OC1 FUEL OIL PUMPS DISCHARGE RETURN LINE VENT VALVE	OC BLDG TANK RM ABOVE TK		
OC1-DFO-169	SHUT	OC1 ENGINE DRIVEN FUEL OIL PUMP SUCTION LINE VENT VALVE	35' OC BLDG NE CNR PEDESTL OVHD		
OC1-DFO-171	SHUT	OC1 FUEL OIL EXCESS FLOW RETURN LINE VENT VALVE	35' OC BLDG NE CNR OC1 ENG OVHD		
OC1-DFO-172	SHUT	OC1 ENGINE DRIVEN FUEL OIL PUMP SUCTION LINE DRAIN VALVE	35' OC BLDG NW CNR OC2 PED OVHD		
OC1-DFO-173	SHUT	OC1 FUEL OIL EXCESS FLOW RETURN LINE DRAIN VALVE	35' OC BLDG NW CNR OC2 PED IN OVHD		
0-DFO-10051-RV	-----	OC1 MOTOR DRIVEN FUEL OIL PUMP INTERNAL RELIEF VALVE	45' OC1 AUX DESK		INTERNAL TO PUMP
0-DFO-10052-RV	-----	OC1 FUEL OIL PUMPS DISCHARGE LINE RELIEF VALVE	45' OC1 AUX DESK		INTERNAL TO FILTER

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
0-DFO-10054-RV	-----	OC1 MOTOR DRIVEN FUEL OIL PUMP DISCHARGE LINE RELIEF VALVE	45' OC1 AUX DESK		
0-DFO-10055-RV	-----	OC1 FUEL OIL FEED RAMP EXCESS FLOW RELIEF VALVE	45' NW CORNER ON OC1 ENGINE		
OC2-DFO-3	SHUT	OC2 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE LINE DRAIN VALVE	35' N OC2 ENG BELOW AUX DESK		
OC2-DFO-9	SHUT	OC2 DUPLEX FILTERS OUTLET LINE DRAIN VALVE	35' N OC2 ENG BELOW AUX DESK		
OC2-DFO-82	LOCKED OPEN	OC2 ENGINE DRIVEN FUEL OIL PUMP SUCTION VALVE	35' OC BDG SW CRNR OC2 ENG OVHD		
OC2-DFO-85	SHUT	OC2 FUEL OIL PUMPS DISCHARGE RETURN LINE DRAIN VALVE	35' OC BLDG BELOW AUX DESK		
OC2-DFO-101	OPEN	OC2 MOTOR DRIVEN FUEL OIL PUMP SUCTION VALVE	45' OC2 AUX DESK		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DFO-102	-----	OC2 MOTOR DRIVEN FUEL OIL PUMP DISCHARGE CHECK VALVE	45' OC2 AUX DESK		
OC2-DFO-103	-----	OC2 ENGINE DRIVEN FUEL OIL PUMP DISCHARGE CHECK VALVE	45' OC2 AUX DESK		
OC2-DFO-106	OPEN	OC2 ENGINE DRIVEN FUEL OIL PUMP SUCTION 0-PI-10064 ROOT VALVE	PT MANIFOLD		
OC2-DFO-107	OPEN	OC2 ENGINE FUEL OIL MANIFOLD 0-PS-10066 ROOT VALVE	PT MANIFOLD		
OC2-DFO-108	OPEN	OC2 MOTOR DRIVEN FUEL OIL PUMP SUCTION 0-PI-10061 ROOT VALVE	45' OC2 AUX DESK		
OC2-DFO-109	OPEN	OC2 DUPLEX FILTER INLET 0-PI-10062 ROOT VALVE	45' OC2 AUX DESK		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DFO-110	OPEN	OC2 DUPLEX FILTER OUTLET O-PI-10063 ROOT VALVE	45' OC2 AUX DESK		
OC2-DFO-120	OPEN	OC2 DUPLEX FILTER O-PDIS-10065 HP ROOT VALVE	45' OC2 AUX DESK		
OC2-DFO-121	OPEN	OC2 DUPLEX FILTER O-PDIS-10065 LP ROOT VALVE	45' OC2 AUX DESK		
OC2-DFO-125	OPEN	OC2 MOTOR DRIVEN FUEL OIL PUMP DISCHARGE VALVE	45' OC2 AUX DESK		
OC2-DFO-131	OPEN	OC2 ENGINE FUEL INJECTOR 1 ISOLATION VALVE	OC2 ENGINE SOUTH SIDE		
OC2-DFO-132	OPEN	OC2 ENGINE FUEL INJECTOR 2 ISOLATION VALVE	OC2 ENGINE SOUTH SIDE		
OC2-DFO-133	OPEN	OC2 ENGINE FUEL INJECTOR 3 ISOLATION VALVE	OC2 ENGINE SOUTH SIDE		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DFO-134	OPEN	OC2 ENGINE FUEL INJECTOR 4 ISOLATION VALVE	OC2 ENGINE SOUTH SIDE		
OC2-DFO-135	OPEN	OC2 ENGINE FUEL INJECTOR 5 ISOLATION VALVE	OC2 ENGINE SOUTH SIDE		
OC2-DFO-136	OPEN	OC2 ENGINE FUEL INJECTOR 6 ISOLATION VALVE	OC2 ENGINE SOUTH SIDE		
OC2-DFO-137	OPEN	OC2 ENGINE FUEL INJECTOR 7 ISOLATION VALVE	OC2 ENGINE SOUTH SIDE		
OC2-DFO-138	OPEN	OC2 ENGINE FUEL INJECTOR 8 ISOLATION VALVE	OC2 ENGINE SOUTH SIDE		
OC2-DFO-139	OPEN	OC2 ENGINE FUEL INJECTOR 9 ISOLATION VALVE	OC2 ENGINE NORTH SIDE		
OC2-DFO-140	OPEN	OC2 ENGINE FUEL INJECTOR 10 ISOLATION VALVE	OC2 ENGINE NORTH SIDE		

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DFO-141	OPEN	OC2 ENGINE FUEL INJECTOR 11 ISOLATION VALVE	OC2 ENGINE NORTH SIDE		
OC2-DFO-142	OPEN	OC2 ENGINE FUEL INJECTOR 12 ISOLATION VALVE	OC2 ENGINE NORTH SIDE		
OC2-DFO-143	OPEN	OC2 ENGINE FUEL INJECTOR 13 ISOLATION VALVE	OC2 ENGINE NORTH SIDE		
OC2-DFO-144	OPEN	OC2 ENGINE FUEL INJECTOR 14 ISOLATION VALVE	OC2 ENGINE NORTH SIDE		
OC2-DFO-145	OPEN	OC2 ENGINE FUEL INJECTOR 15 ISOLATION VALVE	OC2 ENGINE NORTH SIDE		
OC2-DFO-146	OPEN	OC2 ENGINE FUEL INJECTOR 16 ISOLATION VALVE	OC2 ENGINE NORTH SIDE		
OC2-DFO-147/148	NOT IN MID POSITION	OC2 DUPLEX FILTER 3-WAY VALVE	45' OC2 AUX DESK		
OC2-DFO-150	SHUT	OC2 FUEL OIL PUMPS DISCHARGE RETURN LINE DRAIN VALVE	35' OC BLDG NW CNR OC2 PED OVHD		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DFO-165	SHUT	OC2 FUEL OIL EXCESS FLOW RETURN LINE VENT VALVE	OC BLDG TANK RM ABOVE TANK		
OC2-DFO-166	SHUT	OC2 FUEL OIL PUMPS DISCHARGE RETURN LINE VENT VALVE	OC BLDG TANK RM ABOVE TANK		
OC2-DFO-172	SHUT	OC2 ENGINE DRIVEN FUEL OIL PUMP SUCTION LINE DRAIN VALVE	35' OC BLDG W SIDE OF STAIRWELL		
OC2-DFO-173	SHUT	OC2 FUEL OIL EXCESS FLOW RETURN LINE DRAIN VALVE	35' OC BLDG W SIDE OF STAIRWELL		
0-DFO-10061-RV	-----	OC2 MOTOR DRIVEN FUEL OIL PUMP INTERNAL RELIEF VALVE	45' OC2 AUX DESK		INTERNAL TO PUMP
0-DFO-10062-RV	-----	OC2 FUEL OIL PUMPS DISCHARGE LINE RELIEF VALVE	45' OC2 AUX DESK		INTERNAL TO FILTER
0-DFO-10064-RV	-----	OC2 MOTOR DRIVEN FUEL OIL PUMP DISCHARGE LINE RELIEF VALVE	45' OC2 AUX DESK		

ATTACHMENT 1B
OC FUEL OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
0-DFO-10065-RV	-----	OC2 FUEL OIL FEED RAMP EXCESS FLOW RELIEF VALVE	OC2 ENGINE SE CORNER		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC-DLO-2	SHUT	1A LUBE OIL DRAIN SYSTEM RETURN TO OC DG HDR ISOLATION VALVE	35' BETWEEN OC1/OC2 AUX DESKS IN OVHD		
OC-DLO-18	LOCKED SHUT	1A LUBE OIL DRAIN SYSTEM RETURN TO OC2 DG ISOLATION VALVE	35' BETWEEN OC1/OC2 AUX DESKS IN OVHD		
OC-DLO-19	LOCKED SHUT	1A LUBE OIL DRAIN SYSTEM RETURN TO OC1 DG ISOLATION VALVE	35' BETWEEN OC1/OC2 AUX DESKS IN OVHD		
OC-DLO-20	-----	OC LUBE OIL FILL PUMP DISCHARGE CHECK VALVE	45' OC BLDG ABOVE LO FILL PP		
OC-DLO-21	OPEN	OC LUBE OIL AUX TANK O-LS-10166 UPPER ISOLATION VALVE	66' OC BLDG TK RM ON AUX LO TK		
OC-DLO-22	OPEN	OC LUBE OIL AUX TANK O-LS-10166 LOWER ISOLATION VALVE	66' OC BLDG TK RM ON AUX LO TK		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC-DLO-23	SHUT	OC LUBE OIL AUX TANK O-LS-10166 VENT VALVE	66' OC BLDG TK RM ON AUX LO TK		
OC-DLO-24	SHUT	OC LUBE OIL AUX TANK O-LS-10166 DRAIN/SAMPLE VALVE	66' OC BLDG TK RM ON AUX LO TK		
OC-DLO-25	SHUT	OC LUBE OIL AUX TANK DRAIN VALVE	66' OC BLDG TK RM BELOW AUX LO TK		
OC-DLO-28	SHUT	OC LUBE OIL FILL PUMP DISCHARGE LINE DRAIN VALVE	45' OC BLDG ABOVE LO FILL PP		
OC-DLO-30	OPEN	OC LUBE OIL AUX TANK O-LI/LT-10164 ROOT VALVE	66' OC BLDG TK RM ON AUXILIARY LO TK		
OC-DLO-76	OPEN	OC PNEUMATIC PRELUBE PUMP AIR BOTTLE ISOLATION VALVE	35' OC BLDG N SIDE PEDESTAL		
OC-DLO-77	OPEN	OC PNEUMATIC PRELUBE PUMP AIR BOTTLE ISOLATION VALVE	35' OC BLDG N SIDE PEDESTAL		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
0-DLO-10180-PCV	-----	OC PNEUMATIC PRELUBE PUMP AIR BOTTLE PRESS CONTROL VALVE	35' OC BLDG N SIDE PEDESTAL		
OC1-DLO-1	OPEN	OC1 AC PRELUBE PUMP SUCTION VALVE	OC1 AUX DESK		
OC1-DLO-2	SHUT	OC1 PNEUMATIC PRELUBE PUMP SUCTION VALVE	45' BY OC1 PNEUMATIC PRELUBE PP		
OC1-DLO-3	OPEN	OC1 AC PRELUBE PUMP DISCH 0-PS-10161 ROOT VALVE	OC1 AUX DESK		
OC1-DLO-4	-----	OC1 AC PRELUBE PUMP DISCH CHECK VALVE	OC1 AUX DESK		
OC1-DLO-5	OPEN	OC1 AC PRELUBE PUMP DISCHARGE VALVE	OC1 AUX DESK		
OC1-DLO-6	LOCKED OPEN TO ENGINE	OC1 PRELUBE PUMPS DISCH LINE 3-WAY VALVE	OC1 AUX DESK		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DLO-7	-----	OC1 PNEUMATIC PRELUBE PUMP DISCHARGE CHECK VALVE	45' BY OC1 PNEUMATIC PRELUBE PP		
OC1-DLO-8	OPEN	OC1 DIESEL LUBE OIL PREHEATER OUTLET VALVE	OC1 AUX DESK		
OC1-DLO-10	-----	OC1 DIESEL LUBE OIL PREHEATER OUTLET CHECK VALVE	OC BLDG SE CORNER OC1 ENGINE		
OC1-DLO-11	OPEN	OC1 PNEUMATIC PRELUBE PUMP DISCH 0-PI-10169 ROOT VALVE	45' BY OC1 PNEUMATIC PRELUBE PP		
OC1-DLO-12	-----	OC1 ENGINE DRIVEN LUBE OIL PUMP DISCH HDR CHECK VALVE	E END OC1 ENGINE		
OC1-DLO-13	OPEN	OC1 ENGINE DRIVEN LUBE OIL PUMP DISCH HDR 0-PI-10167 ROOT VALVE	PT MANIFOLD		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DLO-14	SHUT	OC1 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE	OC1 AUX DESK		
OC1-DLO-15	OPEN	OC1 DIESEL LUBE OIL CENTRIFUGAL FILTER 1 INLET VALVE	N SIDE OC1 ENGINE UNDER CENTRIFUGAL FILTER		
OC1-DLO-16	LOCKED SHUT	OC1 NORTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE	NE CORNER OC1 ENGINE		
OC1-DLO-17	LOCKED SHUT	OC1 SOUTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE	SE CORNER OC1 ENGINE		
OC1-DLO-19	OPEN	OC1 LUBE OIL CARTRIDGE FILTERS 1/2 INLET 0-PI-10166 ROOT VALVE	PT MANIFOLD		
OC1-DLO-21	OPEN	OC1 LUBE OIL CARTRIDGE FILTERS 1/2 0-PDIS-10171 HP ROOT VALVE	N SIDE OC1 ENGINE ON INLET TO FILTERS		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DLO-22/25	NOT IN MID POSITION	OC1 LUBE OIL CARTRIDGE FILTERS 1/2 3-WAY VALVE	N SIDE OC1 ENGINE BETWEEN FILTERS		
OC1-DLO-23	SHUT	OC1 LUBE OIL CARTRIDGE FILTER 1 DRAIN VALVE	N SIDE OC1 ENGINE BOTTOM OF FILTER		
OC1-DLO-24	SHUT	OC1 LUBE OIL CARTRIDGE FILTER 2 DRAIN VALVE	N SIDE OC1 ENGINE BOTTOM OF FILTER		
OC1-DLO-26	OPEN	OC1 LUBE OIL CARTRIDGE FILTERS 1/2 O-PDIS-10171 LP ROOT VALVE	N SIDE OC1 ENGINE ON OUTLET OF FILTERS		
OC1-DLO-28	OPEN	OC1 LUBE OIL CARTRIDGE FILTERS 1/2 OUTLET O-PI-10165 ROOT VALVE	OC1 ENGINE PT MANIFOLD		
OC1-DLO-29	-----	OC1 DIESEL ENGINE PRELUBE REGULATING BALL CHECK VALVE	NW CORNER OC1 ENGINE		
OC1-DLO-30	LOCKED SHUT	OC1 DIESEL ENGINE OIL SUMP DRAIN VALVE	E END OC1 ENGINE		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DLO-32	-----	OC1 ENGINE DRIVEN LUBE OIL PUMP DISCH HDR CHECK VALVE	E END OC1 ENGINE		
OC1-DLO-33	OPEN	OC1 ENGINE DRIVEN LUBE OIL PUMP DISCH O-PI-10164 ROOT VALVE	PT MANIFOLD		
OC1-DLO-35	OPEN	OC1 DIESEL LUBE OIL CENTRIFUGAL FILTER 2 INLET VALVE	S SIDE OC1 ENGINE		
OC1-DLO-37	OPEN	OC1 LUBE OIL CARTRIDGE FILTERS 3/4 INLET O-PI-10163 ROOT VALVE	PT MANIFOLD		
OC1-DLO-39	OPEN	OC1 LUBE OIL CARTRIDGE FILTERS 3/4 O-PDIS-10170 HP ROOT VALVE	S SIDE OC1 ENGINE ON FILTER INLET		
OC1-DLO-40/43	NOT IN MID POSITION	OC1 LUBE OIL CARTRIDGE FILTERS 3/4 3-WAY VALVE	S SIDE OC1 ENGINE BETWEEN FILTERS		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DLO-41	SHUT	OC1 LUBE OIL CARTRIDGE FILTER 3 DRAIN VALVE	S SIDE OC1 ENGINE ON FILTER		
OC1-DLO-42	SHUT	OC1 LUBE OIL CARTRIDGE FILTER 4 DRAIN VALVE	S SIDE OC1 ENGINE ON FILTER		
OC1-DLO-44	OPEN	OC1 LUBE OIL CARTRIDGE FILTERS 3/4 O-PDIS-10170 LP ROOT VALVE	S SIDE OC1 ENGINE ON OUTLET OF FILTERS		
OC1-DLO-46	OPEN	OC1 LUBE OIL CARTRIDGE FILTERS 3/4 OUTLET O-PI-10162 ROOT VALVE	PT MANIFOLD		
OC1-DLO-47	-----	OC1 DIESEL ENGINE PRELUBE REGULATING BALL CHECK VALVE	SW CORNER OC1 ENGINE		
OC1-DLO-48	OPEN	OC1 DIESEL ENGINE OIL SUMP O-PI-10168 ROOT VALVE	N SIDE OC1 ENGINE BY MANOMETER		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DLO-49	LOCKED OPEN	OC1 DIESEL ENGINE INTERNAL CIRCUIT 0-PS-10175 ROOT VALVE	PT MANIFOLD		
OC1-DLO-50	LOCKED OPEN	OC1 DIESEL ENGINE INTERNAL CIRCUIT 0-PS-10174 ROOT VALVE	PT MANIFOLD		
OC1-DLO-51	LOCKED OPEN	OC1 DIESEL ENGINE INTERNAL CIRCUIT 0-PS-10178 ROOT VALVE	PT MANIFOLD		
OC1-DLO-52	LOCKED OPEN	OC1 DIESEL ENGINE INTERNAL CIRCUIT 0-PS-10177 ROOT VALVE	PT MANIFOLD		
OC1-DLO-53	LOCKED OPEN	OC1 DIESEL ENGINE INTERNAL CIRCUIT 0-PS-10176 ROOT VALVE	PT MANIFOLD		
OC1-DLO-54	LOCKED OPEN	OC1 DIESEL ENGINE OIL SUMP 0-LG-10161/0-LS-10 167 ROOT VALVE	SE CORNER OC1 ENGINE		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DLO-55	LOCKED SHUT	OC1 DIESEL ENGINE OIL SUMP 0-LG-10161/0-LS-10 167 DRAIN VALVE	45' SE CORNER OC1 ENGINE		
OC1-DLO-60	SHUT	OC1 DIESEL ENGINE OIL SUMP FILL VALVE	45' S SIDE OC1 ENGINE		
OC1-DLO-61	LOCKED SHUT	OC LUBE OIL AUX TANK OUTLET TO OC1 OIL SUMP ISOLATION VALVE	45' S SIDE OC1 ENGINE		
OC1-DLO-62	LOCKED OPEN	OC1 DIESEL ENGINE INTERNAL CIRCUIT 0-PS-10179 ROOT VALVE	PT MANIFOLD		
OC1-DLO-63	LOCKED OPEN	OC1 DIESEL ENGINE OIL SUMP 0-PS-10172 ROOT VALVE	N SIDE OC1 ENGINE		
OC1-DLO-70	SHUT	OC1 PNEUMATIC PRELUBE PUMP DISCH LINE DRAIN VALVE	35' BELOW OC1 AUX DESK		
OC1-DLO-71	SHUT	OC1 PRELUBE PUMPS SUCT LINE DRAIN VALVE	35' BELOW OC1 AUX DESK		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DLO-72	SHUT	OC1 DIESEL LUBE OIL PREHEATER OUTLET LINE DRAIN/SAMPLE VALVE	35' BELOW OC1 AUX DESK		
OC1-DLO-73	SHUT	OC1 DIESEL LUBE OIL TO 1A LUBE OIL DRAIN SYSTEM ISOLATION VALVE	35' BELOW OC1 AUX DESK		
OC1-DLO-74	SHUT	OC1 LUBE OIL CARTRIDGE FILTERS 1 & 2 CROSS-TIE VALVE	N SIDE OC1 ENGINE BTWN FILTERS		
OC1-DLO-75	SHUT	OC1 LUBE OIL CARTRIDGE FILTERS 3 & 4 CROSS-TIE VALVE	S SIDE OC1 ENGINE BTWN FILTERS		
0-DLO-10163-BV	-----	OC1 CRANKCASE PRESSURE BREATHER VALVE	SW CORNER OC1 ENGINE		
0-DLO-10184-BV	-----	OC1 CRANKCASE PRESSURE BREATHER VALVE	SE CORNER OC1 ENGINE		

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
0-DLO-10164-RV	-----	OC1 SIDE B CRANKCASE OVERPRESSURE RELIEF VALVE	S SIDE OC1 ENGINE		
0-DLO-10168-RV	-----	OC1 DLO CARTRIDGE FILTERS 1/2 INLET LINE RELIEF VALVE	N SIDE OC1 ENGINE W OF CLR		
0-DLO-10174-RV	-----	OC1 SIDE A CRANKCASE OVERPRESSURE RELIEF VALVE	N SIDE OC1 ENGINE		
0-DLO-10180-RV	-----	OC1 PRELUBE PUMP DISCHARGE LINE RELIEF VALVE	OC1 AUX DESK		
0-DLO-10185-RV	-----	OC1 DLO CARTRIDGE FILTERS 3/4 INLET LINE RELIEF VALVE	S SIDE OC1 ENGINE W OF CLR		
0-DLO-10171-TCV	-----	OC1 LUBE OIL SIDE A TEMP CONTROL VALVE	N SIDE OC1 ENGINE BELOW OIL CLR		
0-DLO-10172-TCV	-----	OC1 LUBE OIL SIDE B TEMP CONTROL VALVE	S SIDE OC1 ENGINE BELOW OIL CLR		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DLO-1	OPEN	OC2 AC PRELUBE PUMP SUCTION VALVE	OC2 AUX DESK		
OC2-DLO-2	SHUT	OC2 PNEUMATIC PRELUBE PUMP SUCTION VALVE	W OF OC2 AUX DESK		
OC2-DLO-3	OPEN	OC2 AC PRELUBE PUMP DISCH 0-PS-10201 ROOT VALVE	OC2 AUX DESK		
OC2-DLO-4	-----	OC2 AC PRELUBE PUMP DISCH CHECK VALVE	OC2 AUX DESK		
OC2-DLO-5	OPEN	OC2 AC PRELUBE PUMP DISCHARGE VALVE	OC2 AUX DESK		
OC2-DLO-6	LOCKED OPEN TO ENGINE	OC2 PRELUBE PUMPS DISCH LINE 3-WAY VALVE	OC2 AUX DESK		
OC2-DLO-7	-----	OC2 PNEUMATIC PRELUBE PUMP DISCHARGE CHECK VALVE	W OF OC2 AUX DESK		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DLO-8	OPEN	OC2 DIESEL LUBE OIL PREHEATER OUTLET VALVE	OC2 AUX DESK		
OC2-DLO-10	-----	OC2 DIESEL LUBE OIL PREHEATER OUTLET CHECK VALVE	NW CORNER OC2 ENGINE		
OC2-DLO-11	OPEN	OC2 PNEUMATIC PRELUBE PUMP DISCHARGE 0-PI-10209 ROOT VALVE	W OF OC2 AUX DESK		
OC2-DLO-12	-----	OC2 ENGINE DRIVEN LUBE OIL PUMP DISCHARGE HDR CHECK VALVE	W END OC2 ENGINE		
OC2-DLO-13	OPEN	OC2 ENGINE DRIVEN LUBE OIL PUMP DISCH HDR 0-PI-10207 ROOT VALVE	PT MANIFOLD		
OC2-DLO-14	SHUT	OC2 PNEUMATIC PRELUBE PUMP DISCHARGE VALVE	OC2 AUX DESK		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DLO-15	OPEN	OC2 DIESEL LUBE OIL CENTRIFUGAL FILTER 1 INLET VALVE	S SIDE OC2 ENGINE		
OC2-DLO-16	LOCKED SHUT	OC2 NORTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE	NW CORNER OC2 ENGINE		
OC2-DLO-17	LOCKED SHUT	OC2 SOUTH LUBE OIL COOLER BYPASS TO ENGINE SUMP ISOLATION VALVE	SW CORNER OC2 ENGINE		
OC2-DLO-19	OPEN	OC2 LUBE OIL CARTRIDGE FILTERS 1/2 INLET 0-PI-10206 ROOT VALVE	PT MANIFOLD		
OC2-DLO-21	OPEN	OC2 LUBE OIL CARTRIDGE FILTERS 1/2 0-PDIS-10211 HP ROOT VALVE	S SIDE OC2 ENGINE ON FILTER INLET PIPING		
OC2-DLO-22/25	NOT IN MID POSITION	OC2 LUBE OIL CARTRIDGE FILTERS 1/2 3-WAY VALVE	S SIDE OC2 ENGINE BETWEEN FILTERS		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DLO-23	SHUT	OC2 LUBE OIL CARTRIDGE FILTER 1 DRAIN VALVE	S SIDE OC2 ENGINE ON FILTER		
OC2-DLO-24	SHUT	OC2 LUBE OIL CARTRIDGE FILTER 2 DRAIN VALVE	S SIDE OC2 ENGINE ON FILTER		
OC2-DLO-26	OPEN	OC2 LUBE OIL CARTRIDGE FILTERS 1/2 O-PDIS-10211 LP ROOT VALVE	S SIDE OC2 ENGINE ON FILTER OUTLET PIPING		
OC2-DLO-28	OPEN	OC2 LUBE OIL CARTRIDGE FILTERS 1/2 OUTLET O-PI-10205 ROOT VALVE	PT MANIFOLD		
OC2-DLO-29	-----	OC2 DIESEL ENGINE PRELUBE REGULATING BALL CHECK VALVE	SE CORNER OC2 ENGINE		
OC2-DLO-30	LOCKED SHUT	OC2 DIESEL ENGINE OIL SUMP DRAIN VALVE	W END OC2 ENGINE		
OC2-DLO-31	SHUT	OC LUBE OIL AUX TANK OUTLET LINE DRAIN VALVE	35' S SIDE OC PEDESTAL		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DLO-32	-----	OC2 ENGINE DRIVEN LUBE OIL PUMP DISCHARGE HDR CHECK VALVE	W END OC2 ENGINE		
OC2-DLO-33	OPEN	OC2 ENGINE DRIVEN LUBE OIL PUMP DISCHARGE 0-PI-10204 ROOT VALVE	PT MANIFOLD		
OC2-DLO-35	OPEN	OC2 DIESEL LUBE OIL CENTRIFUGAL FILTER 2 INLET VALVE	N SIDE OC2 ENGINE		
OC2-DLO-37	OPEN	OC2 LUBE OIL CARTRIDGE FILTERS 3/4 INLET 0-PI-10203 ROOT VALVE	PT MANIFOLD		
OC2-DLO-39	OPEN	OC2 LUBE OIL CARTRIDGE FILTERS 3/4 0-PDIS-10210 HP ROOT VALVE	N SIDE OC2 ENGINE ON FILTER INLET		
OC2-DLO-40/43	NOT IN MID POSITION	OC2 LUBE OIL CARTRIDGE FILTERS 3/4 3-WAY VALVE	N SIDE OC2 ENGINE BETWEEN FILTERS		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DLO-41	SHUT	OC2 LUBE OIL CARTRIDGE FILTER 3 DRAIN VALVE	N SIDE OC2 ENGINE ON FILTER		
OC2-DLO-42	SHUT	OC2 LUBE OIL CARTRIDGE FILTER 4 DRAIN VALVE	N SIDE OC2 ENGINE ON FILTER		
OC2-DLO-44	OPEN	OC2 LUBE OIL CARTRIDGE FILTERS 3/4 O-PDIS-10210 LP ROOT VALVE	N SIDE OC2 ENGINE ON FILTER OUTLET		
OC2-DLO-46	OPEN	OC2 LUBE OIL CARTRIDGE FILTERS 3/4 OUTLET O-PI-10202 ROOT VALVE	PT MANIFOLD		
OC2-DLO-47	-----	OC2 DIESEL ENGINE PRELUBE REGULATING BALL CHECK VALVE	NE CORNER OC2 ENGINE		
OC2-DLO-48	OPEN	OC2 DIESEL ENGINE OIL SUMP O-PI-10208 ROOT VALVE	N SIDE OC2 ENGINE BY MANOMETER		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DLO-49	LOCKED OPEN	OC2 DIESEL ENGINE INTERNAL CIRCUIT 0-PS-10215 ROOT VALVE	PT MANIFOLD		
OC2-DLO-50	LOCKED OPEN	OC2 DIESEL ENGINE INTERNAL CIRCUIT 0-PS-10214 ROOT VALVE	PT MANIFOLD		
OC2-DLO-51	LOCKED OPEN	OC2 DIESEL ENGINE INTERNAL CIRCUIT 0-PS-10216 ROOT VALVE	PT MANIFOLD		
OC2-DLO-52	LOCKED OPEN	OC2 DIESEL ENGINE INTERNAL CIRCUIT 0-PS-10217 ROOT VALVE	PT MANIFOLD		
OC2-DLO-53	LOCKED OPEN	OC2 DIESEL ENGINE INTERNAL CIRCUIT 0-PS-10218 ROOT VALVE	PT MANIFOLD		
OC2-DLO-54	LOCKED OPEN	OC2 DIESEL ENGINE OIL SUMP 0-LG-10201/0-LS-10 205 ROOT VALVE	SW CORNER OC2 ENGINE		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DLO-55	LOCKED SHUT	OC2 DIESEL ENGINE OIL SUMP 0-LG-10201/0-LS-10 205 DRAIN VALVE	SW CORNER OC2 ENGINE BELOW SWITCH		
OC2-DLO-60	SHUT	OC2 DIESEL ENGINE OIL SUMP FILL VALVE	S SIDE OC2 ENGINE		
OC2-DLO-61	LOCKED SHUT	OC LUBE OIL AUX TANK OUTLET TO OC2 OIL SUMP ISOLATION VALVE	S SIDE OC2 ENGINE		
OC2-DLO-62	LOCKED OPEN	OC2 DIESEL ENGINE INTERNAL CIRCUIT 0-PS-10219 ROOT VALVE	PT MANIFOLD		
OC2-DLO-63	LOCKED OPEN	OC2 DIESEL ENGINE OIL SUMP 0-PS-10213 ROOT VALVE	N SIDE OC2 ENGINE		
OC2-DLO-70	SHUT	OC2 PNEUMATIC PRELUBE PUMP DISCHARGE LINE DRAIN VALVE	BELOW OC2 AUX DESK		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DLO-71	SHUT	OC2 PRELUBE PUMPS SUCT LINE DRAIN VALVE	BELOW OC2 AUX DESK		
OC2-DLO-72	SHUT	OC2 DIESEL LUBE OIL PREHEATER OUTLET LINE DRAIN/SAMPLE VALVE	BELOW OC2 AUX DESK		
OC2-DLO-73	SHUT	OC2 DIESEL LUBE OIL TO 1A LUBE OIL DRAIN SYSTEM ISOLATION VALVE	35' BETWEEN AUX DESKS IN OVHD		
OC2-DLO-74	SHUT	OC2 LUBE OIL CARTRIDGE FILTERS 3 & 4 CROSS-TIE VALVE	N SIDE OC2 ENGINE BTWN FILTERS		
OC2-DLO-75	SHUT	OC2 LUBE OIL CARTRIDGE FILTERS 1 & 2 CROSS-TIE VALVE	S SIDE OC2 ENGINE BTWN FILTERS		
0-DLO-10204-BV	-----	OC2 CRANKCASE PRESSURE BREATHER VALVE	S SIDE OC2 ENGINE		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
0-DLO-10222-BV	-----	OC2 CRANKCASE PRESSURE BREATHER VALVE	S SIDE OC2 ENGINE		
0-DLO-10203-RV	-----	OC2 PRELUBE PUMP DISCHARGE LINE RELIEF VALVE	OC2 AUX DESK		
0-DLO-10206-RV	-----	OC2 DLO CARTRIDGE FILTERS 3/4 INLET LINE RELIEF VALVE	N SIDE OC2 ENGINE ON FILTER INLET LINE		
0-DLO-10208-RV	-----	OC2 DLO CARTRIDGE FILTERS 1/2 INLET LINE RELIEF VALVE	S SIDE OC2 ENGINE ON FILTER INLET LINE		
0-DLO-10215-RV	-----	OC2 SIDE B CRANKCASE OVERPRESSURE RELIEF VALVE	N SIDE OC2 ENGINE		
0-DLO-10219-RV	-----	OC2 SIDE A CRANKCASE OVERPRESSURE RELIEF VALVE	S SIDE OC2 ENGINE		
0-DLO-10211-TCV	-----	OC2 LUBE OIL SIDE A TEMP CONTROL VALVE	S SIDE OC2 ENGINE BELOW OIL CLR		

ATTACHMENT 1C
OC LUBE OIL SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
0-DLO-10212-TCV	-----	OC2 LUBE OIL SIDE B TEMP CONTROL VALVE	N SIDE OC2 ENGINE BELOW OIL CLR		

ATTACHMENT 1D
OC HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC-DCW-11	SHUT	OC1 LT EXPANSION TANK FILL VALVE	66' BETWN OC1/OC2 RADIATORS		
OC-DCW-12	SHUT	OC1 HT EXPANSION TANK FILL VALVE	66' BETWN OC1/OC2 RADIATORS		
OC-DCW-13	SHUT	OC2 LT EXPANSION TANK FILL VALVE	66' BETWN OC1/OC2 RADIATORS		
OC-DCW-14	SHUT	OC2 HT EXPANSION TANK FILL VALVE	66' BETWN OC1/OC2 RADIATORS		
OC-DCW-15	SHUT	1A COOLANT MIXING TANK PUMP TO OC1/OC2 HT/LT EXP TANKS LINE DRAIN VALVE	66' BETWN OC1/OC2 RADIATORS		
OC-DCW-16	SHUT	1A COOLANT MIXING TANK PUMP TO OC1/OC2 HT/LT EXP TANKS LINE VENT VALVE	66' S OF OC1 RADIATOR IN OVHD		
OC1-DCW-1	SHUT	OC1 HT RADIATOR FILL AND DRAIN VALVE	35' S SIDE OF PEDESTAL FLR LVL		
OC1-DCW-2	SHUT	OC1 HT RADIATOR INLET VENT VALVE	66' OVRHD S END OC1 RADIATOR		

ATTACHMENT 1D
OC HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DCW-3	SHUT	OC1 HT RADIATOR OUTLET VENT VALVE	66' BETWN OC1/OC2 RADIATORS		
OC1-DCW-4	OPEN	OC1 HT EXPANSION TANK INLET VALVE	66' OVRHD S END OC1 RADIATOR		
OC1-DCW-5	SHUT	OC1 HT PREHEAT PUMP SUCTION DRAIN VALVE	35' NE OC1 PEDESTAL IN OVHD		
OC1-DCW-6	SHUT	OC1 LUBE OIL PREHEATER HT COOLANT OUTLET DRAIN VALVE	35' NE OC1 PEDESTAL IN OVHD		
OC1-DCW-7	LOCKED OPEN	OC1 HT EXPANSION TANK 0-LS-10082 UPPER ROOT VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC1-DCW-8	SHUT	OC1 HT EXPANSION TANK 0-LS-10082 VENT VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC1-DCW-9	SHUT	OC1 HT EXPANSION TANK 0-LS-10082 DRAIN VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC1-DCW-10	LOCKED OPEN	OC1 HT EXPANSION TANK 0-LS-10082 LOWER ROOT VALVE	OC BLDG PENTHOUSE ON EXP TK		

ATTACHMENT 1D
OC HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	*STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DCW-11	LOCKED OPEN	OC1 HT EXPANSION TANK OUTLET VALVE	OC BLDG PENTHOUSE BELOW EXP TK		
OC1-DCW-14	SHUT	OC1 LT RADIATOR FILL AND DRAIN VALVE	35' E END OC1 PEDESTAL		
OC1-DCW-15	SHUT	OC1 LT RADIATOR INLET VENT VALVE	66' S END OC1 RADIATOR		
OC1-DCW-16	SHUT	OC1 LT RADIATOR OUTLET VENT VALVE	66' S END OC1 RADIATOR		
OC1-DCW-19	OPEN	OC1 LT EXPANSION TANK INLET VALVE	66' OVHD S END OC1 RADIATOR		
OC1-DCW-20	LOCKED OPEN	OC1 LT EXPANSION TANK O-LS-10122 UPPER ROOT VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC1-DCW-21	SHUT	OC1 LT EXPANSION TANK O-LS-10122 VENT VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC1-DCW-22	SHUT	OC1 LT EXPANSION TANK O-LS-10122 DRAIN VALVE	OC BLDG PENTHOUSE ON EXP TK		

ATTACHMENT 1D
OC HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DCW-23	LOCKED OPEN	OC1 LT EXPANSION TANK 0-LS-10122 LOWER ROOT VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC1-DCW-24	LOCKED OPEN	OC1 LT EXPANSION TANK OUTLET VALVE	OC BLDG PENTHOUSE BELOW EXP TK		
OC1-DCW-27	SHUT	OC1 ENGINE HT COOLANT OUTLET LINE DRAIN VALVE	35' S SIDE OF OC PEDESTAL		
OC1-DCW-28	SHUT	OC1 HT RADIATOR OUTLET LINE DRAIN VALVE	35' SE CORNER OC1 PEDESTAL		
OC1-DCW-29	SHUT	OC1 LT RADIATOR INLET LINE VENT VALVE	35' SE CORNER OC1 PEDESTAL OVHD		
OC1-DCW-30	SHUT	OC1 DIESEL ENGINE HT COOLANT BLOCK DRAIN VALVE	45' S SIDE OC1 ENGINE GEN END		
OC1-DCW-31	OPEN	OC1 GOVERNOR OIL COOLER HT COOLANT INLET VALVE	45' E END OC1 ENGINE		

ATTACHMENT 1D
OC HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DCW-32	LOCKED OPEN	OC1 ENGINE DRIVEN HT COOLING WATER PUMP DISCH 0-PS-10083 ROOT VALVE	PT MANIFOLD		
OC1-DCW-34	OPEN	OC1 ENGINE DRIVEN HT COOLING WATER PUMP SUCT 0-PI-10081 ROOT VALVE	PT MANIFOLD		
OC1-DCW-35	OPEN	OC1 ENGINE DRIVEN HT COOLING WATER PUMP DISCH 0-PI-10082 ROOT VALVE	PT MANIFOLD		
OC1-DCW-36	OPEN	OC1 LUBE OIL PREHEATER HT COOLANT OUTLET VALVE	OC1 AUX DESK		
OC1-DCW-37	-----	OC1 LUBE OIL PREHEATER HT COOLANT OUTLET CHECK VALVE	OC1 AUX DESK		

ATTACHMENT 1D
OC HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DCW-38	OPEN	OC1 ELECTRIC WATER PREHEATER TO EXPANSION TANK ISOLATION VALVE	OC1 AUX DESK		
OC1-DCW-39	OPEN	OC1 HT PREHEAT PUMP SUCTION VALVE	OC1 AUX DESK		
OC1-DCW-41	OPEN	OC1 GOVERNOR OIL COOLER HT COOLANT OUTLET VALVE	45' E END OC1 ENGINE		
OC1-DCW-42	SHUT	OC1 DIESEL ENGINE HT COOLANT BLOCK DRAIN VALVE	45' N SIDE OC1 ENGINE GEN END		
OC1-DCW-43	OPEN	OC1 ENGINE DRIVEN LT COOLING WATER PUMP SUCT 0-PI-10121 ROOT VALVE	PT MANIFOLD		
OC1-DCW-44	OPEN	OC1 ENGINE DRIVEN LT COOLING WATER PUMP DISCH 0-PI-10122 ROOT VALVE	PT MANIFOLD		

ATTACHMENT 1D
OC HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DCW-45	LOCKED OPEN	OC1 ENGINE DRIVEN LT COOLING WATER PUMP DISCH O-PS-10123 ROOT VALVE	PT MANIFOLD		
OC1-DCW-46	SHUT	OC1 SOUTH LUBE OIL COOLER LT COOLANT DRAIN VALVE	S SIDE OC1 ENGINE BELOW COOLER		
OC1-DCW-47	SHUT	OC1 NORTH LUBE OIL COOLER LT COOLANT DRAIN VALVE	N SIDE OC1 ENGINE BELOW COOLER		
OC1-DCW-48	SHUT	OC1 ENGINE DRIVEN LT COOLING WATER PUMP SUCTION LINE DRAIN VALVE	35' S OF OC PEDESTAL IN OVHD		
OC1-DCW-49	SHUT	OC1 LT RADIATOR INLET LINE DRAIN VALVE	35' S OF OC PEDESTAL IN OVHD		
OC1-DCW-50	SHUT	OC1 ENGINE DRIVEN LT COOLING WATER PUMP SUCTION LINE VENT VALVE	35' E OF OC PEDESTAL IN OVHD		

ATTACHMENT 1D
OC HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DCW-51	OPEN	OC1 HT EXPANSION TANK O-LI/LT-10081 ROOT VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC1-DCW-52	OPEN	OC1 LT EXPANSION TANK O-LI/LT-10121 ROOT VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC1-DCW-53	SHUT	OC1 ENGINE HT COOLANT OUTLET LINE VENT VALVE	35' S OF OC1 PEDESTAL IN OVHD		
OC1-DCW-55	SHUT	OC1 HT RADIATOR DRAIN VALVE	66' S END OC1 HT RADIATOR		
OC1-DCW-56	SHUT	OC1 LT RADIATOR DRAIN VALVE	66' S END OC1 LT RADIATOR		
OC1-DCW-57	SHUT	OC1 HT COOLANT DRAIN/SAMPLE VALVE	35' S SIDE OC1 PEDESTAL		
OC1-DCW-58	SHUT	OC1 LT COOLANT DRAIN/SAMPLE VALVE	35' E END OC1 PEDESTAL		
O-DCW-10091-TCV	-----	OC1 ENGINE HT COOLANT TEMPERATURE CONTROL VALVE	35' S SIDE OC1 PEDESTAL		

ATTACHMENT 1D
OC HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
0-DCW-10132-TCV	-----	OC1 ENGINE LT COOLANT TEMPERATURE CONTROL VALVE	35' E END OC1 PEDESTAL		
OC2-DCW-1	SHUT	OC2 HT RADIATOR FILL AND DRAIN VALVE	35' S OC2 PEDSTL BY HT CLG TCV		
OC2-DCW-2	SHUT	OC2 HT RADIATOR INLET VENT VALVE	66' ABOVE OC2 HT RADIATOR		
OC2-DCW-3	SHUT	OC2 HT RADIATOR OUTLET VENT VALVE	66' ABOVE OC2 HT RADIATOR		
OC2-DCW-4	OPEN	OC2 HT EXPANSION TANK INLET VALVE	66' N END OC2 RADIATOR IN OVHD		
OC2-DCW-5	SHUT	OC2 HT PREHEAT PUMP SUCTION DRAIN VALVE	35' NW CORNER OC2 PEDSTL IN OVHD		
OC2-DCW-6	SHUT	OC2 LUBE OIL PREHEATER HT COOLANT OUTLET DRAIN VALVE	35' NW CORNER OC2 PEDSTL OVHD		
OC2-DCW-7	LOCKED OPEN	OC2 HT EXPANSION TANK 0-LS-10102 UPPER ROOT VALVE	OC BLDG PENTHOUSE ON EXP TK		

ATTACHMENT 1D
OC HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DCW-8	SHUT	OC2 HT EXPANSION TANK O-LS-10102 VENT VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC2-DCW-9	SHUT	OC2 HT EXPANSION TANK O-LS-10102 DRAIN VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC2-DCW-10	LOCKED OPEN	OC2 HT EXPANSION TANK O-LS-10102 LOWER ROOT VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC2-DCW-11	LOCKED OPEN	OC2 HT EXPANSION TANK OUTLET VALVE	OC BLDG PENTHOUSE BELOW EXP TK		
OC2-DCW-14	SHUT	OC2 LT RADIATOR FILL AND DRAIN VALVE	35' W OC2 PEDSTL BY LT CLG TCV		
OC2-DCW-15	SHUT	OC2 LT RADIATOR INLET VENT VALVE	66' N END OC2 RADIATOR INLET LN		
OC2-DCW-16	SHUT	OC2 LT RADIATOR OUTLET VENT VALVE	66' N END OC2 RADIATOR INLET LN		
OC2-DCW-19	OPEN	OC2 LT EXPANSION TANK INLET VALVE	66' N END OC2 RADIATOR IN OVHD		

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DCW-20	LOCKED OPEN	OC2 LT EXPANSION TANK 0-LS-10142 UPPER ROOT VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC2-DCW-21	SHUT	OC2 LT EXPANSION TANK 0-LS-10142 VENT VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC2-DCW-22	SHUT	OC2 LT EXPANSION TANK 0-LS-10142 DRAIN VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC2-DCW-23	LOCKED OPEN	OC2 LT EXPANSION TANK 0-LS-10142 LOWER ROOT VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC2-DCW-24	LOCKED OPEN	OC2 LT EXPANSION TANK OUTLET VALVE	OC BLDG PENTHOUSE BELOW EXP TK		
OC2-DCW-28	SHUT	OC2 HT RADIATOR OUTLET DRAIN VALVE	35' SW CORNER OC2 PEDESTAL		
OC2-DCW-29	SHUT	OC2 LT RADIATOR INLET LINE VENT VALVE	35' IN OVHD BY OC2 AIR RCVRS		
OC2-DCW-30	SHUT	OC2 ENGINE BLOCK HT COOLANT DRAIN VALVE	45' S SIDE OC2 ENGINE		

ATTACHMENT 1D
OC HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DCW-31	OPEN	OC2 GOVERNOR OIL COOLER HT COOLANT INLET VALVE	45' S SIDE OC2 ENGINE		
OC2-DCW-32	LOCKED OPEN	OC2 ENGINE DRIVEN HT COOLING WATER PUMP DISCH O-PS-10103 ROOT VALVE	PT MANIFOLD		
OC2-DCW-34	OPEN	OC2 ENGINE DRIVEN HT COOLING WATER PUMP SUCT O-PI-10101 ROOT VALVE	PT MANIFOLD		
OC2-DCW-35	OPEN	OC2 ENGINE DRIVEN HT COOLING WATER PUMP DISCH O-PI-10102 ROOT VALVE	PT MANIFOLD		
OC2-DCW-36	OPEN	OC2 LUBE OIL PREHEATER HT COOLANT OUTLET VALVE	OC2 AUX DESK		

ATTACHMENT 1D
OC HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DCW-37	-----	OC2 LUBE OIL PREHEATER HT COOLANT OUTLET CHECK VALVE	OC2 AUX DESK		
OC2-DCW-38	OPEN	OC2 ELECTRIC WATER PREHEATER TO EXPANSION TANK ISOLATION VALVE	OC2 AUX DESK		
OC2-DCW-39	OPEN	OC2 HT PREHEAT PUMP SUCTION VALVE	OC2 AUX DESK		
OC2-DCW-41	OPEN	OC2 GOVERNOR OIL COOLER HT COOLANT OUTLET VALVE	45' W END OC2 ENGINE		
OC2-DCW-42	SHUT	OC2 ENGINE BLOCK HT COOLANT DRAIN VALVE	45' N SIDE OC2 ENGINE		
OC2-DCW-43	OPEN	OC2 ENGINE DRIVEN LT COOLING WATER PUMP SUCT 0-PI-10141 ROOT VALVE	PT MANIFOLD		

ATTACHMENT 1D
OC HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DCW-44	OPEN	OC2 ENGINE DRIVEN LT COOLING WATER PUMP DISCH 0-PI-10142 ROOT VALVE	PT MANIFOLD		
OC2-DCW-45	LOCKED OPEN	OC2 ENGINE DRIVEN LT COOLING WATER PUMP DISCH 0-PS-10143 ROOT VALVE	PT MANIFOLD		
OC2-DCW-46	SHUT	OC2 SOUTH LUBE OIL COOLER LT COOLANT DRAIN VALVE	45' BELOW S LO CLR		
OC2-DCW-47	SHUT	OC2 NORTH LUBE OIL COOLER LT COOLANT DRAIN VALVE	45' BELOW S LO CLR		
OC2-DCW-48	SHUT	OC2 ENGINE DRIVEN LT COOLING WATER PUMP SUCTION LINE DRAIN VALVE	35' S OC PEDSTL ABV DIRTY FO TK		
OC2-DCW-49	SHUT	OC2 LT RADIATOR INLET LINE DRAIN VALVE	35' S OC PEDSTL ABV DIRTY FO TK		

ATTACHMENT 1D
OC HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DCW-50	SHUT	OC2 ENGINE DRIVEN LT COOLING WATER PUMP SUCTION LINE VENT VALVE	35' S OC2 PEDSTL BY AIR RCVRS		
OC2-DCW-51	OPEN	OC2 HT EXPANSION TANK O-LI/LT-10101 ROOT VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC2-DCW-52	OPEN	OC2 LT EXPANSION TANK O-LI/LT-10141 ROOT VALVE	OC BLDG PENTHOUSE ON EXP TK		
OC2-DCW-53	SHUT	OC2 ENGINE HT COOLANT INLET LINE VENT VALVE	35' S OC2 PEDSTL IN OVHD		
OC2-DCW-54	SHUT	OC2 HT RADIATOR OUTLET DRAIN VALVE	35' S SIDE OC PEDESTAL S WALL		
OC2-DCW-55	SHUT	OC2 HT RADIATOR INLET DRAIN VALVE	66' N END OC2 RADIATOR IN OVHD		
OC2-DCW-56	SHUT	OC2 LT RADIATOR DRAIN VALVE	66' N OC2 RADIATOR FLOOR LEVEL		
OC2-DCW-57	SHUT	OC2 HT COOLANT DRAIN/SAMPLE VALVE	35' S SIDE OC2 PEDESTAL		

ATTACHMENT 1D
OC HT/LT COOLANT SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DCW-58	SHUT	OC2 LT COOLANT DRAIN/SAMPLE VALVE	35' W END OC2 PEDESTAL		
0-DCW-10111-TCV	-----	OC2 ENGINE HT COOLANT TEMPERATURE CONTROL VALVE	35' E OF OC2 AIR RECEIVERS		
0-DCW-10152-TCV	-----	OC2 ENGINE LT COOLANT TEMPERATURE CONTROL VALVE	35' W END OC2 PEDESTAL		

ATTACHMENT 1E
OC COMBUSTION AIR INTAKE SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-SCA-1	SHUT	OC1 INBOARD WATER WASH TANK ISOLATION VALVE	45' SOUTH SIDE OC1 ENGINE		
OC1-SCA-2	SHUT	OC1 OUTBOARD WATER WASH TANK ISOLATION VALVE	45' SOUTH SIDE OC1 ENGINE		
OC1-SCA-3	OPEN	OC1 INBOARD TURBOCHARGER DISCHARGE 0-PT-10604 ROOT VALVE	PT MANIFOLD		
OC1-SCA-4	OPEN	OC1 NORTH INTAKE HEADER 0-PI-10601 ROOT VALVE	PT MANIFOLD		
OC1-SCA-5	OPEN	OC1 SOUTH INTAKE HEADER 0-PI-10602 ROOT VALVE	PT MANIFOLD		
OC1-SCA-6	OPEN	OC1 OUTBOARD TURBOCHARGER DISCHARGE 0-PT-10603 ROOT VALVE	PT MANIFOLD		

ATTACHMENT 1E
OC COMBUSTION AIR INTAKE SYSTEM VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-SCA-1	SHUT	OC2 INBOARD WATER WASH TANK ISOLATION VALVE	45' SOUTH SIDE OC2 ENGINE		
OC2-SCA-2	SHUT	OC2 OUTBOARD WATER WASH TANK ISOLATION VALVE	45' SOUTH SIDE OC2 ENGINE		
OC2-SCA-3	OPEN	OC2 INBOARD TURBOCHARGER DISCHARGE O-PT-10654 ROOT VALVE	PT MANIFOLD		
OC2-SCA-4	OPEN	OC2 NORTH INTAKE HEADER O-PI-10652 ROOT VALVE	PT MANIFOLD		
OC2-SCA-5	OPEN	OC2 SOUTH INTAKE HEADER O-PI-10651 ROOT VALVE	PT MANIFOLD		
OC2-SCA-6	OPEN	OC2 OUTBOARD TURBOCHARGER DISCHARGE O-PT-10653 ROOT VALVE	PT MANIFOLD		

ATTACHMENT 1F
OC DG SWITCH POSITION VERIFICATION

SWITCH NUMBER	NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
0-HS-10330	AUTOMATIC	OC GOVNR SPEED CONTR SW	OC DG LOCAL CONTROL PANEL 0C188 PANEL 1		
0-HS-10322	REMOTE/AUTO	OC GEN CONTR MODE SEL SW	OC DG LOCAL CONTROL PANEL 0C188 PANEL 2		
0-HS-10323	ENGINE 1+2	OC GEN ENG SEL SW	OC DG LOCAL CONTROL PANEL 0C188 PANEL 2		
0-HS-10324	ELECTRIC	OC GEN GOVNR MODE SEL SW	OC DG LOCAL CONTROL PANEL 0C188 PANEL 2		
0-HS-10325	SLOW	OC GEN LOCAL SPD SEL SW	OC DG LOCAL CONTROL PANEL 0C188 PANEL 2		
0-HS-10021	OFF	OC FO XFER PUMP CONTR SW	OC DG LOCAL CONTROL PANEL 0C188 PANEL 2		
0-HS-10327	NORMAL	OC GEN STRT/STOP CONTR SW	OC DG LOCAL CONTROL PANEL 0C188 PANEL 2		
0-HS-10329	OFF	OC FIELD FLASH SEL SW	OC DG LOCAL CONTROL PANEL 0C188 PANEL 2		
0-HS-10331	AUTOMATIC	OC AUTO VOLT REG CONTR SW	OC DG LOCAL CONTROL PANEL 0C188 PANEL 2		
0-HS-10332	SUB SYST 1+2	OC AIR SUB-SYS START SEL SW	OC DG LOCAL CONTROL PANEL 0C188 PANEL 2		

ATTACHMENT 1F
OC DG SWITCH POSITION VERIFICATION

SWITCH NUMBER	NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
0-HS-10161	AUTOMATIC	OC1 AC PRELUB PP SEL SW	OC DG LOCAL CONTROL PANEL OC188 PANEL 2		
0-HS-10201	AUTOMATIC	OC2 AC PRELUB PP SEL SW	OC DG LOCAL CONTROL PANEL OC188 PANEL 2		
0-HS-10051	AUTOMATIC	OC1 FO B/U PP SEL SW	OC DG LOCAL CONTROL PANEL OC188 PANEL 2		
0-HS-10061	AUTOMATIC	OC2 FO B/U PP SEL SW	OC DG LOCAL CONTROL PANEL OC188 PANEL 2		
0-HS-10082	AUTOMATIC	OC1 HT RAD FAN SEL SW	OC DG LOCAL CONTROL PANEL OC188 PANEL 2		
0-HS-10102	AUTOMATIC	OC2 HT RAD FAN SEL SW	OC DG LOCAL CONTROL PANEL OC188 PANEL 2		
0-HS-10081	AUTOMATIC	OC1 HT PRHT PUMP SEL SW	OC DG LOCAL CONTROL PANEL OC188 PANEL 3		
0-HS-10101	AUTOMATIC	OC2 HT PRHT PUMP SEL SW	OC DG LOCAL CONTROL PANEL OC188 PANEL 3		
0-HS-10241	AUTOMATIC	OC SA COMPR SEL SW	OC DG LOCAL CONTROL PANEL OC188 PANEL 3		
0-HS-152-0703C	NORMAL	OC DG OUT BKR	OC DG LOCAL CONTROL PANEL OC188 PANEL 4		

ATTACHMENT 1F
OC DG SWITCH POSITION VERIFICATION

SWITCH NUMBER	NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
-----	OFF	SYNCHRONIZING JACK SJ	OC DG LOCAL CONTROL PANEL OC188 PANEL 4		
SW 43/LR	REMOTE (DOWN)	OC DG LOCAL/REMOTE SWITCH	OC DG LOCAL CONTROL PANEL OC188 PANEL 4 - REAR		
O-HS-10326	AVR1 ON	AUTO VOLT REGULATOR	OC DG EXCITATION PANEL OG25		
O-HS-10328	AUTOMATIC	VOLT REGULATOR ON	OC DG EXCITATION PANEL OG25		

ATTACHMENT 1G
OC LOCAL BREAKER POSITION VERIFICATION

BREAKER NUMBER	NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
1	ON	CONTROL PANEL (OC192)	120V AC PANEL OP23, OC EDG SWGR RM		
2	ON	JUNCTION BOX (1J691)	120V AC PANEL OP23, OC EDG SWGR RM		
3	ON	CONTROL PANEL (OC192)	120V AC PANEL OP23, OC EDG SWGR RM		
4	ON	AC UNIT (OAHU-1)	120V AC PANEL OP23, OC EDG SWGR RM		
5	ON	AIR HANDLING UNIT (OAHU-2)	120V AC PANEL OP23, OC EDG SWGR RM		
1	ON	CONTROL PANEL (OC188D-1)	120V AC PANEL OP24, MCC 024		
2	ON	ANNUN. FLOW SW. (1FS10580)	120V AC PANEL OP24, MCC 024		
3	ON	4KV SWGR SPACE HTRS.	120V AC PANEL OP24, MCC 024		
4	ON	OC SUMP PUMPS 11 & 12	120V AC PANEL OP24, MCC 024		
5	ON	MCC023 SPACE HTRS.	120V AC PANEL OP24, MCC 024		

ATTACHMENT 1G
OC LOCAL BREAKER POSITION VERIFICATION

BREAKER NUMBER	NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
6	ON	RTU PNL (OC196)	120V AC PANEL OP24, MCC 024		
7	ON	MCC024 SPACE HTRS	120V AC PANEL OP24, MCC 024		
8	ON	480V LC SPACE HTRS	120V AC PANEL OP24, MCC 024		
9	ON	MCC024 SPACE HTRS	120V AC PANEL OP24, MCC 024		
11	ON	CONTROL PANEL (OC192)	120V AC PANEL OP24, MCC 024		

ATTACHMENT 2A
OC STARTING AIR SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DSA-1241	OPEN	OC1 STARTING AIR RECEIVER 11 0-PI/PT-10241 ISOLATION VALVE	35' SE CORNER BY OC1 AIR RECVR		
OC1-DSA-1242	OPEN	OC1 STARTING AIR RECEIVER 12 0-PI/PT-10242 ISOLATION VALVE	35' SE CORNER BY OC1 AIR RECVR		
OC1-DSA-1243	SHUT	OC1 STARTING AIR RECEIVER 11 0-PI/PT-10241 TEST VALVE	35' SE CORNER BY OC1 AIR RECVR		
OC1-DSA-1244	SHUT	OC1 STARTING AIR RECEIVER 12 0-PI/PT-10242 TEST VALVE	35' SE CORNER BY OC1 AIR RECVR		
OC1-DSA-1245	SHUT	OC1 STARTING AIR RECEIVER 11 0-PS-10243/10244 TEST VALVE	35' SE CORNER BY OC1 AIR RECVR		
OC1-DSA-1246	SHUT	OC1 STARTING AIR RECEIVER 12 0-PS-10245/10246 TEST VALVE	35' SE CORNER BY OC1 AIR RECVR		

ATTACHMENT 2A
OC STARTING AIR SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC2-DSA-1241	OPEN	OC2 STARTING AIR RECEIVER 11 0-PI/PT-10271 ISOLATION VALVE	35' SW CORNER BY OC2 AIR RECVR		
OC2-DSA-1242	OPEN	OC2 STARTING AIR RECEIVER 12 0-PI/PT-10272 ISOLATION VALVE	35' SW CORNER BY OC2 AIR RECVR		
OC2-DSA-1243	SHUT	OC2 STARTING AIR RECEIVER 11 0-PI/PT-10271 TEST VALVE	35' SW CORNER BY OC2 AIR RECVR		
OC2-DSA-1244	SHUT	OC2 STARTING AIR RECEIVER 12 0-PI/PT-10272 TEST VALVE	35' SW CORNER BY OC2 AIR RECVR		
OC2-DSA-1245	SHUT	OC2 STARTING AIR RECEIVER 11 0-PS-10273/10274 TEST VALVE	35' SW CORNER BY OC2 AIR RECVR		
OC2-DSA-1246	SHUT	OC2 STARTING AIR RECEIVER 12 0-PS-10275/10276 TEST VALVE	35' SW CORNER BY OC2 AIR RECVR		

ATTACHMENT 2B
OC FUEL OIL SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC-DFO-1028	SHUT	OC FUEL OIL DAY TANK O-LI/LT-10023 TEST VALVE	66' OC TANK RM E OF FO DAY TANK		
OC-DFO-1029	SHUT	OC FUEL OIL TRANSFER PUMP SUCTION O-PI-10021 TEST VALVE	35' SE CORNER BY FO XFER PUMP		
OC-DFO-1030	SHUT	OC FUEL OIL TRANSFER PUMP DISCHARGE O-PI-10022 TEST VALVE	35' SE CORNER BY FO XFER PUMP		
OC-DFO-1162	OPEN	OC FUEL OIL TRANSFER FILTER O-PDIS-10029 HIGH BLOCK VALVE	35' SE CORNER BY FO XFER PUMP		
OC-DFO-1163	OPEN	OC FUEL OIL TRANSFER FILTER O-PDIS-10029 LOW BLOCK VALVE	35' SE CORNER BY FO XFER PUMP		
OC-DFO-1164	SHUT	OC FUEL OIL TRANSFER FILTER O-PDIS-10029 HIGH EQUALIZER VALVE	35' SE CORNER BY FO XFER PUMP		

ATTACHMENT 2B
OC FUEL OIL SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC-DFO-1165	SHUT	OC FUEL OIL TRANSFER FILTER O-PDIS-10029 LOW EQUALIZER VALVE	35' SE CORNER BY FO XFER PUMP		
OC-DFO-1166	SHUT	OC FUEL OIL TRANSFER FILTER O-PDIS-10029 BLEED AND TEST VALVE	35' SE CORNER BY FO XFER PUMP		

ATTACHMENT 2C
OC LUBE OIL SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC-DLO-1001	SHUT	OC LUBE OIL AUXILIARY TANK 0-LI/LT-10164 TEST VALVE	66' OC BLDG TANK RM E OF TANK		
OC1-DLO-1005	SHUT	OC1 PNEUMATIC PRELUBE PUMP 0-PI-10169 TEST VALVE	45' E OF OC1 AUX DESK		
OC2-DLO-1006	SHUT	OC2 PNEUMATIC PRELUBE PUMP 0-PI-10209 TEST VALVE	45' W OF OC2 AUX DESK		

ATTACHMENT 2D
OC HT/LT COOLANT SYSTEM INSTRUMENT VALVE LINEUP

VALVE NUMBER	STARTUP/ NORMAL OP. POS	DESCRIPTION	LOCATION	INIT/ DATE	COMMENTS
OC1-DCW-1128	SHUT	OC1 HT EXPANSION TANK O-LI/LT-10081 TEST VALVE	66' BETWN RADIATORS ON STANCHION		
OC1-DCW-1129	SHUT	OC1 LT EXPANSION TANK O-LI/LT-10121 TEST VALVE	66' BETWN RADIATORS ON STANCHION		
OC2-DCW-1128	SHUT	OC2 HT EXPANSION TANK O-LI/LT-10101 TEST VALVE	66' BETWN RADIATORS ON STANCHION		
OC2-DCW-1129	SHUT	OC2 LT EXPANSION TANK O-LI/LT-10141 TEST VALVE	66' BETWN RADIATORS ON STANCHION		