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CENTRAL FILE

THREE MILE ISLAND NUCLEAR STATION
UNIT #1 SURVEILLANCE PROCEDURE 1303-11.10
ENGINEERED SAFEGUARDS SYSTEM EMERGENCY SEQUENCE & POWER TRANSFER TEST

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Unit 1 Staff Recommends Approval

Approval N/A Date ____

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Unit 2 Staff Recommends Approval

Approval N/A Date ____

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PORC comments of ____ (date) included

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THREE MILE ISLAND NUCLEAR STATION

UNIT #1 SURVEILLANCE PROCEDURE 1303-11.10

ENGINEERED SAFEGUARDS SYSTEM EMERGENCY LOADING SEQUENCE AND POWER TRANSFER TEST

REQUIRED INTERVAL-REFUELING

1.0 PURPOSE

To verify, during each refueling interval, that the emergency loading sequence and power transfer is operable, by verifying that High Pressure and Low Pressure Injection components and required auxiliaries, Reactor Building Spray Pumps, and Reactor Building Emergency Cooling have been successfully started on normal power and transferred to the emergency power source on a bus undervoltage, all in accordance with Technical Specifications Sections 4.5.1.1, 4.5.3.1.A.1, and 4.6.1b.

2.0 PLANT STATUS

Hot or Cold Shutdown. Plant computer should be operable.

3.0 LIMITS AND PRECAUTIONS

3.1 Limits and Precautions for each test are listed under their respective section of the "PROCEDURE" portion of this document and are underlined.

3.2 Technical Specifications require control board component operating lights, and either the station computer or pressure/flow indication for verification that components have actuated. However, some components have no computer points or pressure/flow indication, so physical observation of component actuation is required. Throughout this procedure, personnel must observe such components and be in communication with the control room.

The components under test that require this are:

DR-V1A/B* AH-E-1SA/B

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NR-V1A/C*	AH-E-27A/B
RR-V1OA/B	EF-P2A-D/E**
	EF-P2B-D/E**

*These valves have redundant position indication lamps (open or close) on the console and panel PCR.

**To be observed by Lebanon Relay Dept. Notify relay personnel of test schedule so that they can be on site.

3.3 Do not perform this procedure simultaneously with the operation of the corresponding Decay Heat Removal System in the Reactor Coolant Recirculation mode of operation. There exists possibility of transferring Rx Coolant to BWST, if Decay Heat and Spray Systems are cross connected while Spray System is run on recirc.

3.4 If the turbine is hot (>250°F shell temp.) take the following precautions.

a. Assure that the turbine is slowed down and is on turning gear.

b. Be prepared to reset the 27/86 lockout, start the oil pumps, and start the turning gear as soon as possible after the A Actuation Test.

c. If the turning gear is off more than ten minutes, minimize the bow in the shaft by rotating the shaft 180° and allowing it to sit in that position the same amount of time as in the original position.

d. Monitor turbine for rubs when turning gear is restored.

4.0 LOCATION OF SYSTEM/ASSEMBLY

The test will be conducted from PCR Panel and main console and 4160V E.S. switchgear.

5.0 EQUIPMENT REQUIRED

No special equipment is required.

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6.0 PROCEDURE

6.1 Actuation A

6.1.1 Limits and Precautions

A. There shall be no testing, calibration, or maintenance, of any other ESAS analog or logic channels while this test is being performed.

B. Verify that the AC Transfer Switch for 1C ES Valves MCC is positioned to the "B" supply (on 1S), by means of the selector switch located on panel PCR.

C. Verify that MU-P1A, NR-P1A, and NS-P1A are ES selected.

Pump	Switch Bus	Position
MU-P1A	43/SS2/1D	PpA
NR-P1A	43SS/1R	PpA
NS-P1A	43SS/1P	PpA

D. This test will be performed immediately after Diesel Generator Surveillance test 1301-4.16 has been completed to insure a warm diesel prior to auto start. If this Diesel test is not scheduled at this time, accomplish diesel start and warm up per Surveillance Test 1303-4.16.

E. Notify relay personnel to do preparatory work as required by step 6.1.3.1.B.

F. In this test, an undervoltage condition will be simulated by removing potential to two of the three bus undervoltage relays concurrent with an ES actuation. The undervoltage relays will trip both feeder breakers removing supply voltage from the bus. Upon the loss of voltage and prior to the diesel picking up the loads, the 27/86 lockout relay will either trip and lockout, or prevent from trans-

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ferring or auto starting those loads which are fed from the ES bus, but are not required during an ES condition, thus insuring that only vital ES and ES bus loads are loaded onto the diesel and preventing a possible diesel overload. The loads affected by the 27/86 lockout relay or an undervoltage condition concurrent with an ES are:

1. Tripped and Locked Out Loads
   a. Feeder breaker (N1-02) to 480V Bus 1N
   b. Motor Driven Emergency Feedwater Pumps EF-P2A-D and EF-P2B-D
   c. Tie breaker 1P-12
   d. Tie breaker 1R-12
   e. NS-P1B (non ES selected pump is tripped and locked out)
   f. SW-P1A
   g. SR-P1A
   h. NR-P1B (non ES selected pump is tripped and locked out)
   i. Turbine Oil Lift Pumps LO-P-7A/B, C/D, E/F
   j. IC-P1A
   k. Main Turbine Turning Gear GN-Y1
   l. RC-P1A Lift Pump (RC-P2A-1)
   m. RC-P1C Lift Pump (RC-P2C-1)
   n. SF-P1A
   o. Borated Water Storage Tank Heater DH-T1-H1
2. Instrument Air Compressor 1A-P1A is prevented from auto starting.

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3. There are four ABT's that will be affected at this time. Normally, the ABT will transfer the connected load to the alternate supply on an undervoltage. However, on an ES or an ES followed by an undervoltage, the following action will occur to the listed ABT's:

   a. ABT to 1C ES valves MCC--will not be able to transfer on ES.

   b. Start circuit for Fire Pump FS-P2 will lockout on ES with undervoltage. ABT will transfer load to 480V ES bus 1T, if it is energized.

   c. The ES signal will result in the transfer signal for the ABT's for panels PM1 and PM2 being blocked. Depending on the ABT lineup, the above panels may be lost until the Diesel Generator comes on line.

      CAUTION: Do not have panels PM1 and PM2 out of service for more than one hour, or low SF6 gas pressure may result.

G. Since 4160V ES bus 1D will be de-energized and various components affected (as discussed in F above), the following components are to be started in order to maintain auxiliaries for the current plant status.

1. Spent Fuel Cooling Pump SF-P1B
2. Nuclear Service Closed Cooling Pump NS-P1C(B)*
3. Nuclear Service River Water Pump NR-P1C(B)*

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4. Secondary Service River Water Pump SR-P1C

5. Main Turbine Emergency Bearing Oil Pump LO-P6

6. Main Turbine Oil Lift Pumps LO-P-7G/H, I/J

7. Instrument Air Compressor IA-P1B

8. Decay Heat Removal Pump DH-P1B (if applicable)

9. Decay Heat Closed Cooling Pump DC-P1B

10. Decay Heat River Water Pump DR-P1B

11. Screen Wash Pump SW-P-1B on "start"

12. Intermediate Closed Cooling ICP-1B

13. MU-P1B or MU-P1C supplied from 1E ES Bus and supplying seal injection.

*NOTE: If B pump is used it must be ES selected and fed from B channel.

14. MG set for countroom lined up to 1B ES MCC.

6.1.2 Test 1--"A" Actuation 95X Components

6.1.2.1 A. (1) Prior to commencing the test, note the initial positions of the components under test listed in column 6.1.2.1.A of the data sheet.

(2) Perform make-up pump line up.

B. Place all the components listed in column 6.1.2.1.B of the data sheet to the "Pre-Test Position" indicated.

C. (1) Place the control switch for G1-02, diesel 1A breaker, to the pull to lock position.

(2) Verify "Diesel Generator 1A or 1B Gen. Bkr Locked Out" annunciator alarm is received. (B-2-6)

D. Place the test switch on PCR panel labeled "HIGH PRES INJ A 2/3 CHAN SELECT" (TS2/RCA) to the "TEST 1" position.

(This selects contacts 1 and 2 of the selector switch thus choosing channels RC1A and RC2A to actuate the components associated with the 95X test relay).

(CAUTION: The following step will cause actuation of the Test 1 Components listed below).

Block 1

Makeup Pump (starts)	MU-P1A
Decay Heat Pump (starts)	DH-P1A
Decay Heat Suct & Disch Vvs. (open)	DH-V5A, V4A
Emergency Diesel (starts)	EG-Y-1A
R.B. Fans (stops)	AH-E-1A, E-1C

Block 2

RB Emerg. Clg. (starts)	RR-P1A
RB Fan (starts slow speed)*	AH-E-1A
RB Emerg. Clg. Pp Bypass Vv. (opens)	RR-V10A

*AH-E-1C will stop due to 1C ES Vv MCC being selected to S Bus.

Block 3

Decay Heat River Water Pp (starts)	DR-P1A
Nuclear Services River Wtr. Pp (starts)	NR-P1A
Decay Heat Closed Cyc. Pp (starts)	DC-P1A
Nuclear Services Closed Cyc. Pp (starts)	NS-P1A
Decay Heat River Disch. Vv (opens)	DR-V1A
Nuclear Services River Disch. Vv (opens)	NR-V1A

Block 4

Closed Cycle Pp. Air Cooler (starts)	AH-E-1BA
Screen House Pps. Cooler & vent (starts)	AH-E-27A

E. Actuate the Test 1 components by placing the switch on PCR Panel labeled "HIGH PRES INJ A SYST TEST INITIATE" (TS1/RCA) to the "TST 1" position.

F. Initiate two out of the three high Reactor Building, pressure (30 psig) by placing (and momentarily holding at the same time) the switches on PCR Panel labeled "REACT BLDG PRES PS-283-TEST" and "REACT BLDG PRESS PS-289-TEST" to their "Test" position. (This step will start RB Spray Pump A on recirculation to the Borated Water Storage Tank).

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G. Verify, as shown on 6.1.2.1.G of the data sheet, that the components under test change from the non-safeguards (Pre-Test) to the safeguards (Test) position.

6.1.3 Test 2- "A" Actuation Power Transfer

6.1.3.1 A. Notify representative of Lebanon Relay Dept. that test is about to start. Verify that relay personnel have arrived at the 1D 4160V bus prior to proceeding with the test.

B. Place the breakers for EF-P2A-D and EF-P2B-D in the test position and prepare for test as follows:

(1) Install jumper from TB2-9(PT) to TB2-11(9A) in Unit 1D3.

(2) Install jumper from TB2-9(PT) to TB2-11(9A) in Unit 1D4.

(3) Place the control switch for EF-P2A-D and EF-P2B-D in the AFTER START position.

(4) Place both breakers in the TEST CLOSE position.

NOTE: This set up permits verification that the above breakers will trip as a result of the bus undervoltage.

C. Close 1SA-D2 paralleling the two auxiliary transformers. Check both bus feeder ammeters and verify that neither reads more than 1000 amperes.

D. Place and hold the two high reactor building pressure (30 psig) test switches, "REACT BLDG PRES PS283-TEST" and REACT BLDG PRES 289-TEST" to their "TEST" position. (The switches must be held in "TEST" to allow the spray pump to trip and reclose on the undervoltage).

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E. With the Test 1 components in their safeguards position, initiate a bus undervoltage condition by pressing and holding UV test pushbuttons 43/PB1A and 43/PB1B until the feeder breakers trip, after which the pushbuttons 43/PB1A and 43/PB1B may be released.

1. Verify PCR Panel indication and data logger printout that block 2, 3, and 4 components have tripped on the undervoltage.

Block 2	RR-P1A
	AH-E-1A
	RR-V10A*
Block 3	DR-P1A
	NR-P1A
	DC-P1A
	NS-P1A
	DR-V1A*
	NR-V1A*
Block 4	AH-E-15A
	AH-E-27A
	BS-P1A

*Block 2, 3, and 4 valves will stop on undervoltage, and resume travel upon reload.

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2. Verify PCR Panel indication and data logger printout that block 1 components have not tripped.

   Block 1
   - MU-P1A
   - DH-P1A
   - DH-V5A*
   - DH-V4A*

   *Block 1 valves will stop on undervoltage, and resume travel upon restoration of power.

   CAUTION: Prior to taking the diesel generator breaker control switch out of PULL-TO-LOCK, verify that both bus feeder breakers have opened and wait 5 seconds. (Waiting 5 seconds allows the residual EMF of the motors to decay. This delay is required because the diesel is already up to speed and the undervoltage is simulated, not actual).

3. Take the Control Switch for Diesel Generator breaker 1A(G1-02) out of PULL-TO-LOCK. This will allow the Diesel Generator breaker G1-02 to close in to the 4160V D Bus and will be followed by block loading.

4. Verify PCR Panel indication and data logger printout that all Test 1 components are now in the safeguards position.
   NOTE: Data Logger data may be recorded later on data sheet.

5. Verify PCR Panel indication that the 27/86 lockout relays for 480V ES buses 1P and 1R have operated.

6. Place lift pumps LO-P7A/B, C/D and E/F and Turning Gear Motor GN-Y1 control switches in PULL-TO-LOCK.

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6.1.3.2 With the Test 1 components still in their safeguard position and the diesel generator supplying the loads:

A. Release the 30 psig high Reactor Building test switches PS283 and PS289. (They are spring return and should have gone to the OFF position when released.)

B. Return TS1/RCA and TS2/RCA to their "OFF" position and verify PCR Panel indication that channels RC1A and RC2A are now not tripped. Data logger data may be recorded later.

NOTE: Reset UV relay lockouts as soon as possible due to turbine being off of turning gear. (Clear all circuit breaker amber lights before resetting lockouts.)

C. Reset 27/86 lockout relays for 480V ES buses 1P and 1R from Panel PCR. This will restore ABT transfer capabilities and auto start features.

D. Start Main Turbine Turning Gear Oil Pump LO-P5 if it has not already started.

E. Start Lift Pumps LO-P7 A/B, C/D and E/F.

NOTE: Bypass switches may be used if not all the lift pumps are needed.

F. Start Turning Gear Motor GN-Y1 and place turbine on turning gear and monitor turbine for rubs.

NOTE: The turbine should be placed back on turning gear within 5 mins. or less after it had been taken off. (See Limit and Precaution 3.4).

G. Stop LO-P6.

H. Verify Data Logger printout that block 2, 3, and 4 components actuated at approximately a 5, 10, and 15 sec. interval respec-

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tively after Diesel Generator A breaker G1-02 closed to 4160 bus 1D.

1. Record Diesel generator voltage from console CR.

2. Record Diesel generator current, and MW.

I. Verify that the following breakers have tripped:

1SA-D2
1SB-D2
EF-P2A-D*
EF-P2B-D*
N1-02

*Verified by relay personnel at panel

J. Stop Make-Up pumps and, at discretion of shift supervisor, stop all unnecessary equipment.

6.1.3.3 Return ES bus 1D to its normal supply (Aux. Transf. 1B) by completing the following steps:

A. Verify "1A Diesel Man Voltage Control" set at proper point to carry loads on bus, set at 41.5%. This must be done before switching to manual.

B. Place the exciter droop switch in the parallel position.

C. Place the droop knob on the engine governor at 70%.

D. Place Diesel Generator 1A voltage regulator selector switch ("1A Diesel Exciter") found on Console CR to the "Manual" position.

E. Place the synchroscope into operation by placing the switch to the immediate right of the "1SB-D2 ES Bus 1D FEEDER" control switch to the "ON" position.

F. Match 1D Bus voltage with system voltage (Read from the two voltmeters to the immediate left of the synchroscope*) using the "1A Diesel Man Voltage Control".

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*One reads system voltage and the other DG voltage, they automatically are connected to same breaker as synchroscope.

G. Re-verify that System and Diesel Generator voltages still match.

H. Adjust "1A Diesel Gen Governor" control until the synchroscope is moving slowly in the "Fast" direction (clockwise), when moving slowly and at 12:00 o'clock or 5 of 12 on the synchroscope dial, close 1SB-D2.

6.1.3.4 Test of Undervoltage Relay Contacts in Diesel Start Circuit

A. Shutdown diesel and place in ES standby in accordance with OP 1107-3.

B. Place CS for G1-02 in PULL-TO-LOCK.

C. Close 1SA-D2.

D. Manually operate and hold 5-1 relay on Unit 1D15.

(1) 1SA-D2 should trip

(2) Diesel generator should start and come up to speed.

E. When diesel has started release 5-1 relays.

F. Restore powerto N 480V Bus and, if applicable, restore unit to turning gear.

G. Shutdown diesel and place in E.S. standby in accordance with OP 1107-3.

H. Close 1SA-D2

I. If BS-P1A and RR-P1A were not shutdown in 6.1.3.2.C do so now.

J. Manually operate and hold 5-2 relay on Unit 1D15.

(1) 1SB-D2 should trip.

(2) Diesel generator should start and come up to speed.

K. When diesel has started release 5-2 relay.

L. Shutdown diesel and place in ES standby in accordance with OP 1107-3.

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M. Return ES bus to its normal supply (Aux. Transf. 1B) by closing 1SB-D2 and then opening 1SA-D2.

6.1.3.5 Return all Test 1 components to their "Initial Position" noted on 6.1.2.1.a of data sheet.

6.1.3.6 Remove jumper TB2-9(PT) to TB2-11(9A) in unit 1D3 and remove jumper from TB2-9(PT) to TB2-11(9A) in unit 1D4.

6.1.3.7 Place the control switch for EF-P2A-D and EF-P2B-D in PULL-TO-LOCK.

6.2 Actuation B

6.2.1 Limits and Precautions

A. There should be no testing, calibration, or maintenance, of any other ESAS analog or logic channels while this test is being performed.

B. Verify that the AC Transfer Switch for 1C ES Valves MCC is positioned to the "A" supply (on 1P), by means of the selector switch located on Panel PCR.

C. Verify that MU-P1C, NR-P1C* and NS-P1C* are ES selected.

Pump	Switch/Bus	Position
MU-P1C	43/SS2/1E	PpC
NR-P1C*	43/SS/1T	PpC
NS-P1C*	43/SS/1S	PpC

*NOTE: B Pump may be used if fed from A channel.

D. This test will be performed immediately after Diesel Generator Surveillance test 1303-4.16 has been completed to insure a warm diesel prior to auto start. If this Diesel test is not scheduled at this time, accomplish diesel start and warm up per Surveillance test 1303-4.16.

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E. In this test, an undervoltage condition will be simulated by removing potential to two of the three bus undervoltage relays concurrent with an ES actuation. The undervoltage relays will trip both feeder breakers removing supply voltage from the bus. Upon the loss of voltage and prior to the diesel picking up the loads, the 27/86 lockout relay will either trip and lockout, or prevent from transferring

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or auto starting those loads which are fed from the ES bus but are not required during an ES condition, thus insuring that only vital ES and ES bus loads are loaded onto the diesel and preventing a possible diesel overload. The loads affected by the 27/86 lockout relay or an undervoltage condition concurrent with an ES are:

1. Tripped and Locked Out Loads
   a. Motor Driven Emergency Feedwater Pump EF-P2B-E and EF-P2A-E
   b. Tie breaker 1S-12
   c. Tie breaker 1T-12
   d. NS-P1B (non ES selected pump is tripped and locked out.)
   e. SW-P1B
   f. SR-P1C
   g. NR-P1B (non ES selected pump is tripped and locked out.)
   h. Turbine Oil Lift Pumps LO-P-7G/H, I/J
   i. IC-P1B
   j. RC-P1B Lift Pump (RC-P1B-1)
   k. RC-P1D Lift Pump (RC-P2D-1)
   l. SF-P1B
   m. Borated Water Storage Tank Heater DH-T1-H2
2. Instrument Air Compressor IA-P1B is prevented from auto starting.
3. There are four ABT's that will be affected at this time. Normally, the ABT will transfer the connected load to the alternate supply on an undervoltage. However, on an ES or an ES followed by an overvoltage, the following action will occur to the listed ABT's:

a. ABT to 1C ES Valves MCC--will not be able to transfer on ES.

b. Start circuit for Fire Pump FS-P2 will lockout on ES with undervoltage. ABT will transfer load to 480V ES 1R, if 1R is energized.

c. The ES signal will result in the transfer signal for the ABT's for panels PM1 and PM2 being blocked. Depending on the ABT lineup, the above panels may be lost until the Diesel Generator comes on line.

CAUTION: Do not have panels PM1 and PM2 out of service for more than one hour.

F. Since 4160V ES bus 1E will be de-energized and various components affected (as discussed in E above), the following components are to be started in order to maintain auxiliaries for the current plant status.

1. Spent Fuel Cooling Pump SF-P1A
2. Nuclear Service Closed Cooling Pump NS-P1A*
3. Nuclear Service River Water Pump NR-P1A*
4. Secondary Service River Water Pump SR-P1A
5. Decay Heat Removal Pump DH-P1A (if applicable)
6. Main Turbine Emergency Bearing Oil Pump LO-P6
7. Decay Heat Closed Cooling Pump DC-P1A
8. Main Turbine Oil Lift Pumps LO-P7 A/B, C/D, E/F
9. Decay Heat River Water Pump DR-P1A
10. Intermediate Closed Cooling IC-P1A
11. Screen Wash Pump SW-P-1A on "Start"
12. MU-P1B or MU-P1A supplied from 1D ES Bus and supplying seal injection.

13. Instrument Air Compressor IA-P1A.

14. Place the BYPASS switches for the lift pumps for turbine bearings 7, 8, 9, and 10 in BYPASS to prevent the turning gear from tripping.

*NOTE: B Pump may be used if fed from A channel.

15. Assure MG Set for Count Room is lined up to 1A ES MCC.

6.2.2 Test 1 - "B" Actuation 95X Components

6.2.2.1 A. 1. Prior to commencing the test, note the initial positions of the components under test listed in column 6.2.2.1.A of the data sheet.

2. Perform MakeUp Pump line up.

(TEXT CONT'D ON FOLLOWING PAGE)

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B. Place all the components listed in column 6.2.2.1.B of the data sheet to the "Pre-Test Position" indicated.

6.2.2.1.C (1) Place the Control Switch for G11-02, Diesel 1B Breaker, to the Pull to Lock Position.

(2) Verify "Diesel Generator 1A or 1B Gen. Bkr Locked Out" annunciator alarm is received. (B-2-6)

D. Place the test switch on PCR Panel labeled "HIGH PRES INJ B 2/3 CHAN SELECT" (TS2/RCB) to the "TEST 1" position. (This selects contacts 1 and 2 of the selector switch thus choosing channels RC1B and RC2B to actuate the components associated with the 95X test relay.)

(CAUTION: The following step will cause actuation of the Test 1 components listed below.)

Block 1	Make-up Pump (starts)	MU-P1C
	Decay Heat Pump (starts)	DH-P1B
	Decay Heat Suct. & Disch. Vvs. (open)	DH-V5B, V4B
	Emergency Diesel (starts)	EG-Y-1B
	R.B. Fans (stops)	AH-E-1B, E-1C
Block 2	R.B. Emerg. Clg. (starts	RR-P1B
	R.B. Fan (starts slow speed)*	AH-E-1B
	R.B. Emerg. Clg. Pp. Bypass Vv. (open)	RR-V10B
Block 3	Decay Heat River Water Pp. (start)	DR-P1B
	Nuclear Services River Water Pp.(start)	NR-P1C
	Decay Heat Closed Cyc. Pp. (starts)	DC-P1B
	Nuclear Services Closed Cyc. Pp.(start)	NS-P1C
	Decay Heat River Disch. Vv. (opens)	DR-V1B
	Nuclear Services River Disch. Vv. (open)	NR-V1C
Block 4	Closed Cycle Pp. Air Cooler (starts)	AH-E-1B
	Screen House Pps. Cooler & Vent (start)	AH-E-27B

*AH-E-1C will stop due to ICES Vv MCC being selected to P Bus.

E. Actuate the Test 1 components by placing the switch on PCR Panel labeled "HIGH PRES INJ B SYST TEST INITIATE" (TS1/RCB) to the "TST 1" position.

F. Initiate two out of the three high Reactor Building, pressure (30 psig) by placing (and momentarily holding at the same time) the switches on PCR Panel labeled "REACT BLDG PRES PS-284-TEST" and "REACT BLDG PRES PS-287-TEST" to their

"Test Position. (This step will start RB Spray Pump B on recirculation to the Borated Water Storage Tank.)

G. Verify, as shown on 6.2.2.1.G of the data sheet, that the components under test change from the non-safeguards (Pre-Test) to the safeguards (Test) position.

6.2.3 Test 2 - "B" Actuation Power Transfer

6.2.3.1.A Notify representative of Lebanon Relay Dept. that test is about to start. Verify that relay personnel have arrived at the 1E 4160V bus prior to proceeding with the test.

B. Place the breakers for EF-P2A-E and EF-P2B-E in the test position and prepare for test as follows:

(1) Install jumper from TB2-9(PT) to TB2-11(9A) in Unit 1E4

(2) Install jumper from TB2-9(PT) to TB2-11(9A) in Unit 1E5

(3) Place the control switch for EF-P2A-E and EF-P2B-E in the AFTER START position.

(4) Place both breakers in TEST CLOSE position.

NOTE: This set up permits verification that the above breakers will trip as a result of the bus undervoltage.

C. Close 1SB-E2 paralleling the two auxiliary transformers. Check both bus feeder ammeters and verify that neither reads more than 1000 amperes.

D. Place and hold the two high Reactor Building pressure (30 psig) Test switches, "REACT BLDG PRES 284 TEST" and "REACT BLDG PRES PS 287-TEST" to their "Test" position. (The switches must be held in "Test" to allow the spray pump to trip and reload on undervoltage.)

E. With the Test 1 components in their safeguards position, initiate a bus undervoltage condition by pressing and holding

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UV test pushbuttons 43/PB1A and 43/PB1B until the feeder breakers trip, after which the pushbuttons 43/PB1A and 43/PB1B may be released.

1. Verify PCR Panel indication and data logger printout that Block 2, 3, and 4 components have tripped on the undervoltage.

Block 2	RR-P1B	Block 3	DR-P1B
	AH-E-1B		NR-P1C
	RR-V10B*		DC-P1B
			NS-P1C
			DR-V1B*
			NR-V1C*
Block 4	AH-E-15B		
	AH-E-27B		
	BS-P1B		

*Block 2, 3, and 4 Valves will stop on undervoltage, and resume travel upon reload.

2. Verify PCR Panel indication and data logger printout that block 1 components have not tripped.

Block 1	MU-P1C
	DH-P1B
	DH-V5B*
	DH-V4B*

*Block 1 valves will stop on undervoltage, and resume travel upon restoration of power.

CAUTION: Prior to taking the diesel generator breaker control switch out of PULL-TO-LOCK, verify that both bus feeder breakers have opened and wait 5 seconds. (Waiting 5 seconds allows the residual EMF of the motors to decay. This delay is required because the diesel is already up to speed and the undervoltage is simulated not actual.)

3. Take the Control Switch for Diesel Generator breaker 1B (G11-02) out of PULL-TO-LOCK. This will allow the Diesel Generator breaker G11-02 to close in to the 4160V E Bus and will be followed by block loading.

1412 277

4. Verify data logger printout that block 2, 3, and 4 components actuated at approximately a 5, 10, and 15 sec. interval respectively, after Diesel Generator B breaker G11-02 closed to 4160 Bus 1E.

   a. Record Diesel Generator voltage from console CR.

   b. Record Diesel Generator amps and MW.

5. Verify PCR Panel indication that all Test 1 components are now in the safeguards position.

6. Verify PCR Panel indication that the 27/86 lockout relays for 480V ES buses 1S and 1T have operated.

7. Verify that the following breakers have tripped:

   1SA-E2
   1SB-E2
   EF-P2A-E*
   EF-P2B-E*

   *Verified by relay personnel at panel.

6.2.3.2 With the Test 1 components still in their safeguards position and the diesel generator supplying the loads:

A. Release the 30 psig high Reactor Building test switches PS 284 and PS 287. (They are spring return and should have gone to the OFF position when released.)

B. Return TS1/RCB and TS2/RCB to their "OFF" position and verify PCR Panel indication that channels RC1B and RC2B are now not tripped.

C. Stop Make-Up pumps and, at the discretion of shift supervisor, stop all unnecessary equipment.

D. Verify that the turbine is still on turning gear.

6.2.3.3 Return ES bus 1E to its normal supply (Aux. Transf. 1A) by completing the following steps:

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A. Verify "1B Diesel Man Voltage Control" set at proper point to carry loads on bus, Set at 43.0%. This must be done before switching to manual.

B. Place the exciter droop switch in parallel position.

C. Place the droop knob on engine governor at 70%.

D. Place Diesel Generator 1B voltage regulator selector switch ("1B Diesel Exciter") found on Console SR to the "Manual" position.

E. Place the synchroscope into operation by placing the switch to the immediate right of the "1SA-E2 Bus 1E FEEDER" control switch to the "ON" position.

F. Match 1E Bus voltage with system voltage (Read from the two voltmeters to the immediate left of synchroscope.*) using the "1B Diesel Man. Voltage Control."

*One reads system voltage and the other DG Voltage. They automatically are connected to the same breaker as the synchroscope.

G. Re-verify that System and Diesel Generator voltages still match.

H. Adjust "1B Diesel Gen. Governor" control until the synchroscope is moving slowly in the "Fast" direction (clockwise), when moving slowly and at 12:00 o'clock or 5 of 12 on the synchroscope dial, close 1SA-E2.

6.2.3.4. Test of Undervoltage Relay Contacts in Diesel Start Circuit

A. Shutdown diesel and place in ES standby in accordance with OP 1107-3.

B. Place CS for G11-02 in PULL-TO-LOCK.

C. Close 1SB-E2

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D. Manually operate and hold 5-1 relay on Unit 1E-14.

(1) 1SA-E2 should trip.

(2) Diesel generator should start and come up to speed.

E. When diesel has started release 5-1 relay.

F. Shutdown diesel and place in ES standby in accordance with OP 1107-3.

G. Close 1SA-E2.

H. If BS-P1B and RR-P1B were not shutdown in 6.2.3.2.C do so now.

I. Manually operate and hold 5-2 relay on Unit 1E-14.

(1) 1SB-E2 should trip.

(2) Diesel generator should start and come up to speed.

J. When diesel has started release 5-2 relay.

K. Shutdown diesel and place in ES standby in accordance with OP 1107-3.

NOTE: (Clear all circuit breaker amber lights before resetting lockouts.)

6.2.3.5 Reset bus 1S and 1T lockout by depressing the two "Reset" buttons located on Panel PCR and verify that the 27/86 lockout relays reset. This will restore ABT transfer capabilities and auto start features.

6.2.3.6 Return all Test 1 comporents to their "Initial Position" noted on 6.2.2.1.A of data sheet.

6.2.3.7 Remove jumper TB2-9(PT) to TB2-11(9A) in 1E4 and jumper from TB2-9 (PT) to TB2-11(9A) in 1E5.

6.2.3.8 Place control switch for EF-P2A-E and EF-P2B-E in PULL-TO-LOCK.

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6.2.3.9 Stop LO-P6. Start LO-P7G/H and LO-P7I/J, if necessary, remove interlock switches from bypass.

7.0 ACCEPTANCE CRITERIA

The test will be considered satisfactory if engineered safeguard pumps, fans, and valves (for emergency core cooling and building spray) have operated on preferred power and transferred to emergency power, and the diesel generators have automatically started (due to an actual loss of normal AC station service power together with a simulated engineered safeguards signal) and assumed vital loads in ten seconds and all safeguard equipment within 60 seconds after initial starting signal, as evidenced by the control board component operating lights and either station computer or pressure/flow indication.

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DATA SHEETS

ENGINEERED SAFEGUARDS SYSTEM SEQUENCE AND POWER TRANSFER TEST

SURVEILLANCE PROCEDURE 1303-11.10, 11.15, and 11.17

REQUIRED INTERVAL-REFUELING

Step Sequence and Power Transfer-Actuation A

6.1.1.A _____(No testing, calibration, or maintenance of any other ES channel

B _____(1C ES Valves MCC on bus 1S)

C _____(MU-P1A, NR-P1A and NS-P1A are ES selected)

D _____(Insure Diesel Generator A is warm)

E _____(Notify Relay Department)

F _____(Personnel standing by to reset UV lockouts and place turbine back on turning gear).

G _____(Start the following components to maintain a normal cold shutdo

SF-P1B___ NS-P1C(B)___ DR-P1B___

NR-P1C(B)___ DH-P1B___(if applicable) SW-P1B___(on "Start")

SR-P1C(B)___ DC-P1B___ LO-P6___

LO-P7 G/H,I/J___ IC-P1B___ MU-P1B or MU-P1C___

IA-P1B___ from 1E Bus___

MG Set for Count Room from 1B ES MCC___

TEST 1

6.1.2.1.A (1) (Note initial position of Test 1 components)

Component	Initial Position	6.1.3.5 Returned to Initial Position
RR-P1A	_____	_____
DR-P1A	_____	_____
NR-P1A	_____	_____
NS-P1A	_____	_____
DC-P1A	_____	_____
AH-E15A	_____	_____

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Component	Initial Position	6.1.3.5 Returned to Initial Position
AH-E27A		
DH-P1A		
BS-P1A		
Diesel A		
AH-E1A		
AH-E1C		
DH-V4A		
DH-V5A		
DH-V19A		
DR-V1A		
NR-V1A		
RR-V10A		
RR-V1A		
BS-V1A		
BS-V3A		
BS-V60A		
BS-V59		
DH-V6A		
DH-V7A		
MU-V16A		
MU-V16B		
MU-V14A		
BS-V4A		
DH-V62		
DH-V63		
DH-V64		

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Component	Initial Position	6.1.3.5 Returned to Initial Position
MU-P1A		
MU-P1B		
MU-P1C		
MU-V193A		
MU-V193B		
MU-V193C		
MU-V64A		
MU-V64B		
MU-V64C		
MU-V74A		
MU-V74B		
MU-V74C		
MU-V72A		
MU-V72B		
MU-V72C		
MU-V68A		
MU-V68B		
MU-V69A		
MU-V69B		
U-V76A		
MU-V76B		
MU-V77A		
MU-V77B		
MU-V12		
MU-V36		
MU-V37		

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6.1.2.1.A (2) _____Perform Make Up Pump Line Up as follows to maintain seal injection.

NOTE: It is assumed that the B Make Up Pump is running at the beginning of this test.

(a) Open, if not already opened, the following valves.

MU-V193A	Open	_____
MU-V193B	Open	_____
MU-V193C	Open	_____
MU-V64A	Open	_____
MU-V64B	Open	_____
MU-V64C	Open	_____
MU-V74A	Open	_____
MU-V74B	Open	_____
MU-V74C	Open	_____
MU-V72A	Open	_____
MU-V72B	Open	_____
MU-V72C	Open	_____
MU-V68A	Open	_____
MU-V68B	Open	_____
MU-V69A	Open	_____
MU-V69B	Open	_____
MU-V76A	Open	_____
MU-V76B	Open	_____
MU-V77A	Open	_____
MU-V77B	Open	_____
MU-V12	Open	_____
MU-V36	Open	_____
MU-V37	Open	_____

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(b) _____ Start DC-P1B

_____ Start DR-P1B

(c) _____ Verify main lube oil pump for MU-P1C is running.

(d) _____ Verify MU-P1C is ES selected from the 1E 4160V ES bus.

(e) _____ Start MU-P1C

(f) _____ Verify MU-P1C current is normal

(g) _____ Verify MU-P1C oil system status is normal

(h) _____ Stop MU-P1B

(i) _____ Verify MU-P1C is supplying Normal Seal Injection.

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6.1.2.1.B (Components are in their Pre-test Position as indicated below)_____

6.1.2.1.G. (Actuated components are in the position indicated below)_____
(Tech. Specs. require Status lite and Computer or Pressure/Flow Ind.)

Equipment Under Test	Pretest Position	Status Light Condition	Test ES Position	Status Light Condition	Computer Pt. No/Readout	Pressure/ Flow Indication
MU-P1A	not running	Amber_____	Running	Blue_____	2833 ____	MU22/P12_____
DH-P1A	not running	Amber_____	running	Blue_____	2829_____	DH5/P11_____
DH-V5A	mid-position	Blue/Amber_____	open	Blue_____	2133_____	
DH-V4A	closed	Amber_____	open	Blue_____	2128_____	
Diesel 1A EG-Y-1A	not running	Amber_____	running	Blue_____	Note: Freq. must be >60.0 & <60.5	Ready to Load Light ON_____ Freq._____hz RPM_____
AH-E-1A	running-high speed	Amber_____	running-low speed	Blue_____	2645_____	
***-E-1C	running-high speed	Amber_____	Stopped*	Green_____	2649_____	
RR-P1A	not running	Amber_____	running	Blue_____		Observation _____
RR-V10A	closed	Blue _____	open	Amber_____		Observation _____
DR-P1A	not running	Amber_____	running	Blue_____		PI472A_____
NR-P1A	not running	Amber_____	running	Blue_____		PI470A_____
DC-P1A	not running	Amber_____	running	Blue_____		PI176_____
NS-P1A	not running	Amber	running	Blue_____		PI166_____
DR-V1A	closed	Amber_____	open	Blue_____		Observation _____
NR-V1A	closed	Amber_____	open	Blue_____		Observation _____
AH-E-15A	not running	Amber_____	running	Blue_____		Observation _____
AH-E-27A	not running	Amber_____	running	Blue_____		Observation _____
BS-P1A	not running	Amber	running	Blue_____	2825 ____	BS2/P11____

*Stops due to IC ES Vv being selected off of S Bus (B Act.)

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6.1.2.1.B

Insure that: (This insures that a recirc. path has been established for the pumps)

RR-V1A	Closed	Green_____
BS-V1A	Closed	Amber_____ and BS-V1A Breaker Open_____
BS-V4A	Closed	Amber_____
BS-V3A	Open	Blue_____
BS-V50A	Open 1 3/4 Turns	Manual Valve_____
BS-V59	Open	Manual Valve_____
DH-V6A	Closed	Green_____
DH-V7A	Closed	Green_____
DH-V19A	Open*	Manual Valve_____

*Closed if plant is in cold shutdown and <400 psig.

MU-V16A	Closed	Amber_____
MU-V16B	Closed	Amber_____
MU-V14A	Closed	Amber_____
DH-V62	Closed	Manual Valve_____
DH-V63	Closed	Manual Valve_____
DH-V64	Closed	Manual Valve_____

6.1.2.1.C.1_____ (G1-02 in Pull to Lock)
2_____ (Verify DG Bkr Locked Out Alarm)

6.1.2.1.D _____ (Place TS2/RCA to the Test 1 position)

E _____ (Actuate Test 1 components by placing TS1/RCA in the "Test 1" position)

F _____ (Start RB Spray Pump A by momentarily placing PS283 and PS289 to the "Test" position)

G _____ (Verify that Test 1 components actuated--page 27 right column)

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6.1.3.1 A_____ (Representative of Lebanon Relay Dept. at 4160V D Bus switchgear).

B_____ (Breakers EF-P2A-D and EF-P2B-D in "TEST" position)

B(1) _____ (Jumper installed from TB2-9(PT) to TB2-11(9A) in Unit 1D3).

B(2) _____ (Jumper installed from TB2-9(PT) to TB2-11(9A) in Unit 1D4).

B(3) _____ (Control switch for EF-P2A-D and EF-P2B-D in "AFTER-START" position).

B(4) _____ (Breakers for EF-P2A-D and EF-P2B-D in "TEST CLOSE" position).

C_____ (Breaker 1SA-D2 closed).

D_____ (Place and hold PS283 and PS289 to their "Test" position).

E_____ (Bus undervoltage accomplished by pushing and holding 43/PB1A and 43/PB1B until feeder breakers trip at which time 43/PB1A and 43/PB1B released.)

6.1.3.1.E.1_____ (G1-02 out of Pull to Lock after 5 sec. of 1SB-D2 trip)

6.1.3.1.E.2_____ (Verify that block 2, 3, and 4 components tripped on undervoltage).

	Component	Status Light Condition	Data Logger (Pt. No.)
	RR-P1A	Amber _____	Observa._____
	AH-E-1A	Amber _____	Trip _____(2645)
Block 2			
	*RR-V10A	Blue _____	Observa. _____
	DR-P1A	Amber _____	Observa. _____
	NR-P1A	Amber _____	Observa. _____
Block 3	DC-P1A	Amber _____	Observa. _____
	NS-P1A	Amber _____	Observa. _____
	*DR-V1A	Amber _____	Observa. _____
	*NR-V1A	Amber _____	Observa. _____
	AH-E-15A	Amber _____	Observa. _____

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Block 4 AH-E-27A Amber _____ Observa. _____

BS-P1A Amber _____ Trip _____(2825)

*Block 2, 3, & 4 valves will stop on undervoltage, and resume travel upon reload.

6.1.3.1.E.3____(Verify that block 1 components did not trip on undervoltage)

Block 1 Component	Status Light Condition	Data Logger (Pt. No.)
MU-P1A	Blue _____	Norm _____(2833)
DH-P1A	Blue _____	Norm _____(2829)
*DH-V4A	Blue _____	Open _____(2133)
*DH-V5A	Blue _____	Open _____(2128)

*Block 1 valves will stop on undervoltage, and resume travel upon restoration of power.

6.1.3.1.E.4 ____ Verify that all Test 1 Components are actuated.

(Tech Specs. require Status lite and Computer or Pressure/Flow Ind.)

	Test ES Position	Status Light Condition	Computer Pt. No. Readout	Pressure/Flow Indication
MU-P1A	Running	Blue_____	2833 _____	MU22/P11 _____
DH-P1A	Running	Blue_____	2829 _____	DH5/P11 _____
DH-V5A	Open	Blue_____	2133 _____	
DH-V4A	Open	Blue_____	2128 _____	
Diesel A EG-Y-1A	Running	Blue_____		Tach. (RPM)_____
AH-E-1A	Running-low speed	Blue_____	2645_____	
RR-P1A	Running-Running	Blue_____		Observation_____
RR-V10A	Open	Amber_____		Observation_____
DR-P1A	Running	Red_____		PI472A_____
NR-P1A	Running	Blue_____		PI470A_____
DC-P1A	Running	Blue_____		PI177_____

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NS-P1A	Running	Blue_____		PI166_____
DR-V1A	Open	Blue_____		Observation_____
NR-V1A	Open	Blue_____		Observation_____
AH-E-15A	Running	Blue_____		Observation_____
AH-E-27A	Running	Blue_____		Observation_____
BS-P1A	Running	Blue_____	2825_____	BS2/P11_____

6.1.3.1.E.5____(Verify that the 27/86 lockout actuated)

PCR PANEL

"Bus 1R Lockout Relay Actuated" ON_____

"Bus 1P Lockout Relay Actuated" ON_____

6.1.3.1.E.6____Place the following components in PULL-TO-LOCK.

LO-P7A/B _____

LO-P7C/D _____

LO-P7E/F _____

GN-Y1 _____

6.1.3.2.A_____(30 psig test switches in OFF position)

B_____(Return TS1/RCA and TS2/RCA to the OFF position and verify that channels RC1A and RC2A are not tripped.)

PCR Panel

HIGH PRESSURE INJ CHAN RC1A GROUP 1

Blue Light - OFF ____

Orange Light - OFF _____

HIGH PRESSURE INJ CHAN RC2A GROUP 1

Blue Light - OFF ____

Orange Light - OFF ____

Data Logger

Loading Seq A Timer 5 sec. NORM_____(2108)

Loading Seq A Timer 10 sec. NORM_____(2109)

Loading Seq A Timer 15 sec. NORM_____(2110)

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C____(1P and 1R 27/86 lockouts Reset from PCR)

D____(Start LO-P5)

E____(Start Following Lift Pumps)

LO-P7A/B _____

LO-P7C/D _____

LO-P7E/F _____

F____(Start GN-Y1 and place turbine on turning gear.)

G____(Stop LO-P6.)

6.1.3.2.H____(Verify that blocks 2, 3, and 4 re-actuated)

Data Logger

Diesel Gen 1A Breaker G1-02 Close_____(2074)

Loading Sequence A Timer 5 Sec-Test_____(2108)

Loading Sequence A Timer 10 Sec-Test_____(2109)

Loading Sequence A Timer 15 Sec-Test_____(2110)

(1) Diesel generator voltage _____

(2) Diesel generator amps _____

MW _____

6.1.3.2.I____(Breakers for 1SA-D2, 1SB-D2, EF-P2A-D, and N1-02 have tripped)

6.1.3.2.J____(Make-up pumps stopped)

6.1.3.3.A____(Set Manual Voltage Control at proper point to carry loads on bus)

B____(Place exciter droop switch in parallel)

C____(Place droop knob on engine governor at 70%)

D____(Place "1A Diesel Exciter" to "Manual" position)

E____(Place synchroscope for 1SB-D2 to ON)

F____(Match bus voltage with system voltage)

G____(Re-verify System and Bus Voltage are matched)

H____(Synchronize bus with system, then close 1SB-D2)

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6.1.3.4 A___(Shutdown diesel and place in ES standby).

B___(Place CS for G1-02 breaker in PULL-TO-LOCK).

C___(Close 1SA-02).

D___(Manually operate on hold 5-1 relay).

D.1__(1SA-D2 tripped).

D.2__(Diesel generator started and came up to speed).

E___(Release 5-1 relay).

F___(Restore power to 480V N Bus and if necessary place turbine on turning gear).

G___(Shutdown diesel and place in ES standby).

H___(Close 1SA-D2).

I___(If not shutdown, shutdown BS-P1A and RR-P1A).

J___(Manually operate and hold 5-2 relay).

J.1__(1SB-D2 tripped).

J.2__(Diesel generator started and up to speed).

K___(Release 5-2 relay).

L___(Shutdown diesel and place in ES standby).

M___(Close 1SB-D2 and open 1SA-D2).

6.1.3.5____ (Return all Test 1 components to their "Initial position" as noted on 6.1.2.1.A (1) of data sheet.

6.1.3.6____ Jumpers removed in 1D3 and 1D4.

6.1.3.7____ CS for EF-P2A-D and EF-P2B-D in PTL.

Sequence and Power Transfer - Actuation B

6.2.1 A___(No testing, calibration, or maintenance of any other ES channel).

B___(1C ES Valves MCC on bus 1P).

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C____(MU-P1C, NR-P1C, and NS-P1C are ES selected).

D____(Insure Diesel Generator B is warm).

F____(Start the following components to maintain a normal cold shutdown).

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SF-P1A_____

NS-P1A_____

NR-P1A_____

SR-P1A_____

DH-P1A_____(If applicable)

DC-P1A_____

DR-P1A_____

SW-P1A_____(on "Start")

LO-P6 _____

LO-P7 A/B, C/D, E/F _____

IC-P1A _____

MU-P1A or MU-P1B
from 1D ES _____

OIL PRESS INTERLOCK
SWITCHES IN BYPASS

Bearing 7 _____

Bearing 8 _____

Bearing 9 _____

Bearing 10_____

MG Set For Count Room From 1A ES MCC _____

Test 1

6.2.2.1.A (1) (Note initial position of Test 3 components)

Component	Initial Position	6.2.3.6 Returned to Initial Position
RR-P1B	_____	_____
DR-P1B	_____	_____
NR-P1C	_____	_____
NS-P1C	_____	_____
DC-P1B	_____	_____
AH-E15B	_____	_____
AH-E27B	_____	_____

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6.2.2.1.A (continued)

Component	Initial Position	6.2.3.6 Returned to Initial Position
DH-P1B		
BS-P1B		
AH-E1B		
AH-E1C		
DH-V4B		
Diesel B		
DH-V5B		
DR-V1B		
NR-V1C		
RR-V10B		
RR-V1B		
BS-V1B		
BS-V4B		
BS-V3B		
BS-V60B		
BS-V59		
DH-V6B		
DH-V7B		
MU-V16C		
MU-V16D		
MU-V14B		
DH-V19B		
DH-V62		
DH-V63		
DH-V64		

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Component	Initial Position	6.2.3.6 Returned to Initial Position
MU-P1A		
MU-P1B		
MU-P1C		
MU-V193A		
MU-V193B		
MU-V193C		
MU-V64A		
MU-V64B		
MU-V64C		
MU-V74A		
MU-V74B		
MU-V74C		
MU-V72A		
MU-V72B		
MU-V72C		
MU-V68A		
MU-V68B		
MU-V69A		
MU-V69B		
MU-V76A		
MU-V76B		
MU-V77A		
MU-V77B		
MU-V12		
MU-V36		
MU-V37		

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6.2.2.1.A (2) _____ Perform Make Up Pump line up as follows to maintain seal injection.

NOTE: It is assumed that the B Make Up Pump is running at the beginning of this test.

(a) Open, if not already opened, the following valves.

MU-V193A	Open	_____
MU-V193B	Open	_____
MU-V193C	Open	_____
MU-V64A	Open	_____
MU-V64B	Open	_____
MU-V64C	Open	_____
MU-V74A	Open	_____
MU-V74B	Open	_____
MU-V74C	Open	_____
MU-V72A	Open	_____
MU-V72B	Open	_____
MU-V72C	Open	_____
MU-V68A	Open	_____
MU-V68B	Open	_____
MU-V69A	Open	_____
MU-V69B	Open	_____
MU-V76A	Open	_____
MU-V76B	Open	_____
MU-V77A	Open	_____
MU-V77B	Open	_____
MU-V12	Open	_____
MU-V36	Open	_____
MU-V37	Open	_____

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(b) _____ Start DC-P1A.

_____ Start DR-P1A.

(c) _____ Verify main lube oil pump is running for MU-P1A.

(d) _____ Verify MU-P1A is ES selected from the 1D 4160V ES bus.

(e) _____ Start MU-P1A.

(f) _____ Verify MU-P1A current is normal.

(g) _____ Verify MU-P1A oil system is normal.

(h) _____ Stop MU-P1B.

(i) _____ Verify MU-P1A is supplying normal seal injection.

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2.2.1.B (Components are in their Pre-rest position as indicated below)_____

6.2.2.1.G (Actuated Components are in the position indicated below)_____
(Tech. Specs. require Status Lite and Computer or Pressure/Flow indication)

Equipment Under Test	Pretest Position	Status Light Condition	Test ES Position	Status Light Condition	Computer Pt. No./ Readout	Pressure/ Flow Indication
MU-P1C	not running	Amber_____	running	Blue_____	2837 _____	MU22/P13_____
DH-P1B	not running	Amber_____	running	Blue_____	2831 _____	DH5/P12_____
DH-V5B	mid position	Blue/Amber_____	open	Blue_____	2134_____	
DH-V4B	closed	Amber_____	open	Blue_____	2129_____	
Diesel 1B						Ready to Load Light On_____
EG-Y-1B	not running	Amber_____	running	Blue_____		Freq._____nz
AH-E-1B	running-high speed	Amber_____	running-low speed	Blue_____	2647_____	RPM_____
AH-E-1C	running-high speed	Amber_____	stopped*	Green_____	2649_____	
RR-P1B	not running	Amber_____	running	Blue_____		
RR-V10B	closed	Blue _____	open	Amber___		Obs._____
RR-P1B	not running	Amber_____	running	Blue_____		PI472D_____
NR-P1C	not running	Amber_____	running	Blue_____		PI470F_____
DC-P1B	not running	Amber_____	running	Blue_____		PI179_____
NS-P1C	not running	Amber_____	running	Blue_____		PI168_____
DR-V1B	closed	Amber_____	open	Blue_____		Obs._____
NR-[illegible]C	closed	Amber_____	open	Blue_____		Obs._____
AH-E-15B	not running	Amber_____	running	Blue_____		Obs._____
AH-E-27B	not running	Amber_____	running	Blue_____		Obs._____
BS-P1B	not running	Amber_____	running	Blue_____	2827 _____	BS2/P12_____

*Stops due to IC ES Vv being selected off of P Bus (A Act.)

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6.2.2.1.B (continued)

Insure that: (This insures that a recirc path has been established for the pumps)

RR-V1B	Closed	Green_____
BS-V1B	Closed	Amber_____ & BS-V1B Breaker Open____
BS-V4B	Closed	Amber_____
BS-V3B	Open	Blue_____
BS-V60B	Open 1 3/4 turns	Manual Valve_____
BS-V59	Open	Manual Valve_____
DH-V6B	Closed	Green_____
DH-V7B	Closed	Green_____
MU-V16C	Closed	Amber_____
MU-V16D	Closed	Amber_____
MU-V14B	Closed	Amber_____
DH-19B	Open*	Manual Valve_____

*Closed if plant is in cold shutdown and <400 psig

DH-V62	Closed	Manual Valve_____
DH-V63	Closed	Manual Valve_____
DH-V64	Closed	Manual Valve_____

6.2.2.1.C (1) _____(G11-02 in Pull to Lock)

(2) _____(Verify DG Bkr Locked Out Alarm)

D _____(Place TS2/RCB in the Test 1 position)

E _____(Actuate Test 1 components by placing TS1/RCB to the Test position).

F _____(Start Spray Pump B by momentarily placing PS284 and PS287 to the Test Position).

G _____(Verify that Test 1 components actuated-page 37 right column)

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6.2.3.1.A _____ (Representative of Lebanon Relay Dept. at 4160V E Bus Switchgear)

B _____ (Breakers for EF-P2A-E & EF-P2B-E in "Test" position)

B1_____ (Jumper installed from TB2-9(PT) to TB2-11 (9A) in Unit 1E4)

B2_____ (Jumper installed from TB2-9(PT) to TB2-11(9A) in Unit 1E5)

B3_____ (Control switch for EF-P2A-E & EF-P2BE in "After Start" position

B4_____ (Breakers for EF-P2A-E & EF-P2B-E in TEST CLOSE position)

C _____ (Breaker 1SB-E2 closed)

D _____ (Place and hold PS284 and PS287 to their "Test" position)

E _____ (Bus undervoltage accomplished by pushing & holding 43/PB1A & 43/PB1B until feeder breakers trip at which time 43/PB1A & 43/PB1B released)

6.2.3.1.E (1) _____G11-02 out of Pull to Lock after 5 sec. of 1SA-E2 trip.

6.2.3.1.E (2) _____(Verify that block 2, 3, and 4 components tripped on undervoltage)

	Component	Status Light Condition	Data Logger (Pt. No.)
	RR-P1B	Amber_____	Observ._____
	AH-E-1B	Amber_____	Trip_____(2647)
Block 2			
	*RR-V10B	Blue_____	Observ._____
	DR-P1B	Amber_____	Observ._____
	NR-P1C	Amber_____	Observ._____
	DC-P1B	Amber_____	Observ._____
Block 3	NS-P1C	Amber_____	Observ._____
	*DR-V1B	Amber_____	Observ._____
	*NR-V1C	Amber_____	Observ._____
	AH-E-15B	Amber_____	Observ._____
Block 4	AH-E-27B	Amber_____	Observ._____
	BS-P1B	Amber_____	Trip_____(2827)

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*Block 2, 3, and 4 valves will stop on undervoltage and resume travel upon reload.

6.2.3.1.E.3_____(Verify that block 1 components did not trip on undervoltage)

Block 1 component	Status Light Condition	Data Logger(PT.No.)
MU-P1C	Blue_____	Norm_____(2837)
DH-P1B	Blue_____	Norm_____(2831)
*DH-V4B	Blue_____	Open_____(2129)
*DH-V5B	Blue_____	Open_____(2134)

*Block 1 valves will stop on undervoltage and resume travel upon restoration of power.

6.2.3.1.E.4_____(Verify that blocks 2, 3, and 4 re-actuated)

Data Logger

Diesel Gen 1B Breaker G11-02 Close_____(2075)

Loading Sequence B Timer 5 Sec-Test_____(2111)

Loading Sequence B Timer 10 Sec-Test_____(2112)

Loading Sequence B Timer 15 Sec-Test_____(2113)

a. Diesel Generator Voltage_____

b. Diesel Generator Amps_____

MW_____

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6.2.3.1.E.5 Verify that all Test 1 components are actuated

(Tech. Specs. require Status lite and Computer or Pressure/Flow Ind)

	Test ES Position	Status Light Condition	Computer Pt. No./ Readout	Pressure/ Flow Indication
MU-P1C	running	Blue_____	2837 _____	MU22/PI3____
DH-P1B	running	Blue_____	2831 _____	DH5/P12____
DH-V5B	open	Blue_____	2134_____	
DH-V4B	open	Blue_____	2129_____	
Diesel 1B		Blue_____		Tach.
EG-Y-1B	running	Blue_____		(RPM)_____
AH-E-1B	running-low speed	Blue_____	2647_____	
RR-P1B	running	Blue_____		Observ._____
RR-V10B	open	Amber_____		Observ._____
DR-P1B	running	Blue_____		PI472D_____
NR-P1C	running	Blue_____		PI470F_____
DC-P1B	running	Blue_____		PI179_____
NS-P1C	running	Blue_____		PI168_____
DR-V1B	open	Blue_____		Observ._____
NR-V1C	open	Blue_____		Observ._____
AH-E-15B	running	Blue_____		Observ._____
AH-E-27B	running	Blue_____		Observ._____
BS-P1B	running	Blue_____	2827_____	B52/P12____

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6.2.3.1.E.6_____(Verify that the 27/86 lockout actuated)

PCR Panel

"Bus 1S Lockout Relay Actuated" ON_____

"Bus 1T Lockout Relay Actuated" ON_____

6.2.3.1.E.7_____ (Breakers for 1SA-E2, 1SB-E2, EF-P2A-E, EF-P2BE, have tripped.

6.2.3.2.A_____ (30 psig test switches in OFF position)

B_____ (Return TS1/RCB and TS2/RCB to the OFF position and verify that channels RC1B and RC2B are not tripped)

PCR Panel

HIGH PRESSURE INJ CHAN RC1B GROUP 1

Blue Light - OFF_____

Orange Light - OFF_____

HIGH PRESSURE INJ CHAN RC2B GROUP 1

Blue Light - OFF_____

Orange Light - OFF_____

Data Logger

Loading Seq. B Timer 5 sec. NORM_____(2111)

Loading Seq. B Timer 10 sec. NORM_____(2112)

Loading Seq. B Timer 15 sec. NORM_____(2113)

C_____ (Make-up pumps stopped)

6.2.3.3.A_____ (Set Manual Voltage Control at proper point to carry loads on bus)

B_____ (Place exciter droop switch in parallel)

C_____ (Place the droop knob on engine governor at 70%)

D_____ (Place "1B Diesel Exciter" to "Manual" Position)

E_____ (Place synchroscope for 1SA-E2 on ON)

F_____ (Match bus voltage with system voltage)

G_____ (Reverify System and Bus Voltages are matched)

H_____ (Synchronize bus with system, then close 1SA-E2)

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6.2.3.4 A___(Shutdown diesel and place in ES standby).

B___(Place CS for G11-02 breaker in PULL-TO-LOCK).

C___(Close 1SB-E2).

D___(Manually operate and hold 5-1 relay).

D.1__(1SA-E2 tripped).

D.2__(Diesel generator started and came up to speed).

E___(Release 5-1 relay).

F___(Shutdown diesel and place in ES standby).

G___(Clsoe 1SA-E2).

H___(If not shutdown, shutdown BS-P1B and RR-1B).

I___(Manually operate and hold 5-2 relay).

I.1__(1SB-E2 tripped).

I.2__(Diesel generator started and up to speed).

J___(Release 5-2 relay).

K___(Shutdown diesel and place in ES standby).

6.2.3.5_____ (Reset bus 1S and 1T lockouts).

6.2.3.6_____ (Return all Test 1 components to their "Initial position" as noted on 6.2.2.1.A (1) of data sheet).

6.2.3.7_____ Jumpers removed in 1E4 and 1E5.

6.2.3.8_____ CS for EF-P2A-E and EF-P2B-E in PTL.

6.2.3.9_____ Stop LO-P6.

Performed By:_____ Date_____

Approved By: _____ Date_____

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