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ENGINEERING DATA TRANSMITTAL

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FEB 03 1998

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Acceptance Test Report 2721-Z Upgrades

R. D. Keck

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Acceptance Test Procedure 2721-Z Upgrades

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Acceptance Test Procedure 2721-Z Upgrades

1 General

1.1 Scope

This test procedure provides instructions for acceptance testing of modifications to the 2721-Z diesel generator system made by Project C-189. The modifications include 1) replacing the generator NUMA-LOGIC controller with connection to the PFP distributed control system (DCS), 2) replacing ATS-1 with a breaker switching scheme for 2736-ZB backup power and 3) providing a method for generator load and system testing.

1.2 References

Drawings

H-2-827908, Electrical Phase 3 Plan
H-2-827909, Electrical Phase 3 One Line Diagram
H-2-827910, Electrical Phase 3 Details & Elevations

Engineering Change Notices (ECN)

C189-043, MICON Information
C189-046, MICON Information
C189-013, Essential Drawings

Prior to final test approval, enter ECNs written against this ATP on the exceptions page.

1.3 Responsibilities

1.3.1 General

Each company or organization participating in this ATP will designate personnel to assume the responsibilities and duties as defined herein for their respective roles. The designees shall become familiar with this ATP and the systems involved to the extent that they can perform their assigned duties.

1.3.2 Project Engineer

Acts as liaison between the participants in acceptance testing.

Distributes the approved testing schedule before start of testing.

Schedules and conducts a pretest kickoff meeting with test participants when necessary.

Notifies the persons supporting the test 2 days before the start of testing.

Notifies concerned parties when a change is made in the testing schedule.

Signs Test Approval page when test is approved and accepted.

Takes necessary action to clear exceptions to the test.

1.3.3 Test Director (PFP Electrical Power and Control Cognizant Engineer or MICON Cognizant Engineer)

Coordinates and directs acceptance testing.

Confirms that field testing and inspection of the system or portion of the system to be tested has been completed.

Stops any test which, in his or her judgment, may cause damage to the system until the problem has been resolved.

After verifying there is no adverse impact, may alter the sequence in which systems or subsystems are tested.

Ensures that required environmental conditions are maintained.

If a test is to be suspended for a period of time, ensures that the system is left in a safe mode.

Before restarting suspended test, reverifies the test prerequisites.

Initiates ECNs to document required changes to the ATP.

Reviews recorded data, discrepancies, and exceptions.

Obtains information or changes necessary to clear or resolve objections during the performance of the test.

Signs Test Approval page when test has been performed.

Obtains required signatures on the ATP Master prior to reproduction and distribution.

1.3.4 WITNESSES (Provided by Participating Organizations. One witness shall be a Title III acceptance inspector.)

Witness the tests.

Review results of testing.

Assist the Test Director when requested.

Title III acceptance inspector sign Test Approval page when test has been performed.

1.3.5 Recorder (Provided by FDNW)

Records test instrument identification numbers and calibration expiration dates, as required.

Initials and dates every test step on the Field copy as it is completed next to the step number or on a data sheet, when provided. Records test data. On data sheets where there is not room for both the initial and date, date may be entered at bottom of column.

Records exceptions on exception form. Uses additional exception forms as needed. Notifies the Test Director at time the exception is made.

After test is finished, assigns alpha numeric page numbers to added exception forms. Records page numbers in the Table of Contents.

Transfers Field copy entries for each step to the Master in ink or type, signs, and dates. Transmits the completed Master to the Test Director for approval signature routing.

1.3.6 Test Operator

Performs test under direction of the Test Director.

Provides labor, equipment, and test instruments required for performing tests which have not been designated as being provided by others.

Requests in writing from the Test Director those services, materials, or equipment that have been designated as being supplied by others.

Confirms that all equipment required for performing test will be available at the start of testing.

1.3.7 Lead Design Engineer

Evaluate results.

Sign for Approval on Test Approval page.

1.4 Description of the System

Project C-189 is modifying the 2721-Z diesel generators to: 1) replace the generator NUMA-LOGIC controller with connection to the PFP distributed control system (DCS), 2) replace ATS-1 with a breaker switching scheme for 2736-ZB backup power and 3) provide a method for generator load and system testing.

The testing will focus on verifying the connections to the DCS, verifying the hardwired generator controls and current connections to the DCS were not impacted by the modifications and verifying the operability of the DCS configuration software in an off-line mode.

1.5 Test Conditions and Equipment Required

Supplied by Test Operator unless otherwise noted.

1.5.1 Voltohmmeters (VOM):

Instrument No. 840-45-08-008 Expiration Date 4-9-98

1.5.2 Ammeters: 0 to 5 Amp.

Instrument No. 840-45-02-013 Expiration Date 12-4-97

1.5.3 Power Source; 0 to 60 Hertz

1.5.4 Jumper wires connected to a switch.

1.5.5 Current sources; 0 to 1 madc, 0 to 5 amp AC

Transmotion
840-13-20-012
11-25-97

1.6 Change Control

Technical changes to this test procedure shall be authorized by an ECN. Administrative changes, including order of turning activating inputs or verifications, may be authorized by the Electrical Power and Control or MICON Cognizant Engineer and shall be recorded in black ink on the instruction page. Changes shall be signed by the Cognizant Engineer and the QA Engineer or his representative. Record these changes on the exception sheet in appendix A.

1.7 Execution

1.7.1 Occupational Safety and Health

Individuals shall carry out their assigned work in a safe manner to protect themselves and others from undue hazards and to prevent damage to property and environment. Facility line managers shall assure the safety of activities within their areas to prevent injury, property damage, or interruption of operation. Performance of test activities shall always include safety and health aspects. A pre-job safety meeting shall be held and this ATP discussed with the personnel supporting the test.

In order to accomplish the work in this ATP, it is necessary to have the equipment or circuit energized. Complete testing requires installation and removal of jumpers to 24 VDC circuits. Verification of no exposed voltages above 50 volts in the area of installation and removal of jumpers is required.

1.8 Exceptions

Exceptions to the required test results are sequentially numbered and recorded on the exception forms.

Technical Errors/exceptions in the ATP itself shall NOT be processed as test exceptions (see Section 1.6 CHANGE CONTROL).

Number each exception sequentially as it occurs and record it on the exception form.

Enter disposition to resolve each exception when such determination is made.

2 Acceptance Test

NOTE: IF A PIECE OF EQUIPMENT FAILS OR DOES NOT PERFORM AS DESIGNATED BY THIS DOCUMENT, THE TEST COORDINATOR MAY MOVE TO ANOTHER PART OF THIS PROCEDURE OR ANOTHER PIECE OF EQUIPMENT TO CONTINUE TESTING WHILE TROUBLESHOOTING AND REPAIR IS COMPLETED UNDER WORK PACKAGE CONTROL ON THE FAILED OR UNSATISFACTORY EQUIPMENT.

2.1 Test Conditions

2.1.1 Energy Boundaries

8-22-97

- 2721-Z Switchgear Circuit Breaker 1 OPEN and L&T installed
- F8X309 Racked out and L&T installed.
- Over tag on back-up power junction box for ATS-3/4 (cables from 2721-Z CB2).
- Over tag on ATS-2 (cables from 2721-Z CB3).
- NP-VF-1-3 (CB 3) Closed and remote close control locked out

2.1.2 Equipment Configuration

- 2721-Z Switchgear Circuit Breakers 2, 3 and 4 OPEN.
- 2721-Z Generators 1, 2 and 3 mode switches in AUTO position.
- In Switchgear master section verify the following wires for NP-VF-1-3 (CB 3) are lifted and taped 0119 (TB15), 711 (TB15) and 0104 (TB13).
- Circuit breakers #26, #28, #30, #31, #33, & #35, panel LP-EP-5, 2721-Z CLOSED.
- The positive leads on diesel generator batteries connected.
- Verify 24 vdc power supply in 2721-Z switchgear master section and generator batteries are operating at less than 50 vdc.

2.1.3 Notifications

8-21-97

- Notify B.E.D.\Shift Operations Manager (PAX 227)
- Notify MICON Control Room, PAX 348/373-0084 that DCS alarms will be generated and verification of DCS values will be required.

NOTE: Sections 2.2 through 2.9 may be done in any order at the Test Director's discretion.

NOTE: Fuel Level must be taken in accordance with ZO-060-210 each day before running a diesel generator and after the last run of the day.

2.2 Lamp Test

Depress lamp test pushbutton on Master Section of the Switchgear and verify the following lamps on the top section of the panel illuminate

GEN 1 AVAILABLE
GEN 2 AVAILABLE
GEN 3 AVAILABLE
GEN 1 TROUBLE
GEN 2 TROUBLE
GEN 3 TROUBLE
GEN 1 ON LINE
GEN 2 ON LINE
GEN 3 ON LINE
1-2-3 SEQUENCE
2-3-1 SEQUENCE
3-1-2 SEQUENCE
GEN 1 LOAD SHED
GEN 2 LOAD SHED
GEN 3 LOAD SHED
GEN TEST
U/O Volt
U/O Frequency

2.3 Sequence Lamps

Depress the 1-2-3 sequence switch/lamp on the Master Section of the Switchgear

Verify the 1-2-3 sequence lamp illuminates and stays illuminated after the switch is released.

Verify the 1-2-3 mode is indicated on the DCS 2721-Z generator status display.

Depress the 2-3-1 sequence switch/lamp on the Master Section of the Switchgear

Verify the 2-3-1 sequence lamp illuminates and stays illuminated after the switch is released.

Verify the 2-3-1 mode is indicated on the DCS 2721-Z generator status display.

Depress the 3-1-2 sequence switch/lamp on the Master Section of the Switchgear

Verify the 3-1-2 sequence lamp illuminates and stays illuminated after the switch is released.

Verify the 3-1-2 mode is indicated on the DCS 2721-Z generator status display.

2.4 Mode switches

- Verify three generator mode switches are in the AUTO position.
- Verify the three GEN X AVAILABLE lamps on the Master Section of the Switchgear are illuminated.
- Turn the mode switch on generator 1 to the OFF/RESET position and verify the GEN 1 AVAILABLE lamp is extinguished and the GEN 1 TROUBLE lamp is illuminated.
- Verify on the DCS generator status display shows generator 1 is off.
- Turn the mode switch on generator 2 to the OFF/RESET position and verify the GEN 2 AVAILABLE lamp is extinguished and the GEN 2 TROUBLE lamp is illuminated.
- Verify on the DCS generator status display shows generator 1 and 2 are off.
- Verify a DCS GEN_OFLN alarm was received.
- Turn the mode switch on generator 3 to the OFF/RESET position and verify the GEN 3 AVAILABLE lamp is extinguished and the GEN 3 TROUBLE lamp is illuminated.
- Verify that the DCS generator status display shows the three generators in the off mode.
- Verify a DCS GEN_OFLN alarm was received.
- Turn the mode switch on generator 2 to the AUTO position and verify the GEN 2 AVAILABLE lamp is illuminated and the GEN 2 TROUBLE lamp is extinguished.
- Verify a DCS GEN_OFLN alarm was received.
- Return the remaining two mode switches to the AUTO position and verify the GEN X AVAILABLE lamps are illuminated and the GEN X TROUBLE are extinguished.
- Verify a DCS GEN_ONLN alarm was received.
- Verify that the DCS generator status display shows the three generators in the auto mode.

2.5 Generator 1 Controls and Alarms

2.5.1 Low Battery Voltage

- Install insulating blanket over terminals 247 and 248 (120 vac)

Install a jumper between terminals 213 and 203 in Generator 1 switchgear cubicle and verify the following

 LOW BATTERY VOLTAGE lamp for generator 1 is illuminated.

 Verify the alarm horn in 2721-Z sounds.

 Press the horn silence button on the switchgear master section and verify the horn is silenced.

 Verify a DCS EAL_GEN1 alarm was received.

 Remove jumper between terminals 213 and 203.

 Remove insulating blanket over terminals 247 and 248 (120 vac)

2.5.2 Breaker Position

8-26-97 Turn generator 1 mode switch to the MANUAL position and verify that the generator starts.

 Verify the DCS generator status display shows generator 1 in manual mode and a DCS event is printed.

 Turn breaker control handle for generator 1 and verify breaker CLOSES.

 Verify the GEN 1 ON LINE light illuminates on the switchgear master section.

 Verify the DCS generator status display shows generator 1 in manual and generator 1 breaker closed.

2.5.3 High Water Temperature

 Install a jumper between terminals 206 and 203 in Generator 1 switchgear cubicle and verify the following:

 HIGH WATER TEMP lamp for generator 1 is illuminated.

 GEN 1 TROUBLE lamp for generator 1 is illuminated on the switchgear master section.

 Verify the alarm horn in 2721-Z sounds.

 Press the horn silence button on the switchgear master section and verify the horn is silenced.

 Verify a DCS TAH_GEN1 alarm was received.

 Verify generator 1 engine stops and generator 1 breaker OPENS.

- Remove jumper between terminals 206 and 203.
- Turn generator mode switch to OFF/RESET to reset controller.
- 2.5.4 Return generator 1 mode switch to the MANUAL position and verify that the generator restarts.
- 2.5.5 Low Oil Pressure
 - 8269 Install a jumper between terminals 204 and 203 in Generator 1 switchgear cubicle and verify the following:
 - LOW OIL PRESSURE lamp for generator 1 is illuminated.
 - GEN 1 TROUBLE lamp for generator 1 is illuminated on the switchgear master section.
 - Verify the alarm horn in 2721-Z sounds.
 - Press the horn silence button on the switchgear master section and verify the horn is silenced.
 - Verify a DCS PAL_GEN1 alarm was received.
 - Verify the engine stops.
 - Remove jumper between terminals 204 and 203.
 - Turn generator mode switch to OFF/RESET to reset controller.
- 2.5.6 Return generator 1 mode switch to the MANUAL position and verify that the generator restarts.
- 2.5.7 Engine Overspeed
 - 8269 OPEN field breaker in generator control cabinet (located in lower right).
 - Have Mechanic manually override governor to increase speed until engine stops and verify the following:
 - OVERSPEED lamp for generator 1 is illuminated.
 - GEN 1 TROUBLE lamp for generator 1 is illuminated on the switchgear master section.
 - Verify the alarm horn in 2721-Z sounds.
 - Press the horn silence button on the switchgear master section and verify the horn is silenced.
 - Verify a DCS SAH_GEN1 alarm was received.

CLOSE field breaker in generator control cabinet (located in lower right).

 Turn generator mode switch to OFF/RESET to reset controller.

 Return generator 1 mode switch to the AUTO position.

 2.5.8 OVER CRANK (start fail)
8-26-97

 Install insulating blanket over terminals 247 and 248 (120 vac)

 Install a jumper between terminals 235 and 236 in Generator 1 switchgear cubicle and verify the following:

 Verify a DCS XA_G1_1 alarm was received.

 Remove jumper between terminals 235 and 236.

 Remove insulating blanket over terminals 247 and 248 (120 vac)

 2.5.9 Control Power Failure
8-26-97

 Turn off control power for generator 1 by turning off circuit breaker 1-CB in the lower right of generator 1 switchgear cubicle.

 Verify GEN 1 TROUBLE lamp for generator 1 is illuminated on the switchgear master section.

 Verify on the DCS values table that the 1-CPR input is on.

 Turn on control power for generator 1 by turning on circuit breaker 1-CB in the lower right of generator 1 switchgear cubicle.

 2.5.10 Generator Shutdown Relay
8-26-97

 Verify the generator mode switch is in the AUTO position.

 Press the Emergency Stop switch for generator 1.

 Verify GEN 1 TROUBLE lamp for generator 1 is illuminated on the switchgear master section.

 Verify on the DCS values table that the 1-SDR input is on.

 Verify the alarm horn in 2721-Z sounds.

 Press the horn silence button on the switchgear master section and verify the horn is silenced.

- Release the Emergency Stop switch for generator 1.
- Turn generator mode switch to OFF/RESET to reset controller.
- Return generator 1 mode switch to the AUTO position.

2.6 Generator 2 Controls and Alarms

2.6.1 Low Battery Voltage

8-25-97

- Install insulating blanket over terminals 447 and 448 (120 vac)
- Install a jumper between terminals 413 and 403 in Generator 2 switchgear cubicle and verify the following
- LOW BATTERY VOLTAGE lamp for generator 2 is illuminated.
- Verify the alarm horn in 2721-Z sounds.
- Press the horn silence button on the switchgear master section and verify the horn is silenced.
- Verify a DCS EAL_GEN2 alarm was received.
- Remove jumper between terminals 413 and 403.
- Remove insulating blanket over terminals 447 and 448 (120 vac)

2.6.2 Breaker Position

8-26-97

- Turn generator 2 mode switch to the MANUAL position and verify that the generator starts.
- Verify the DCS generator status display shows generator 2 in manual mode and a DCS event is printed.
- Turn breaker control handle for generator 2 and verify breaker CLOSES.
- Verify the GEN 2 ON LINE light illuminates on the switchgear master section.
- Verify the DCS generator status display shows generator 2 in manual and generator 2 breaker closed.

2.6.3 High Water Temperature

8-26-97

- Install a jumper between terminals 406 and 403 in Generator 2 switchgear cubicle and verify the following:
- HIGH WATER TEMP lamp for generator 2 is illuminated.

- GEN 2 TROUBLE lamp for generator 2 is illuminated on the switchgear master section.
- Verify the alarm horn in 2721-Z sounds.
- Press the horn silence button on the switchgear master section and verify the horn is silenced.
- Verify a DCS TAH_GEN2 alarm was received.
- Verify generator 2 engine stops and generator 2 breaker OPENS.
- Remove jumper between terminals 406 and 403.
- Turn generator mode switch to OFF/RESET to reset controller.
- 2.6.4 Return generator 2 mode switch to the MANUAL position and verify that the generator restarts.
- 2.6.5 Low Oil Pressure
 - Install a jumper between terminals 404 and 403 in Generator 2 switchgear cubicle and verify the following:
 - LOW OIL PRESSURE lamp for generator 2 is illuminated.
 - GEN 2 TROUBLE lamp for generator 2 is illuminated on the switchgear master section.
 - Verify the alarm horn in 2721-Z sounds.
 - Press the horn silence button on the switchgear master section and verify the horn is silenced.
 - Verify a DCS PAL_GEN2 alarm was received.
 - Verify the engine stops.
 - Remove jumper between terminals 404 and 403.
 - Turn generator mode switch to OFF/RESET to reset controller.
- 2.6.6 Return generator 2 mode switch to the MANUAL position and verify that the generator restarts.
- 2.6.7 Engine Overspeed
 - OPEN field breaker in generator control cabinet (located in lower right).

Have Mechanic manually override governor to increase speed until engine stops and verify the following:

OVERSPEED lamp for generator 2 is illuminated.

GEN 2 TROUBLE lamp for generator 2 is illuminated on the switchgear master section.

Verify the alarm horn in 2721-Z sounds.

Press the horn silence button on the switchgear master section and verify the horn is silenced.

Verify a DCS SAH_GEN2 alarm was received.

CLOSE field breaker in generator control cabinet (located in lower right).

Turn generator mode switch to OFF/RESET to reset controller.

Return generator 2 mode switch to the AUTO position.

2.6.8 OVER CRANK (start fail)

Install insulating blanket over terminals 447 and 448 (120 vac)

Install a jumper between terminals 435 and 436 in Generator 2 switchgear cubicle and verify the following:

Verify a DCS XA_G2_1 alarm was received.

Remove jumper between terminals 435 and 436.

Remove insulating blanket over terminals 447 and 448 (120 vac)

2.6.9 Control Power Failure

Turn off control power for generator 2 by turning off circuit breaker 2-CB in the lower right of generator 2 switchgear cubicle.

Verify GEN 2 TROUBLE lamp for generator 2 is illuminated on the switchgear master section.

Verify on the DCS values table that the 2-CPR input is on.

Turn on control power for generator 2 by turning on circuit breaker 2-CB in the lower right of generator 2 switchgear cubicle.

8-26-97 2.6.10 Generator Shutdown Relay

- 8-26-97 Verify the generator mode switch is in the AUTO position.
- 8-26-97 Press the Emergency Stop switch for generator 2.
- 8-26-97 Verify GEN 2 TROUBLE lamp for generator 2 is illuminated on the switchgear master section.
- 8-26-97 Verify on the DCS values table that the 2-SDR input is on.
- 8-26-97 Verify the alarm horn in 2721-Z sounds.
- 8-26-97 Press the horn silence button on the switchgear master section and verify the horn is silenced.
- 8-26-97 Release the Emergency Stop switch for generator 2.
- 8-26-97 Turn generator mode switch to OFF/RESET to reset controller.
- 8-26-97 Return generator 2 mode switch to the AUTO position.

8-26-97 2.7 Generator 3 Controls and Alarms

8-26-97 2.7.1 Low Battery Voltage

- 8-26-97 Install insulating blanket over terminals 647 and 648 (120 vac)
- 8-26-97 Install a jumper between terminals 613 and 603 in Generator 3 switchgear cubicle and verify the following
- 8-26-97 LOW BATTERY VOLTAGE lamp for generator 3 is illuminated.
- 8-26-97 Verify the alarm horn in 2721-Z sounds.
- 8-26-97 Press the horn silence button on the switchgear master section and verify the horn is silenced.
- 8-26-97 Verify a DCS EAL_GEN3 alarm was received.
- 8-26-97 Remove jumper between terminals 613 and 603.
- 8-26-97 Remove insulating blanket over terminals 647 and 648 (120 vac)

8-26-97 2.7.2 Breaker Position

- 8-26-97 Turn generator 3 mode switch to the MANUAL position and verify that the generator starts.
- 8-26-97 Verify the DCS generator status display shows generator 3 in manual mode and a DCS event is printed.

OW Turn breaker control handle for generator 3 and verify breaker CLOSES.

OW Verify the GEN 3 ON LINE light illuminates on the switchgear master section.

OW Verify the DCS generator status display shows generator 3 manual and generator 3 breaker closed.

2.7.3 High Water Temperature

OW 8-26-97 Install a jumper between terminals 606 and 603 in Generator 3 switchgear cubicle and verify the following:

OW HIGH WATER TEMP lamp for generator 3 is illuminated.

OW GEN 3 TROUBLE lamp for generator 3 is illuminated on the switchgear master section.

OW Verify the alarm horn in 2721-Z sounds.

OW Press the horn silence button on the switchgear master section and verify the horn is silenced.

OW Verify a DCS TAH_GEN3 alarm was received.

OW Verify generator 3 engine stops and generator 3 breaker OPENS.

OW Remove jumper between terminals 606 and 603.

OW Turn generator mode switch to OFF/RESET to reset controller.

OW 2.7.4 Return generator 3 mode switch to the MANUAL position and verify that the generator restarts.

OW 2.7.5 Low Oil Pressure

OW 8-26-97 Install a jumper between terminals 604 and 603 in Generator 3 switchgear cubicle and verify the following:

OW LOW OIL PRESSURE lamp for generator 3 is illuminated.

OW GEN 3 TROUBLE lamp for generator 3 is illuminated on the switchgear master section.

OW Verify the alarm horn in 2721-Z sounds.

OW Press the horn silence button on the switchgear master section and verify the horn is silenced.

OW Verify a DCS PAL_GEN3 alarm was received.

- Verify the engine stops.
- Remove jumper between terminals 604 and 603.
- Turn generator mode switch to OFF/RESET to reset controller.
- 2.7.6 Return generator 3 mode switch to the MANUAL position and verify that the generator restarts.
- 2.7.7 Engine Overspeed
- 8-26-97 OPEN field breaker in generator control cabinet (located in lower right).
- Have Mechanic manually override governor to increase speed until engine stops and verify the following:
 - OVERSPEED lamp for generator 3 is illuminated.
 - GEN 3 TROUBLE lamp for generator 3 is illuminated on the switchgear master section.
 - Verify the alarm horn in 2721-Z sounds.
 - Press the horn silence button on the switchgear master section and verify the horn is silenced.
 - Verify a DCS SAH_GEN3 alarm was received.
- CLOSE field breaker in generator control cabinet (located in lower right).
- Turn generator mode switch to OFF/RESET to reset controller.
- Return generator 3 mode switch to the AUTO position.
- 2.7.8 OVER CRANK (start fail)
- 8-26-97 Install insulating blanket over terminals 647 and 648 (120 vac)
- Install a jumper between terminals 635 and 636 in Generator 3 switchgear cubicle and verify the following:
 - Verify a DCS XA_G3_1 alarm was received.
- Remove jumper between terminals 635 and 636.
- Remove insulating blanket over terminals 647 and 648 (120 vac)

2.7.9 Control Power Failure

- 2.7.9.1 Turn off control power for generator 3 by turning off circuit breaker 3-CB in the lower right of generator 3 switchgear cubicle.
- 2.7.9.2 Verify GEN 3 TROUBLE lamp for generator 3 is illuminated on the switchgear master section.
- 2.7.9.3 Verify on the DCS values table that the 3-CPR input is on.
- 2.7.9.4 Turn on control power for generator 3 by turning on circuit breaker 3-CB in the lower right of generator 3 switchgear cubicle.

2.7.10 Generator Shutdown Relay

- 2.7.10.1 Verify the generator mode switch is in the AUTO position.
- 2.7.10.2 Press the Emergency Stop switch for generator 3.
- 2.7.10.3 Verify GEN 3 TROUBLE lamp for generator 3 is illuminated on the switchgear master section.
- 2.7.10.4 Verify on the DCS values table that the 3-SDR input is on.
- 2.7.10.5 Verify the alarm horn in 2721-Z sounds.
- 2.7.10.6 Press the horn silence button on the switchgear master section and verify the horn is silenced.
- 2.7.10.7 Release the Emergency Stop switch for generator 3.
- 2.7.10.8 Turn generator mode switch to OFF/RESET to reset controller.
- 2.7.10.9 Return generator 3 mode switch to the AUTO position.

2.8 Miscellaneous Inputs and Outputs

2.8.1 Test Switches

- 2.8.1.1 Turn generator mode switches for generators 1, 2 and 3 to OFF/RESET position.
- 2.8.1.2 Turn and hold the Test Switch on the Switchgear Master section to the LOAD position.
- 2.8.1.3 Verify on the DCS values table that the LOAD TEST input is on.
- 2.8.1.4 Turn and hold the Test Switch on the Switchgear Master section to the SYSTEM position.

- OW Verify on the DCS values table that the SYSTEM TEST input is on.
- OW Release the Test Switch on the Switchgear Master section.
- OW Press and hold the EGS Test Emergency Stop Switch on the Switchgear Master section.
- OW Verify on the DCS values table that the EGS Test Emergency Stop input is on.
- OW Release the EGS Test Emergency Stop Switch on the Switchgear Master section.
- OW Turn generator mode switches for generators 1, 2 and 3 to AUTO position.

OW 2.8.2 Automatic Generator Load Controller (AGLC)
8-2297

2.8.2.1 Base Load Signal

- OW Install insulating blanket over 120 vac terminals of AGLC.
- OW Install a VOM on terminals 11 and 12 of the Woodward AGLC in the Master Switchgear section.
- OW Verify the DC voltage reading across terminals is between -0.05 volts to +0.05 volts.
- OW Request DCS Operator to use the AGLC controller to increase the AGLC output to maximum.
- OW Verify the DC voltage reading across terminals is between 2.95 volts to 3.05 volts.
- OW Request DCS Operator to use the AGLC controller to decrease the AGLC output to minimum.
- OW Remove insulating blanket over 120 vac terminals of AGLC.

2.8.2.2 AGLC and VAR/PF Controllers

- OW Wiring for the AGLC and VAR/PF controllers using ECNs C189-043, C189-046 and C189-038 was verified in work package 96-2749.

AGLC and VAR/PF Controllers are correctly installed and ready for operational testing

*

Power Systems Representative / Date

* See following page 20-A, Rev 0 for
Power Systems Representative Signature.
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2.8.2.2 AGLC and VAR/PF Controllers

- ✓ Wiring for the AGLC and VAR/PF controllers using ECNs C189-012 and C189-038 was verified in work package 96-2749.

AGLC and VAR/PF Controllers are correctly installed and ready for operational testing

James J. Gendron 1 8/30/97
Power Systems Representative Date

2.8.3 Signals from 234-5Z Transfer Control Panel

2.8.3.1 Normal Bus Over/Under Frequency

- On the DCS Values table verify the 234-5Z Normal Bus Over/Under Frequency input is ON.
- Lift wire 1604 or 34-1604 from terminal in CTBX-1.
- On the DCS Values table verify the 234-5Z Normal Bus Over/Under Frequency input is OFF.
- Land wire 1604 or 34-1604 lifted in CTBX-1 in previous step.
- On the DCS Values table verify the 234-5Z Normal Bus Over/Under Frequency input is ON.

2.8.3.2 Normal Bus Over/Under Voltage

- On the DCS Values table verify the 234-5Z Normal Bus Over/Under Voltage input is ON.
- Lift wire 1605 or 34-1605 from terminal in CTBX-1.
- On the DCS Values table verify the 234-5Z Normal Bus Over/Under Voltage input is OFF.
- Land wire 1605 or 34-1605 lifted in CTBX-1 in previous step.
- On the DCS Values table verify the 234-5Z Normal Bus Over/Under Voltage input is ON.

2.8.3.3 234-5Z Emergency Bus Over/Under Frequency

- On the DCS Values table verify the 234-5Z Emergency Bus Over/Under Frequency input is ON.
- Lift wire 1606 or 34-1606 from terminal in CTBX-1.
- On the DCS Values table verify the 234-5Z Emergency Bus Over/Under Frequency input is OFF.

2.8.3 Signals from 234-5Z Transfer Control Panel

2.8.3.1 Normal Bus Over/Under Frequency

- On the DCS Values table verify the 234-5Z Normal Bus Over/Under Frequency input is OFF.
- Jumper wires 1604 and 34-1604 in generator switchgear master section.
- On the DCS Values table verify the 234-5Z Normal Bus Over/Under Frequency input is ON.
- Remove jumper from 1604 and 34-1604 in generator switchgear master section.
- On the DCS Values table verify the 234-5Z Normal Bus Over/Under Frequency input is OFF.

2.8.3.2 Normal Bus Over/Under Voltage

- On the DCS Values table verify the 234-5Z Normal Bus Over/Under Voltage input is OFF.
- Jumper wires 1605 and 34-1605 in generator switchgear master section.
- On the DCS Values table verify the 234-5Z Normal Bus Over/Under Voltage input is ON.
- Remove jumper from 1605 and 34-1605 in generator switchgear master section.
- On the DCS Values table verify the 234-5Z Normal Bus Over/Under Voltage input is OFF.

2.8.3.3 234-5Z Emergency Bus Over/Under Frequency

- On the DCS Values table verify the 234-5Z Emergency Bus Over/Under Frequency input is ON.
- Lift wire 1606 or 34-1606 from terminal in generator switchgear master section.
- On the DCS Values table verify the 234-5Z Emergency Bus Over/Under Frequency input is OFF.
- Land wire 1606 or 34-1606 lifted in generator switchgear master section in previous step.
- On the DCS Values table verify the 234-5Z Emergency Bus Over/Under Frequency input is ON.

2.8.3.4 234-5Z Emergency Bus Over/Under Voltage

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 On the DCS Values table verify the 234-5Z Emergency Bus Over/Under Voltage input is ON.

 Lift wire 1607 or 34-1607 from terminal in generator switchgear master section.

 On the DCS Values table verify the 234-5Z Emergency Bus Over/Under Voltage input is OFF.

 Land wire 1607 or 34-1607 lifted in generator switchgear master section in previous step.

 On the DCS Values table verify the 234-5Z Emergency Bus Over/Under Voltage input is ON.

2.8.3.5 234-5Z EGS Bus Over/Under Frequency

 Install a jumper between terminals 1610 and 34-1610 in generator switchgear master section.

 On the DCS Values table verify the 234-5Z EGS Bus Over/Under Frequency input is ON.

 Remove jumper between terminals 1610 and 34-1610 in generator switchgear master section.

 On the DCS Values table verify the 234-5Z EGS Bus Over/Under Frequency input is OFF.

2.8.3.6 234-5Z EGS Bus Over/Under Voltage

 Install a jumper between terminals 1611 and 34-1611 in generator switchgear master section.

 On the DCS Values table verify the 234-5Z EGS Bus Over/Under Voltage input is ON.

 Remove jumper between terminals 1611 and 34-1611 in generator switchgear master section.

 On the DCS Values table verify the 234-5Z EGS Bus Over/Under Voltage input is OFF.

2.8.4 234-5Z Breaker Position Indications

2.8.4.1 F8X309

WARNING

Electrical SHOCK potential is present (480 & 120 VAC, 125 VDC) on in the compartment while installing and removing jumpers. Install insulating blanket over terminals and equipment adjacent to terminal being tested.

PERSONAL INJURY COULD OCCUR.

REFER TO WHC-CM-1-10

2.8.4.1 Install a jumper between terminals QCF (F8 & 1513) AND QCG (F9 & 34-1513) in section 15 top compartment Room 266 switchgear.

2.8.4.1 Verify F8X309 is shown as CLOSED on the DCS Generator display.

2.8.4.1 Remove jumper between terminals QCF (F8 & 1513) AND QCG (F9 & 34-1513) in section 15 top compartment Room 266 switchgear.

2.8.4.1 Install a jumper between terminals QCH (F3 & 1514) AND QCJ (F4 & 34-1514) in section 15 top compartment Room 266 switchgear.

2.8.4.1 Verify F8X309 is shown as OPEN on the DCS Generator display.

2.8.4.1 Remove jumper between terminals QCH (F3 & 1514) AND QCJ (F4 & 34-1514) in section 15 top compartment Room 266 switchgear.

2.8.4.2 F8X400

WARNING

Electrical SHOCK potential is present (480 & 120 VAC, 125 VDC) on in the compartment while installing and removing jumpers. Install insulating blanket over terminals and equipment adjacent to terminal being tested.

PERSONAL INJURY COULD OCCUR.

REFER TO WHC-CM-1-10

2.8.4.2 Verify F8X400 is shown as OPEN on the DCS Generator display.

In section 15 top compartment Room 266 switchgear, lift wire E2 (34-1602) or E1 (1602) and install jumper between wires E6 (34-1601) and E5 (1601).

 Verify F8X400 is shown as CLOSED on the DCS Generator display.

 In section 15 top compartment Room 266 switchgear, land wire E2 (34-1602) or E1 (1602) and remove jumper between wires E6 (34-1601) and E5 (1601).

 Verify F8X400 is shown as OPEN on the DCS Generator display.

2.8.4.3 F8X340

WARNING

Electrical SHOCK potential is present (480 & 120 VAC, 125 VDC) on in the compartment while installing and removing jumpers. Install insulating blanket over terminals and equipment adjacent to terminal being tested.

PERSONAL INJURY COULD OCCUR.

REFER TO WHC-CM-1-10

 Verify F8X340 is shown as CLOSED on the DCS Generator display.

 In section 15 top compartment Room 266 switchgear, lift wire T6 (34-1515A) or T5 (1515) and install jumper between wires T2 (34-1516) and T1 (1516).

 Verify F8X340 is shown as OPEN on the DCS Generator display.

 In 2721-Z Switchgear Master section, land wire 34-1515 or 1515 lifted in earlier step and remove jumper between wires 34-1516 and 1516.

 Verify F8X340 is shown as CLOSED on the DCS Generator display.

2.8.5 Generator Bus Load Circuit Breaker Position/Control

2.8.5.1 Set-up

 Turn mode switches for generators 1, 2 and 3 to the OFF/RESET position

2.8.5.2 2721-Z CB1

 Wiring for 2721-Z CB1 breaker control using ECN's C189-043 and C-189-046 was verified in work package 96-2749.

OW 8-22-97 Verify 2721-Z CB1 is shown as OPEN on the DCS Generator display.

OW Remove energy control from CB1 and CLOSE.

OW Verify 2721-Z CB1 is shown as CLOSED on the DCS Generator display.

OW OPEN CB1 and install energy control.

2.8.5.3 2721-Z CB2
8-22-97

OW Verify 2721-Z CB2 is shown as OPEN on the DCS Generator display.

OW CLOSE CB2.

OW Verify 2721-Z CB2 is shown as CLOSED on the DCS Generator display.

OW OPEN CB2.

2.8.5.4 2721-Z CB3
8-22-97

OW Verify 2721-Z CB3 is shown as OPEN on the DCS Generator display.

OW CLOSE CB3.

OW Verify 2721-Z CB3 is shown as CLOSED on the DCS Generator display.

OW OPEN CB3.

2.8.5.5 2721-Z CB4
8-22-97

OW Verify 2721-Z CB4 is shown as OPEN on the DCS Generator display.

OW CLOSE CB4.

OW Verify 2721-Z CB4 is shown as CLOSED on the DCS Generator display.

OW OPEN CB4.

OW 8-22-97 2.8.6 Panel NP-VF-1-3 (CB 3) Position Indication and Control

OW Wiring for NP-VF-1-3 in accordance with ECN's C189-043 and C189-046 was verified in work package 96-2749.

OW Verify NP-VF-1-3 is shown as CLOSED on the DCS generator display.

2.8.7 ATS position indications

2.8.7.1 ATS-2

Verify ATS-2 is shown in the NORMAL position on the DCS Generator display.

Lift either 1507 or 34-1507 in CBTX-1 in 2721-Z.

Verify ATS-2 is shown in the intermediate position on the DCS Generator display.

Install a jumper between 1508 and 34-1508 in generator switchgear master section in 2721-Z.

Verify ATS-2 is shown in the EGS position on the DCS Generator display.

Remove jumper between 1508 and 34-1508 in generator switchgear master section in 2721-Z.

Land either 1507 or 34-1507 lifted in earlier step in CBTX-1 in 2721-Z.

Verify ATS-2 is shown in the NORMAL position on the DCS Generator display.

2.8.7.2 ATS-3

Verify ATS-3 is shown in the NORMAL position on the DCS Generator display.

Lift either 1509 or 34-1509 in CBTX-1 in 2721-Z.

Verify ATS-3 is shown in the intermediate position on the DCS Generator display.

Install a jumper between 1510 and 34-1510 in CBTX-1 in 2721-Z.

Verify ATS-3 is shown in the EGS position on the DCS Generator display.

Remove jumper between 1510 and 34-1510 in CBTX-1 in 2721-Z.

Land either 1509 or 34-1509 lifted in earlier step in CBTX-1 in 2721-Z.

Verify ATS-3 is shown in the NORMAL position on the DCS Generator display.

2.8.7.3 ATS-4

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DO Verify ATS-4 is shown in the NORMAL position on the DCS Generator display.

DO Lift either 1511 or 34-1511 in CBTX-1 in 2721-Z.

DO Verify ATS-4 is shown in the intermediate position on the DCS Generator display.

DO Install a jumper between 1512 and 34-1512 in CBTX-1 in 2721-Z.

DO Verify ATS-4 is shown in the EGS position on the DCS Generator display.

DO Remove jumper between 1512 and 34-1512 in CBTX-1 in 2721-Z.

DO Land either 1511 or 34-1511 lifted in earlier step in CBTX-1 in 2721-Z.

DO Verify ATS-4 is shown in the NORMAL position on the DCS Generator display.

2.8.8 Over/Under Voltage/Frequency and Reset

8-22-97

DO Verify the OVER/UNDER VOLTAGE and OVER/UNDER FREQUENCY inputs are OFF using the DCS Values table.

DO Start one generator by moving the mode switch to the MANUAL position.

DO CLOSE the circuit breaker for the operating generator.

DO Verify the OVER/UNDER VOLTAGE and OVER/UNDER FREQUENCY inputs are ON using the DCS Values table.

DO Press the O/U VOLT FREQ. RESET on the Switchgear Master section.

DO Momentarily (more than 2 seconds) disconnect wire 61 on TB11 in the switchgear master section (O/U FREQ).

DO Verify the O/U FREQ light is illuminated.

DO Verify the alarm horn in 2721-Z sounds.

DO Press the horn silence button on the switchgear master section and verify the horn is silenced.

DO Press the O/U VOLT FREQ. RESET on the Switchgear Master section.

Verify the O/U FREQ light is extinguished.

 Stop operating generator by moving the mode switch to the AUTO position.

 2.8.9 2721-Z UPS Failure

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 Unplug the power supply cord to the 2721-Z UPS.

 Verify a DCS UPS_GEN alarm was received.

 Plug the power supply cord for the 2721-Z UPS back in.

2.9 Transducer Inputs

Verify the following transducer inputs on the DCS values table. For each transducer, record the test connection point and the results of the minimum and maximum range test points.

Transducer	Connection Point	Test Value	DCS Value	Actual DCS	Verified
Generator 1 Watt					
Range 0-1 mdc		0 mdc	0 kw to 20 kw	.5	00W
Scale 0-400 KW	1-XDCR	1 mdc	360 kw to 440 kw	400	00W
Generator 1 VAR					
Range 0-1 mdc		0 mdc	0 kvar to 20 kvar	1.0	00W
Scale 0-400 KVAR	1-XDCR	1 mdc	360 kvar to 440 kvar	413.8	00W
Generator 2 Watt					
Range 0-1 mdc		0 mdc	0 kw to 20 kw	0	00W
Scale 0-400 KW	2-XDCR	1 mdc	360 kw to 440 kw	400	00W
Generator 2 VAR					
Range 0-1 mdc		0 mdc	0 kvar to 20 kvar	.6	00W
Scale 0-400 KVAR	2-XDCR	1 mdc	360 kvar to 440 kvar	400	00W
Generator 3 Watt					
Range 0-1 mdc		0 mdc	0 kw to 20 kw	1.0	00W
Scale 0-400 KW	3-XDCR	1 mdc	360 kw to 440 kw	399	00W

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Transducer	Connection Point	Test Value	DCS Value	Actual DCS	Verified
Generator 3 VAR					
Range 0-1 mdc		0 mdc	0 kvar to 20 kvar	1.0	00W
Scale 0-400 KVAR	3-XOCR	1 mdc	360 kvar to 440 kvar	401	00W
Generator Bus Load Breaker 1 Phase A Current					
Range 0-5 amps	3T-CB1-A Terms 1+3	0 amps	0 amps to 20 amps	-1.6	00W
Scale 0-400 amps	4.8	5 amps	360 amps to 440 amps	390	00W
Generator Bus Load Breaker 1 Phase B Current					
Range 0-5 amps	3T-CB1-B Terms 1+3	0 amps	0 amps to 20 amps	0	00W
Scale 0-400 amps	4.8	5 amps	360 amps to 440 amps	390	00W
Generator Bus Load Breaker 1 Phase C Current					
Range 0-5 amps	3T-CB1-C Terms 1+3	0 amps	0 amps to 20 amps	0.1	00W
Scale 0-400 amps	4.7	5 amps	360 amps to 440 amps	385	00W
Generator Bus Load Breaker 2 Phase A Current					
Range 0-5 amps	3T-CB2-A Terms 1+3	0 amps	0 amps to 20 amps	.2	00W
Scale 0-400 amps	5.0	5 amps	360 amps to 440 amps	415	00W
Generator Bus Load Breaker 2 Phase B Current					
Range 0-5 amps	3T-CB2-B Terms 1+3	0 amps	0 amps to 20 amps	0	00W
Scale 0-400 amps	4.5	5 amps	360 amps to 440 amps	372	00W

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Transducer	Connection Point	Test Value	DCS Value	Actual DCS	Verified
Generator Bus Load Breaker 2 Phase C Current					
Range 0-5 amps	27-CB2-C Term 123	0 amps	0 amps to 20 amps	.03	00W
Scale 0-400 amps	5.0	5 amps	360 amps to 440 amps	405	00W
Generator Bus Load Breaker 3 Phase A Current					
Range 0-5 amps	27-CB3-A Term 123	0 amps	0 amps to 20 amps	.2	00W
Scale 0-400 amps	4.8	5 amps	360 amps to 440 amps	396	00W
Generator Bus Load Breaker 3 Phase B Current					
Range 0-5 amps	27-CB3-B Term 123	0 amps	0 amps to 20 amps	0	00W
Scale 0-400 amps	5	5 amps	360 amps to 440 amps	409	00W
Generator Bus Load Breaker 3 Phase C Current					
Range 0-5 amps	27-CB3-C Term 123	0 amps	0 amps to 20 amps	.08	00W
Scale 0-400 amps	4.6	5 amps	360 amps to 440 amps	379	00W
Generator Bus Load Breaker 4 Phase A Current					
Range 0-5 amps	27-CB4-A Term 123	0 amps	0 amps to 20 amps	0.2	00W
Scale 0-400 amps	4.8	5 amps	360 amps to 440 amps	390	00W
Generator Bus Load Breaker 4 Phase B Current					
Range 0-5 amps	27-CB4-B Term 123	0 amps	0 amps to 20 amps	0	00W
Scale 0-400 amps	4.7	5 amps	360 amps to 440 amps	374	00W

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Transducer	Connection Point	Test Value	DCS Value	Actual DCS	Verified
Generator Bus Load Breaker 4 Phase C Current					
Range 0-5 amps	ET-CB4-C Term 133	0 amps	0 amps to 20 amps	0	00W
Scale 0-400 amps	4.5	5 amps	360 amps to 440 amps	360	00W
Generator Bus Voltage Phase A					
Range 0-150 volts	ET-EGS-A	0 volts	0 volts to 6 volts	0	00W
Scale 0-600 volts		120 volts	432 volts to 528 volts	467	00W
Generator Bus Voltage Phase B					
Range 0-150 volts	ET-EGS-B	0 volts	0 volts to 6 volts	.2	00W
Scale 0-600 volts		120 volts	432 volts to 528 volts	467	00W
Generator Bus Voltage Phase C					
Range 0-150 volts	ET-EGS-C	0 volts	0 volts to 6 volts	.8	00W
Scale 0-600 volts		120 volts	432 volts to 528 volts	469	00W

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Transducer	Connection Point	Test Value	DCS Value	Actual DCS	Verified
Panel NP-VF-1 Voltage					
Range 0-480 volts	N/A	0 volts	0 volts to 6 volts	.1	OK
Scale 0-480 volts		480 volts	432 volts to 512 volts	466.4	OK
Panel NP-VF-1 Frequency					
Range 55-65 Hertz	N/A	55 Hertz	52 Hertz to 57 Hertz	52.5	OK
Scale 55-65 Hertz		60 Hertz	58 Hertz to 62 Hertz	59.98	OK

2.10 Back-up Power Load Start Calls

2.10.1 Set-up

2-27-97 2.10.1 Verify 2721-Z switchgear load breaker 1 is OPEN, the breaker operator is disengaged and energy controls are installed.

2.10.1 Verify 2721-Z switchgear load breakers 2, 3 and 4 are OPEN, the breaker operators are engaged and no energy control is installed.

2.10.2 ATS-3 Start Call

2-27-97 2.10.2 Disconnect the normal ATS-3 position input (wire no. 1509) in CTBX-1.

2.10.2 Push the 1-2-3 sequence button on the Switchgear Master Section and verify the 1-2-3 sequence light comes on.

2.10.2 Install a jumper across the ATS-3-ES-1 and ATS-3-ES-2 contacts (start call) in CTBX-1.

2.10.2 Verify generator 1 starts and breaker closes.

2.10.2 Verify a DCS ATS3_EM alarm is received.

2.10.2 Verify the 2721-Z switchgear load breaker operator for CB2 moves to the CLOSE position.

2.10.2 Within about 2 minutes, verify a DCS ATS3_FL alarm is received.

2.10.2 Disconnect jumper across the ATS-3-ES-1 and ATS-3-ES-2 contacts in CTBX-1.

2.10.2 Verify the 2721-Z switchgear load breaker operator for CB2 moves to the OPEN position.

2.10.2 Verify Generator 1 breaker opens and generator goes into cool down.

2.10.2 Connect the normal ATS-3 position input (wire no. 1509) in CTBX-1.

2.10.3 ATS-4 Start Call

2.10.3 Disconnect the normal ATS-4 position input (wire no. 1511) in CTBX-1.

2.10.3 Push the 2-3-1 sequence button on the Switchgear Master Section and verify the 2-3-1 sequence light comes on.

- Install a jumper across the ATS-4-ES-1 and ATS-4-ES-2 contacts (start call) in CTBX-1.
- Verify generator 2 starts and breaker closes.
- Verify a DCS ATS4_EM alarm is received.
- Verify the 2721-Z switchgear load breaker operator for CB2 moves to the CLOSE position.
- Within about 2 minutes, verify a DCS ATS4_FL alarm is received.
- Disconnect jumper across the ATS-4-ES-1 and ATS-4-ES-2 contacts in CTBX-1.
- Verify the 2721-Z switchgear load breaker operator for CB2 moves to the OPEN position.
- Verify Generator 2 breaker opens and generator goes into cool down.
- Connect the normal ATS-4 position input (wire no. 1511) in CTBX-1.

 2.10.4 234-5Z Start Call

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- In Room 266 on Switchgear section 15, verify MANUAL-AUTO switch is in the MANUAL position.
- Verify no breaker is installed in F8X309 cubicle.
- Push the 3-1-2 sequence button on the Switchgear Master Section and verify the 3-1-2 sequence light comes on.
- Install a jumper across the 1616 and 34 contacts (start call) in switchgear master section.
- Verify generator 3 starts and breaker closes.
- Verify a DCS Z_EM alarm is received.
- Verify load breaker CB4 in the 2721-Z switchgear CLOSES.
- Within about 2 minutes, verify a DCS Z_FL alarm is received.
- Remove jumper across 1616 and 34 contacts (start call) in switchgear master section.
- Verify load breaker CB4 in 2721-Z switchgear OPENS.
- Verify Generator 3 breaker opens and generator goes into cool down.

2.10.5 2736-ZB Start Call

- 2.10.5 Verify the wiring for NP-VF-1-3 per ECN's C189-043, C189-046 and C189-038. (Note: Operation of NP-VF-1-3 (CB-3) cannot be checked due to the breaker providing power to 2736-ZB)
- 2.10.5 Inside the Switchgear Master section, turn the 2736-ZB Transfer Test Switch to the TEST position.
- 2.10.5 Verify generators 3 and 1 start and breakers close.
- 2.10.5 Verify a DCS ZB_EM alarm is received.
- 2.10.5 Verify on the DCS values table that the 2736-ZB Transfer Test input is on and NP-VF-1 Bus Voltage is zero or less.
- 2.10.5 Within about 2 minutes, verify a DCS ZB_FL alarm is received.
- 2.10.5 Return the 2736-ZB Transfer Test Switch on the Switchgear Master section to the OFF position.
- 2.10.5 Verify Generators 3 and 1 breakers opens and generators go into cool down.

2.10.6 2736-ZB Start Call

- 2.10.6 Disconnect the normal ATS-2 position input (wire no. 1507) in CTBX-1.
- 2.10.6 Install a jumper across the ATS-2-ES-1 and ATS-2-ES-2 contacts (start call) in CTBX-1.
- 2.10.6 Verify 3 generators start.
- 2.10.6 Verify a DCS ATS2_EM alarm is received.
- 2.10.6 Verify the 2721-Z switchgear load breaker operator for CB3 moves to the CLOSE position.
- 2.10.6 Within about 2 minutes, verify a DCS ATS2_FL alarm is received.
- 2.10.6 Disconnect jumper across the ATS-2-ES-1 and ATS-2-ES-2 contacts in CTBX-1.
- 2.10.6 Verify the 2721-Z switchgear load breaker operator for CB3 moves to the OPEN position.
- 2.10.6 Verify 3 Generator breakers open and generators go into cool down.

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ow Connect the normal ATS-2 position input (wire no. 1507) in
92-97 CTBX-1.

2

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ITEM	STEP	PAGE	DESCRIPTION	DISPOSITION

ITEM	STEP	PAGE	DESCRIPTION	DISPOSITION

4 Test Parties

All personnel involved in the performance of this test including the person-in-charge (PIC), data taker/recorder, verifier and witnesses shall fill out the data below:

PRINT NAME	SIGN NAME	INITIAL	POSITION	DATE
RD Keck	RD Keck	RPK	Test Director	8/21/97
AC Russell	AC Russell	AR	Electrician	8/21/97
SD Stewart	SD Stewart	SS	S.O.E.	8/21/97
GR Silvan	GR Silvan	RS	Test Director	8/21/97
DO Wallace	DO Wallace	DOW	Recorder	8-21-97
CM ICAYAN	CM ICAYAN	CI	WITNESS	8-21-97
BRUCE R LANG	BR Lang	BRL	ATP COORDINATOR	8-21-97
Ben Tabayevan	Ben Tabayevan	BT	PIC	8-21-97
W.E. Allen	W.E. Allen	WA	Power Ops, S.O.E	8-22-97
JEFF BAILEY	Jeff Bailey	JB	PNWL WITNESS	8-26-97
JAMES WOODCOCK	James Woodcock	JW	Continuing NW witness	8-26-97
JOHN FAULKNER	John Faulkner	JF	S.O.E.	8-26-97
Gary Hayden	Gary Hayden	GH	S.O.E.	8-27-97
JOEL Gibson	Joel Gibson	JG	Instruments	8-28-97

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5 TEST APPROVAL

Without
exceptions

☒

With exceptions
resolved

With exceptions
outstanding

R D Keck
PFP Electrical Cognizant Engineer

10-6-97

Date

[Signature]
MICON Cognizant Engineer

10/9/97

Date

[Signature]
Title III Inspector

10-2-97

Date

[Signature]
Project Engineer

10-13-97

Date

[Signature]
FDNW Lead Design Engineer

10-14-97

Date

DISTRIBUTION SHEET

To	From	Page 1 of 1
Information Resource Management	PFP Facilities Systems Engineering	Date 11/14/97
Project Title/Work Order	EDT No. 141073	
27-96-2749	ECN No.	

Name	MSIN	Text With All Attach.	Text Only	Attach./Appendix Only	EDT/ECN Only
Central Files	A3-88	X			
R.D. Keck	T4-20	X			
G.D. Anderson	T5-21	X			
B.R. Lang	T5-50	X			
B.T. Tabayoyon	T5-50	X			
G.R. Silvan	T4-20	X			
Project Files	R1-29	X			
FDNW CDC	S2-53	X			