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WP 04-ED1631

Revision 8

Underground Backup Power Distribution

Technical Procedure

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APPROVED FOR USE

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INTRODUCTION

The purpose of this procedure is to provide instructions for performing underground (U/G) backup power electrical distribution lineups at the Waste Isolation Pilot Plant (WIPP) when there is a loss of normal power without the availability of immediate return.

Records generated by the performance of this procedure are entries made in the Underground Facilities Operations Logbook.

REFERENCES

BASELINE DOCUMENTS

- Cutler Hammer FP 5000 (Feeder Protection Relay [FPR])
- WP 04-ED1341, Surface Backup Power Distribution
- Drawings 25-J-020-W1 through W6, WIPP SITE PRIMARY POWER DISTRIBUTION - ONE LINE REFERENCE SHEET
- Drawing 53-J-009-W, Underground HV & LV Power Cable Routing and Equipment Location
- Drawing 53-J-510-W1, Underground Utilities Substation 1, 53P-SBD04/5
- Drawing 53-J-511-W, Underground Utilities 480V Dist. Panels 53P-DP04/11, 53P-DP04/8, 53P-DP04/10 Single Line Diagram
- Plant Metering System (PMS)

REFERENCED DOCUMENTS

- WP 04-ED1621, Underground Electrical Distribution

PRECAUTIONS AND LIMITATIONS

- High voltage is present in switches and circuit breakers; caution should be used when positioning these devices.
- Load Interrupter Switches (LISs) **SHALL NOT** be operated from closed to open position with a connected load. Operation of LISs should be at zero (0) volts.
- Key interlocks **SHALL NOT** be bypassed or defeated. The key for these interlocks can be removed only from an open switch or breaker.
- Breaker and system interlocks **SHALL NOT** be relied upon for safe operation of site electrical systems.

- Protective relays limit operation as follows:

  - A CB that has a flag displayed **SHALL NOT** be closed.

  - Equipment being served by the tripped CB **SHALL NOT** be energized.

  - More than one attempt to reset an 86 (lockout) relay **SHALL NOT** be made.

  - Relay flags shall be reset only after maintenance has verified that the circuit and equipment being served from the circuit is not in a fault condition.

  - The 95 Ground Check relay may be reset only if the relay has opened due to a known undervoltage of the power distribution system. If the local CB has a flag displayed, the 95 Ground Check relay **SHALL NOT** be reset.

- The performance of this procedure requires coordination between Facility Operations personnel on the surface and in the underground. The Central Monitoring Room Operator (CMRO) will be the point of contact and will coordinate these activities.

- U/G switching station (SS) 1, SS 2, SS 4, SS 5, and SS 6, are 13.8kV switchgear that are equipped with safety intrusion switches and emergency stop (ES) pushbuttons. The upstream CBs will trip via 95 relay if a panel cover is removed, or an ES pushbutton is pressed.

- Plant substation (PS) CB-2 or CB-5 will trip if a corresponding switchgear panel is removed, or an ES pushbutton is pressed. Likewise, PS CB-2 and CB-5 **CANNOT** be closed if a corresponding switchgear panel is removed, or an ES pushbutton is pressed. All 13.8kV switchgear panel covers **SHALL** remain installed except during approved maintenance activities.

- Performance of this procedure directs the use of remote switches. These switches **SHALL** only be operated to the closed position one time.

- If preventive maintenance (PM) or corrective maintenance (CM) is being performed to any of the applicable switchgear during the performance of this procedure, the U/G Facility Engineer **SHALL** determine the option to be performed.

- U/G services must verify normal conditions at SS 1, SS 5, and SS 6 via the FPR before closing the circuit breakers.

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PREREQUISITE ACTIONS

1.0 Prior to resetting a Vacuum Circuit Breaker (VCB) due to an unknown outage, perform a walkdown of the circuit from the SS to the load.

2.0 VCBS shall be operated from the Control Panel or Remotely from the PMS. If VCB are required to be CLOSED from the local mechanism at the breaker contact the Cognizant Engineer (CE) prior to performing the task.

3.0 During a loss of power an ALARM and Other Trip Signal (general) may be present on the FPR the following should be performed:

3.1 To clear the Alarm push the reset button twice and use the down arrow to select ALARM, push the Enter button twice. This should clear the alarm signal.

3.2 To clear the Trip push the reset button twice and use the up and down arrow to select TRIP, push the Enter button twice. This should clear the trip signal. Push the RESET button to view the voltage/current screen.

3.3 If the alarm or trip signal does not clear contact U/G maintenance.

NOTE

During the remote operation of the CBs from the PMS system the following shall apply:

- One operator at the SS
- One operator at the PMS Monitor

PERFORMANCE

1.0 U/G LOAD REDUCTION

1.1 Open CBs at U/G SUB 1 53P-SBD04/5.

CB-15	CB-9

1.2 Open CBs at 53P-DP04/7.

CB-13	CB-14	CB-40	CB-35

1.3 Open CBs at 53P-DP03/6.

CB-3	CB-4	CB-10	CB-16

1.4 Open 53P-SW03/58 at Control Panel 309.

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1.5 Open CBs at 53P-DP04/10.

CB-3	CB-10	CB-14	CB-33
CB-39	CB-43	CB-46	CB-47

1.6 Open CBs at 53P-DP04/8.

CB-3	CB-4	CB-9	CB-26	CB-22
CB-31	CB-37	CB-38	CB-45	CB-46
CB-52	CB-53	CB-57	CB-58	CB-63
CB-64	CB-70	CB-76	CB-79	CB-87

1.7 Open CBs at 53P-MPC03/57.

CB-1	CB-5	CB-8

1.8 Notify CMRO that U/G load reduction is complete.

1.9 Perform one of the following subsections as directed by the CMRO.

2.0 SALT HANDLING SHAFT FEEDER

2.1 Perform the following at SS 1:

2.1.1 Verify the following CBs are open:

CB-1	CB-2	CB-3	CB-4

2.1.2 Verify SW-2 is open.

2.1.3 Verify SW-1 is closed.

2.1.4 Verify 53P-SW03/58 to Control Panel 309 is open.

2.2 Perform the following at SS 5:

2.2.1 Verify the following CBs are open.

CB-1	CB-2	CB-3

2.2.2 Verify SW-1 is closed.

2.2.3 Verify SW-2 is open.

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2.3 Perform the following at SS 6:

2.3.1 Verify the following CBs are open.

CB-1	CB-2	CB-3

2.3.2 Verify SW-1 is closed.

2.3.3 Verify SW-2 is open.

2.4 Notify CMRO to close CB-2 at Plant SUB.

2.5 When SH shaft feeder is energized, at SS 1 close CBs as required.

CB-1	CB-2	CB-3	CB-4

2.6 Verify essential loads are being fed from 53P-SBD04/5.

2.7 Close CBs at 53P-SBD04/5 as required.

Main CB	CB-1	CB-2	CB-5
CB-6	CB-8	CB-18	

2.8 Close 53P-SW03/58 at Control Panel 309.

2.9 Restore power to SS 5.

2.9.1 When SS 5 is energized, close CB-1.

2.10 Close CBs at SUB 5.

Main CB	CB-1	CB-2
CB-3	CB-4	CB-5

2.11 **IF** SUB 5 is down for maintenance,
use SUB 3 or alternate Portable Power Center (PPC).

CB-5 at SS 2 via SUB 3

2.12 Perform the following at SS 4, verify CB-1, CB-2, and CB-3 are open:

2.12.1 Open SW-2.

2.12.2 Close CB-1 at SS 4.

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2.12.3 Close CB-3 at SS 1.

2.12.4 Close CB-1 at SS 4.

2.13 Verify SW-2 is closed at SS 2.

2.13.1 Close CB-5 at SS 2.

2.13.2 Verify transfer switches in S-2520 are aligned as required.

2.13.3 Close CBs at SUB 3 or alternate PPC as required.

Main CB	CB-1	CB-2	CB-3	CB-4

2.14 Restore power at SS 6.

2.14.1 Close CB-1 at SS 6.

2.14.2 Close CBs at SUB 6 as required.

Main CB	CB-1	CB-2	CB-6

2.15 Reset bulkhead doors.

2.16 Notify CMRO that backup power is complete.

3.0 WASTE HANDLING SHAFT FEEDER

3.1 Perform the following at SS 4:

3.1.1 Verify SW-1 is open.

3.1.2 Verify SW-2 is closed.

3.2 Perform the following at SS 1:

3.2.1 Verify CBs are open.

3.2.2 Verify SW-1 is open.

3.2.3 Verify SW-2 is closed.

3.2.4 Verify switch 53P-SW03/58 to Control Panel 309 is open.

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3.3 Perform the following at SS 2:

3.3.1 Verify the CBs are open.

3.3.2 Verify SW-1 is open.

3.3.3 Verify SW-2 is closed.

3.4 Notify CMRO to close CB-5 at the Plant SUB.

3.5 When Waste Handling (WH) shaft feeder is energized, close the CBs at SS 4 as required.

CB-1	CB-2	CB-3

3.6 Perform the following at SS 2:

3.6.1 Verify the CBs are open:

CB-1	CB-2	CB-4	CB-5

3.6.2 Verify CB-3 is closed.

3.6.3 Close CB-1 at SS 2, close CBs as required.

3.7 Restore power at SS 1.

3.7.1 At SS 1 close the CBs as required.

CB-1	CB-2	CB-3	CB-4

3.7.2 Verify essential loads are being fed from 53P-SBD04/5.

3.7.3 Close CBs at 53P-SBD04/5 as required.

Main CB	CB-1	CB-2	CB-5
CB-6	CB-8	CB-18	

3.7.4 Close 53P-SW03/58 at Control Panel 309.

3.8 Restore power to SS 5.

3.8.1 When SS 5 is energized, close CB-1.

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3.9 Close CBs at SUB 5.

Main CB	CB-1	CB-2
CB-3	CB-4	CB-5

3.10 **IF** SUB 5 is down for maintenance,
THEN use alternate PPC supply:

SUB 3 via SS 2 CB-5

3.11 Close CB-5 at SS 2.

3.12 Verify transfer switches at S2520 are aligned as required.

3.13 Close CBs at SUB 3 or alternate PPC as required.

Main CB	CB-1	CB-2	CB-3	CB-4

3.14 Restore power at SS 6.

3.14.1 When SS 6 is energized, close CB-1.

3.15 Close CBs at SUB 6 as required.

CB Main	CB-1	CB-2	CB-6

3.16 Reset bulkhead doors.

3.17 Notify CMRO that backup power alignment is complete.

4.0 U/G SHAFT FEEDERS ARE AVAILABLE

4.1 Perform the following at SS 1:

4.1.1 Verify the CBs are OPEN at SS 1.

CB-1	CB-2	CB-3

4.1.2 Verify SW-2 is open.

4.1.3 Verify SW-1 is closed.

4.1.4 Verify 53P-SW03/58 at Control Panel 309 is open.

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4.2 Perform the following at SS 5:

4.2.1 Verify the CBs are open at SS 5.

4.2.2 Verify SW-2 is open.

4.2.3 Verify SW-1 is closed.

4.3 Perform the following at SS 6:

4.3.1 Verify the CBs are open at SS 6.

4.3.2 Verify SW-2 is open.

4.3.3 Verify SW-1 is closed.

4.4 Notify CMRO to close CB-2 at the Plant SUB, when SH shaft feeder is energized.

4.5 At SS 1, close CBs as required.

4.6 Close CBs at 53P-SBD04/5 as required.

Main CB	CB-1	CB-2	CB-5
CB-6	CB-8	CB-18	

4.7 Perform the following at SS 5:

4.7.1 At SS 5, close CBs as required.

4.8 At SUB 5, close CBs as required.

4.9 **IF** SUB 5 is down for maintenance,
THEN use alternate PPC supply:

SUB 3 or any PPC via SS 2 CB-5

4.10 At SS 6 close CBs as required.

4.11 At SUB 6 close CBs as required.

4.12 Perform the following at SS 4:

4.12.1 Verify CBs are open.

4.12.2 Verify SW-1 is open and SW-2 is closed.

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4.13 Notify CMRO to close Plant SUB CB-5 at the Plant SUB.

4.14 Close CBs at SS 4 as required.

4.15 Verify SW-2 at SS 2 is closed.

4.15.1 Close CBs at SS 2 as required.

4.16 Reset bulkhead doors.

4.17 Notify CMRO that backup power is complete.