

WP 05-WH1732

Revision 0

RH Training Canister and Shield Plug Retrieval Using Distributed Controls

Technical Procedure

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APPROVED FOR USE

CONTINUOUS USE PROCEDURE

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INTRODUCTION ^{1,2}

This procedure describes how to place the Facility Cask (FC) onto the emplacement machine and retrieve a training waste package canister and shield plug from a horizontal borehole.

REFERENCES

BASELINE DOCUMENTS

- DOE Standard 1090-2007, *Hoisting and Rigging*
- WTSD-TME-044, *Horizontal Emplacement and Retrieval Equipment (HERE) Operation and Maintenance Manual*

REFERENCED DOCUMENTS

- WP 05-WH1602, 41-Ton Diesel Forklift 52-H-005A
- WP 05-WH1700, Horizontal Emplacement and Retrieval Equipment Assembly
- WP 05-WH1711, 6-Ton Toyota Forklift 52-H-007C
- WP 05-WH1730, Horizontal Emplacement and Retrieval Equipment Assembly Using Distributed Controls
- WP 05-WH4401, Waste Handling Operator Event Response
- WP 12-HP2001, Abnormal Radiological Conditions
- WP 12-HP4000, Emergency Radiological Control Responses
- EA04IM1000-1-0, WIPP Form

EQUIPMENT

- 6-ton forklift
- 41-ton forklift
- HERE
- Portable air compressor

PRECAUTIONS AND LIMITATIONS

- Only personnel qualified as a Remote-Handled (RH) Underground (U/G) Waste Handling Technician (WHT)/WHE or trainees operating under the direct supervision of a qualified RH U/G WHT/WHE are authorized to perform the waste handling activities specified in this procedure.
- While extending or retracting the Staging Platform (SP) or the Transfer Carriage (TC), the operators must be alert to prevent personnel from being caught between the moving parts.
- If the Control Console (CC) will be left unattended with the CC POWER switch turned **ON**, **ENSURE** the M-CB actuator on front of Motor Control Center (MCC) must be **OFF**. Performing this will eliminate control power to H.E.R.E. controls and multiple re-boots of CC.
- During emplacement, if hydraulic pressure on the digital display for the Transfer Mechanism (TM) exceeds 500 pounds per square inch (psi), operation must be stopped and WHE contacted.
- During retrieval, if hydraulic pressure on the digital display for the TM exceeds 2,200 psi, operation must be stopped and WHE contacted.
- Spotters, using standard forklift hand signals, are required to assist the forklift drivers in maneuvering the FC and Shield Plug Carriage (SPC) into place.
- Abnormal events that require cessation of this procedure, such as a radiological event, are to be performed in accordance with WP 05-WH4401 and WP 12-HP4000.
- If procedure cannot be performed as written or in sequence, WHE shall be contacted.
- TM position and hydraulic pressure are indicated on the CC on digital displays.
- The Alignment Fixture Assembly (AFA) and the TC locking mechanisms switches must be held for approximately 15 seconds to ensure full rotation of all locking mechanisms.
- A minimum of three RH personnel are required during the performance of this procedure.
- A spotter is required when operating the 41-ton forklift loaded with a FC.
- A spotter is required when operating the 6-ton forklift, 20-ton forklift, or the 41-ton forklift within 75 ft of the contact handled (CH) disposal array face.

- Electrical equipment associated with the HERE must be at least 10 ft from the CH waste array face, or a fire watch must be posted.
- WH may switch between screens, as needed.
- WP 08-NT3001 shall be used if waste handling (WH) activities are suspended or interrupted. Site Environmental Compliance (SEC) must be notified if suspension or interruption will exceed 72 hours.
- Personnel must stay in the vicinity of CC during emplacement and must approach the machine only as necessary to place the FC or the SPC on the Waste Transfer Machine Assembly (WTMA).
- Spotters are required to assist the forklift drivers in maneuvering the FC and SPC into place using standard forklift hand signals.
- At any time during the emplacement process, the HERE may be leveled if an unlevel indication is present on the Tilt Status Array.
- Waste may be transferred to the U/G via the Waste Shaft only.
- Abnormal and/or Emergency events that require the cessation of this procedure, such as a radiological event, shall be performed in accordance with WP 05-WH4401, WP 12-HP4000, and WP 12-HP2001, as applicable.
- Loaded and unloaded shipment transportation must be coordinated with CH WHE.
- If the canister to be loaded into the FC exceeds 3,220 lb, hoisting supervisor must be notified for work bonnet removal prior to loading the FC containing RH waste onto the waste hoist conveyance.
- Mechanical means may be used to assist in the opening and closing of the FC lock pins, if necessary.
- Equipment weight:
 - Facility Cask 67,389 lb
 - Facility Cask Transfer Car 9,400 lb
 - Waste Hoist Work Bonnet 10,000 lb
- If the WH process cannot be completed in its entirety, the WHE shall determine where and when to start and stop the process during the shift, and where to stop the process for the end of shift.

- When the Facility Cask Transfer Car (FCTC) is not over the telescoping port shield, or being operated, the Facility Cask Rotating Device (FCRD) gates shall be closed or the open hole covered.
- No RH waste shall be moved to a location outside the designated disposal path.
- A spotter is required when operating the 41-ton forklift or 6-ton forklift when moving waste or vision is impaired.
- A spotter is required when operating the 41-ton forklift or 6-ton forklift within 75 ft of the CH disposal array face.
- A spotter is required when operating any diesel equipment within 75 ft of the HERE/FC aligned on a borehole.
- RH WH personnel will be responsible for determining if a WIPP Form (EA04IM1000-1-0) is required to be generated for documentation purposes or the tracking and closure of an off-normal event.
- Personnel operating the HERE must drain the compressor used for FC valve operation prior to leaving the U/G.
- Safety glasses, long-sleeve 100% cotton shirt, voltage gloves, and leather gloves must be worn when opening and closing breakers.

PREREQUISITE ACTIONS

1.0 WHE, verify the following:

- WTMA preoperational checks per WP 05-WH1730 are complete.
- Preoperational checks are completed on the 41-ton forklift per WP 05-WH1602.
- Preoperational checks are completed on the 6-ton forklift per WP 05-WH1711.

2.0 WH, verify the following:

- Fire Suppression System control module system status lights are functioning properly.
- No trouble lights are illuminated on the equipment.
- The automatic/manual Fire Suppression System has not discharged.

PERFORMANCE

1.0 WTMA EMPLACEMENT SETUP

- 1.1 **IF** the WTMA is still set up from a training emplacement, **THEN GO TO** Section 8.0.

2.0 INSTALLMENT OF FC

CAUTION

The FC is designed to go on the SP in one direction only. The cask rotation trunnions are on the Rear Shield Valve (RSV) end and will be on the side away from the face of the borehole when oriented properly. Additionally, the shield valve housings have different chamfers to assure proper orientation. Failure to orient the cask correctly may result in damage to the cask mounting blocks on the SP.

The weight of the FC is sufficient to change the alignment of the WTMA and AFA if it is misaligned as it is set down.

- 2.1 Install FC by performing the following:

- 2.1.1 Ensure shield collar and bore hole are properly aligned.
- 2.1.2 Install the FC on SP.

3.0 FC CONNECTION TO SP

- 3.1 Connect FC to SP by performing the following:

- 3.1.1 Ensure Site Power and MCC are **OFF**.
- 3.1.2 Ensure the following:
- Install Cable Harnesses 5 and 6 between SP and FC.

NOTE

Valve SV301 supplies the Front Shield Valve (FSV) and valve SV302 supplies the RSV.

- Hook up air supply to regulator.

4.0 INITIAL CC SETTINGS

- 4.1 Ensure Site Power is **ON**.

- 4.2 Set up CC by performing the following:
 - 4.2.1 Turn POWER KEY on CC to **ON**.
 - 4.2.2 Place Main Circuit Breaker on front of MCC to **ON**.
 - 4.3 Once boot-up has been performed, Startup screen will appear. Press LEVEL button to view level screen.
 - 4.4 Perform the following, if tilt status array lights are not all green:
 - 4.4.1 Ensure MODE SELECT Switch #1 button is in ASSAY/DISASSAY and ASSAY/DISASSAY light is **ON**.
 - 4.4.2 Push TC PUMP button to **ON**.
 - 4.4.3 Push AFA PUMP button to **ON**.
 - 4.4.4 Ensure all other buttons are **OFF**.
 - 4.5 Operate leveling jack buttons and SHOW LEVEL button, as necessary, to obtain level indication (green lights only) on TILT STATUS ARRAYS.
 - 4.6 Ensure visually that AFA and TC locking mechanisms are in UNLOCKED position.
 - 4.7 Push TC PUMP button to **OFF**.
 - 4.8 Push AFA PUMP button to **OFF**.
- 5.0 FC TO AFA EXTENSION

WARNING

When extending SP or TC on HERE, operators must be alert to prevent personnel from being caught between moving parts.

- 5.1 Push EMPLACE CANISTER button to view emplacement screen.
- 5.2 Push STAGING PLATFORM button to EXTEND.
- 5.3 Ensure SP is moving forward (toward borehole).
- 5.4 When TRAVEL LIMIT INTERLOCK light flashes, push STAGING PLATFORM button to **OFF**.
- 5.5 Ensure front of FC is against shield collar.

- 5.6 Push AFA PUMP button to **ON**.
- 5.7 Push ALIGNMENT FIXTURE button to LOCK, hold for approximately 15 seconds, then release.
 - 5.7.1 Push AFA PUMP to **OFF**.
- 5.8 Push RETRIEVE button to view retrieve screen.
 - 5.8.1 Push MODE SELECT Switch #1 button to OPERATE.
 - 5.8.2 Push MODE SELECT Switch #2 button to RETRIEVE.
- 6.0 TC RETRACTION
 - 6.1 Retract TC by performing the following:
 - 6.1.1 Push TRANSFER CARRIAGE button to RETRACT.
 - 6.1.2 Verify TC is moving away from the AFA.
 - 6.1.3 When TC automatically stops, release the TRANSFER CARRIAGE button.
 - 6.1.4 Push MODE SELECT Switch #1 button to ASSAY/DISASSY.
 - 6.1.5 Push TRANSFER CARRIAGE button to LOCK, hold for approximately 15 seconds and release.
 - 6.1.6 Push MODE SELECT Switch #1 button to OPERATE.
- 7.0 SPC INSTALLMENT
 - 7.1 Install SPC by performing the following:
 - 7.1.1 Install the SPC on the SP.
 - 7.1.2 Remove 6-ton forklift.
 - 7.2 Push TRANSFER CARRIAGE button to EXTEND.
 - 7.3 When TC is against SPC, push TRANSFER CARRIAGE button to **OFF**.
 - 7.4 Push TC PUMP button to **OFF**.
 - 7.5 Install the four TC to SP clamps.

8.0 RETRIEVAL OF SHIELD PLUG

8.1 Retrieve shield plug by performing the following:

8.1.1 Push CASK RSV button to OPEN.

8.1.2 When CASK RSV OPEN light starts flashing, push the CASK RSV button to **OFF**.

8.1.3 Push TC PUMP button to **ON**.

NOTE

The TM will be automatically stopped by the CASK VALVE IMPROPER POSITION interlock light with the grapple in the FC (130 to 145 inches).

8.1.4 Push TRANSFER MECHANISM control joystick to EXTEND.

8.1.5 Verify TRANSFER MECHANISM POSITION display is increasing.

8.1.6 Hold TRANSFER MECHANISM control joystick to EXTEND until CASK VALVE IMPROPER POSITION interlock light flashes and the TM automatically stops.

8.1.7 Return TRANSFER MECHANISM control joystick to neutral.

8.1.8 Push CASK FSV button to OPEN.

8.1.9 When CASK FSV OPEN light starts flashing, push the CASK FSV button to **OFF**.

NOTE

The TM should be automatically stopped by the TRAVEL LIMIT (256 to 267 inches).

8.1.10 Push TRANSFER MECHANISM control joystick to EXTEND.

8.1.11 Verify TRANSFER MECHANISM POSITION display is increasing.

8.1.12 Hold TRANSFER MECHANISM control joystick to EXTEND until the TRAVEL LIMIT interlock indication and PINTLE DETECT interlock light flashes and the TM automatically stops.

8.1.13 Return TRANSFER MECHANISM control joystick to neutral.

8.1.14 Verify PINTLE DETECT interlock light stops flashing and remains **ON**.

- 8.1.15 Push GRAPPLE button to CLOSE.
- 8.1.16 When GRAPPLE CLOSED light starts flashing, return the GRAPPLE button to **OFF**.
- 8.1.17 Verify GRAPPLE ON light is **OFF**.
- 8.1.18 Verify GRAPPLE CLOSED light is **ON**.

NOTE

The TM will be automatically stopped with the grapple inside the FC (130 to 145 inches).

- 8.1.19 Push TRANSFER MECHANISM control joystick to RETRACT, and verify TRANSFER MECHANISM POSITION display is decreasing.
- 8.1.20 Hold TRANSFER MECHANISM control joystick to RETRACT until the TRAVEL LIMIT interlock light flashes and the TM automatically stops.
- 8.1.21 Return TRANSFER MECHANISM control joystick to neutral.
- 8.1.22 Push CASK FSV button in the CLOSED.
- 8.1.23 When CASK FSV CLOSED light starts flashing, push the CASK FSV button to **OFF**.
- 8.1.24 Verify the CLOSED light stops flashing and remains **ON**.
- 8.1.25 Verify the LOCKPINS CLOSED light is **ON**.

NOTE

The TM should be automatically stopped by the TRAVEL LIMIT interlock with the grapple in the TC (-1.0 to 1.0 inch).

- 8.1.26 Push the TRANSFER MECHANISM control joystick to RETRACT, and verify TRANSFER MECHANISM POSITION display is decreasing.
- 8.1.27 Hold TRANSFER MECHANISM control joystick to RETRACT until the TRAVEL LIMIT interlock light flashes and the TM automatically stops.
- 8.1.28 Return TRANSFER MECHANISM control joystick to neutral.
- 8.1.29 Push GRAPPLE button to OPEN.

- 8.1.30 When GRAPPLE OPEN light starts flashing, push GRAPPLE button to **OFF**.
- 8.1.31 Verify GRAPPLE ON light is **OFF**.
- 8.1.32 Verify GRAPPLE OPEN light is **ON**.
- 8.1.33 Push TRANSFER MECHANISM control joystick to EXTEND and center the shield plug on the Shield Plug Carriage.
- 8.1.34 Push TRANSFER MECHANISM control to RETRACT until the TRAVEL LIMIT interlock light flashes and the TM automatically stops.
- 8.1.35 Push CASK RSV button to CLOSE.
- 8.1.36 When CASK RSV CLOSED light starts flashing, push the CASK RSV button to **OFF**.
- 8.1.37 Verify CASK RSV CLOSED light stops flashing and remains **ON**.
- 8.1.38 Verify LOCKPINS CLOSED light is **ON**.
- 8.2 Retract TC by performing the following:
 - 8.2.1 Ensure the locking mechanisms on the TC are locked.
 - 8.2.2 Push TC PUMP button to **OFF**.
 - 8.2.3 Remove TC to SP clamps.
 - 8.2.4 Push TC PUMP button to **ON**.
 - 8.2.5 Push TRANSFER CARRIAGE button to RETRACT.
 - 8.2.6 Verify TC is moving away from the AFA.
 - 8.2.7 When TC automatically stops, release the TRANSFER CARRIAGE button.
 - 8.2.8 Push TC PUMP button to **OFF**

9.0 SPC REMOVAL

9.1 Remove SPC (with Shield Plug) by performing the following:

- 9.1.1 With 6-ton forklift, slowly lift SPC straight up over the rails and back the forklift out.
- 9.1.2 Transport SPC to the shield plug storage area.

10.0 RETRIEVAL OF CANISTER

10.1 Extend TC to the FC by performing the following:

- 10.1.1 Push MODE SELECT Switch #1 button to ASSAY/DISASSY.
- 10.1.2 Push TC PUMP button to **ON**.
- 10.1.3 Push TRANSFER FIXTURE button to UNLOCK; hold for at approximately 15 seconds and release.
- 10.1.4 Visually verify TRANSFER CARRIAGE locking mechanisms are unlocked.
- 10.1.5 Push MODE SELECT Switch #1 button to OPERATE.
- 10.1.6 Push TRANSFER CARRIAGE button to EXTEND.
- 10.1.7 Verify TC is moving forward (towards the FC).
- 10.1.8 When TC stops moving and the TRAVEL LIMIT interlock light starts flashing, push the TRANSFER CARRIAGE button to **OFF**.
- 10.1.9 Ensure TC is against the rear end of the FC.
- 10.1.10 Push MODE SELECT Switch #1 button to ASSAY/DISASSY.
- 10.1.11 Push TRANSFER FIXTURE button to LOCK, hold for approximately 15 seconds and release.
- 10.1.12 Push MODE SELECT Switch #1 button to OPERATE.
- 10.1.13 Push CASK RSV button to OPEN.
- 10.1.14 When CASK RSV OPEN light starts flashing, push the CASK RSV button to **OFF**.

NOTE

The TM should be automatically stopped by the CASK VALVE IMPROPER POSITION interlock light with the grapple inside the FC (130 to 145 inches).

- 10.1.15 Push TRANSFER MECHANISM control joystick to EXTEND.
- 10.1.16 Verify TRANSFER MECHANISM POSITION display is increasing.
- 10.1.17 Hold TRANSFER MECHANISM control joystick to EXTEND until CASK VALVE IMPROPER POSITION interlock flashes and the TM automatically stops.
- 10.1.18 Return TRANSFER MECHANISM control joystick to neutral.
- 10.1.19 Push CASK FSV button to OPEN.
- 10.1.20 When CASK FSV OPEN light starts flashing, push the CASK FSV button to **OFF**.

NOTE

The TM should be automatically stopped by the TRAVEL LIMIT with the TM reading 269 to 275 inches.

- 10.1.21 Push TRANSFER MECHANISM control joystick to EXTEND.
- 10.1.22 Verify TRANSFER MECHANISM POSITION display is increasing.
- 10.1.23 Hold TRANSFER MECHANISM control joystick to EXTEND until the TRAVEL LIMIT interlock light starts flashing and the TM automatically stops.
- 10.1.24 Return TRANSFER MECHANISM control joystick to neutral.
- 10.1.25 Verify PINTLE DETECT light is **ON**.
- 10.1.26 Push GRAPPLE button to CLOSE.
- 10.1.27 When GRAPPLE CLOSED light starts flashing, push the GRAPPLE button to **OFF**.
- 10.1.28 Verify GRAPPLE ON light is **OFF**.
- 10.1.29 Verify GRAPPLE CLOSED light is **ON**.

NOTE

The TM should be automatically stopped by the CASK VALVE IMPROPER POSITION interlock with the grapple inside the FC (12.5 to 14.5 inches).

- 10.2 Push TRANSFER MECHANISM control joystick to RETRACT, and verify TRANSFER MECHANISM POSITION display is decreasing.
- 10.3 Hold TRANSFER MECHANISM control joystick to RETRACT until the CASK VALVE IMPROPER POSITION light starts flashing and the TM automatically stops.
- 10.4 Return TRANSFER MECHANISM control joystick to neutral.

NOTE

During the time the FSV is closing, the TRANSFER MECHANISM IMPROPER POSITION interlock light will flash. This is expected and does not affect operation.

- 10.5 Push CASK FSV to CLOSED.
- 10.6 When CASK FSV CLOSED light starts flashing, push the CASK FSV button to **OFF**.
- 10.7 Verify CASK FSV CLOSED light stops flashing and remains **ON**.
- 10.8 Verify LOCKPINS CLOSED light is **ON**.
- 10.9 Push GRAPPLE button to OPEN.
- 10.10 When GRAPPLE OPEN light starts flashing, push the GRAPPLE button to **OFF**.
- 10.11 Verify GRAPPLE ON light is **OFF**.
- 10.12 Verify GRAPPLE OPEN light is **ON**.

CAUTION

Movement of the TRANSFER MECHANISM control joystick should be done slowly since this operation will push the waste package against the FC FSV and could cause damage to equipment.

- 10.13 Push TRANSFER MECHANISM control joystick to EXTEND until the display is between 19.0 and 20.0 inches, then release the TM to the center position.

NOTE

The TM should be automatically stopped by the TRAVEL LIMIT interlock with the Grapple inside the TC (-1.0 to 1.0 inch).

- 10.14 Push TRANSFER MECHANISM control joystick to RETRACT, and verify TRANSFER MECHANISM POSITION display is decreasing.
- 10.15 Hold TRANSFER MECHANISM control joystick to RETRACT until TRAVEL LIMIT interlock light starts flashing and the TM automatically stops.
- 10.16 Return TRANSFER MECHANISM control joystick to neutral.
- 10.17 Push CASK RSV button to CLOSE.
- 10.18 When CASK RSV CLOSED light starts flashing, push the CASK RSV button to **OFF**.
- 10.19 Verify CASK RSV CLOSED light stops flashing and remains **ON**.
- 10.20 Verify the LOCKPINS CLOSED light IS **ON**.
- 10.21 Push MODE SELECT Switch #1 button to ASSAY/DISASSY.
- 10.22 Push TRANSFER FIXTURE button to UNLOCK; hold for approximately 15 seconds and release.
- 10.23 Push MODE SELECT Switch #1 button to OPERATE.

CAUTION

The TC should not extend more than 36 inches beyond the end of the SP so that when the SP is retracted for FC removal, the TC will not contact the wall of the emplacement room or equipment could be damaged.

11.0 RETRACT THE TC

- 11.1 Retract TC by performing the following:
 - 11.1.1 Push TRANSFER CARRIAGE button to RETRACT.
 - 11.1.2 Verify Transfer Carriage ON light is **ON**.
- 11.2 When TC is about halfway between its travel limits, push the TRANSFER CARRIAGE button to **OFF**.

11.3 Push TC PUMP button to **OFF**.

12.0 SHIFT CC TO DISASSEMBLY MODE

12.1 Push MODE SELECT Switch #1 button to ASSY/DISASSY.

12.2 Push MODE SELECT Switch #2 button to **OFF**.

13.0 RETRACT SP

13.1 Retract the SP by performing the following:

13.1.1 Push AFA PUMP button to **ON**.

13.1.2 Push ALIGNMENT FIXTURE ASSEMBLY LOCKING MECHANISM button to UNLOCK; hold for approximately 15 seconds and release.

13.1.3 Push AFA PUMP button to **OFF**.

13.1.4 Push STAGING PLATFORM button to RETRACT and hold.

13.1.5 Verify SP is moving away from the AFA.

13.1.6 When RETRACT LIMIT light comes on and the SP automatically stops, push the STAGING PLATFORM button to **OFF**.

14.0 DISCONNECT FC AIR SUPPLY

14.1 Disconnect main air supply to SP.

14.2 Disconnect the two quick-disconnect hoses between SP and the FC.

- Place the hoses on the storage rack.
- Replace the dust caps on the connectors.

15.0 DISCONNECT FC CABLES

15.1 Turn power key on the CC to **OFF**.

15.2 Rotate the M-CB activator on the outside of the Main Control Center to **OFF**.

15.3 Disconnect both ends of cable harnesses 5 and 6 between the SP and FC.

- Coil and hang the cables on the storage rack.
- Close the connection covers on the FC and LP and replace the cable connector covers.

16.0 REMOVE THE FC

16.1 Lift FC with the 41-ton forklift.

16.2 Return FC to the FCTC at the waste hoist underground station.

16.3 Ensure the FC is oriented properly on the FCTC.