

WP 05-WH1730

Revision 0

Horizontal Emplacement and Retrieval Equipment Assembly Using Distributed Controls

Technical Procedure

EFFECTIVE DATE: 01/26/10

Craig Suggs
APPROVED FOR USE

CONTINUOUS USE PROCEDURE

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INTRODUCTION ^{1,2}

This procedure provides the instructions for setting up the remote-handled (RH) transuranic (TRU) waste canister Horizontal Emplacement and Retrieval Equipment (HERE) in preparation for canister emplacement in a horizontal borehole using distributed controls.

This procedure meets the **Surveillance Requirements (SR) 4.1.2.1** and **4.1.2.3** of **Limiting Conditions for Operations (LCO) 3.1.2**.

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules.

- Equipment Logbook

REFERENCES

BASELINE DOCUMENTS

- Title 40 *Code of Federal Regulations* (CFR) §264.15, "General Inspection Requirements"
- DOE Standard 1090-2007, *Hoisting and Rigging*
- DOE/WIPP-07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*
- DOE/WIPP-07-3373, *Waste Isolation Pilot Plant Technical Safety Requirements*
- WTSD - TME - 044 *Horizontal Emplacement and Retrieval Equipment Operation and Maintenance Manual*

REFERENCED DOCUMENTS

- WP 04-AD3001, Facility Mode Compliance
- WP 04-IM1000, Issues Management Processing of WIPP Forms
- EA04IM1000-1-0, WIPP Form
- WP 05-WH1601, 20-Ton Diesel Forklift 52-H-125
- WP 05-WH1602, 41-Ton Diesel Forklift 52-H-005A

EQUIPMENT

The following equipment is required to be on hand prior to setup of the HERE:

- Waste Transfer Machine Assembly (WTMA)
- Alignment Fixture Assembly (AFA)
- Control Console (CC)
- 41-Ton Diesel Forklift
- 20-Ton Diesel Forklift

PRECAUTIONS AND LIMITATIONS

The Technical Safety Requirements (TSRs) contain LCOs and Specific Administrative Controls (SACs) which provide specific preventative or mitigative limits and required actions for identified accident scenarios. Failure to comply with LCOs or SACs may constitute a violation and must be immediately reported to the Facility Shift Manager (FSM). The step affected by the LCO/SAC is followed by the LCO/SAC number in bold brackets (e.g. [**LCO 3.X.X**]). Applicable LCO/SAC Surveillance Data Sheets SHALL be completed as required by WP 04-AD3001.

- Only personnel qualified as an RH Waste Handling Technician/Engineer (WHT/WHE), or trainees operating under the direct supervision of a qualified RH WHT/WHE, are authorized to perform the RH Waste Handling (WH) activities specified in this procedure.
- The size, weight, and powered operation of the HERE dictate that special care be taken to prevent injury to personnel during its setup and operation.
- Spotters, using standard forklift hand signals, are required to assist the forklift drivers in maneuvering the AFA and WTMA into place.
- Preoperational checks are to be completed prior to the start of an RH Waste evolution.
- If the Control Console (CC) will be left unattended with the CC POWER switch turned **ON**, **ENSURE** the Main Circuit Breaker (M-CB) actuator on front of Motor Control Center (MCC) is **OFF**. Performing this will eliminate control power to HERE controls and multiple re-boots of CC.
- If this procedure cannot be performed as written or in sequence, WHE shall be contacted.
- Transfer Mechanism (TM) position and hydraulic pump pressure are indicated on digital display meters on the CC.

- Safety glasses, long-sleeve 100% cotton shirt, voltage gloves, and leather gloves must be worn when opening and closing breakers.
- Electrical equipment associated with the HERE or the borehole machine must be at least 10 ft from the CH waste array face or a fire watch is posted.³
- Operating the RH 41-ton, 20-ton, or 6-ton waste handling forklifts within 75 ft of the CH disposal waste array face requires a spotter.
- Operating any diesel-powered equipment within 75 ft of the HERE/Facility Cask aligned on a borehole requires a spotter.
- Readjustment of the AFA jacks (1, 2, or 3) and the WTMA jack (4) or the Show Level button may be adjusted as necessary to maintain level (GREEN light only) indications on TILT STATUS ARRAYS.

PREREQUISITE ACTIONS

- 1.0 Ensure all required equipment is at the emplacement site.
- 2.0 Waste Handling, ensure all preoperational checks have been completed on the following:
 - 20-ton forklift (52-H-125) per WP 05-WH1601
 - 41-ton forklift (52-H-005A) per WP 05-WH1602
- 3.0 If a required inspection becomes delinquent, perform the following:
 - 3.1 Immediately notify Site Environmental Compliance (SEC) of the delinquent inspection.
 - 3.2 Schedule and complete the required inspection.
 - 3.3 Document the following in a letter to SEC within five working days:
 - Schedule of inspection
 - Reason(s) why the inspection was not performed
 - Any measures taken to offset negative impacts resulting from not performing the inspection
 - Actions to prevent further delinquencies
 - 3.4 WH, **GO TO** WP 04-IM1000 and determine if a WIPP Form (EA04IM1000-1-0) is required.

- 4.0 Review Equipment Logbook for outstanding deficiencies and Action Requests (ARs).
- 5.0 WHE, review Equipment Logbook on a weekly basis, generally the last day of the work week.

PERFORMANCE

1.0 AFA SETUP

NOTE

The forks should not extend more than 4 in. beyond the back of the AFA base plate to avoid contacting the rib before the AFA is in place.

- 1.1 Ensure the following conditions have been met, prior to installing the AFA.
 - 1.1.1 Using the borehole insert, ensure the diameter of the borehole is within tolerance to receive the waste package.
 - [A] **IF** borehole is out of tolerance,
THEN move to the next borehole.
 - [B] **IF** the borehole is **NOT** a minimum depth of 17 ft,
THEN move to the next borehole.
 - 1.1.2 Using the transfer mechanism insert, ensure that the insert will engage into the borehole to a minimum depth of 80 in.
 - [A] **IF** the insert will **NOT** engage to the required depth,
THEN move to the next borehole.
 - 1.1.3 **IF** standing water is present in borehole,
THEN remove the standing water with absorbent and/or shop vac,
OR move to next borehole.
 - 1.2 Engage the forklift pockets on the AFA with the 20-ton forklift until the forklift is supporting the weight of the AFA.
 - 1.3 Move the AFA toward the borehole until the shield collar is positioned properly per direction from the spotter.
- ### 2.0 AFA POWER CONNECTION
- 2.1 Transport the CC to an area no less than 20 ft from the AFA along the same rib as the emplacement borehole.

WARNING

Proper Personal Protective Equipment (PPE), including long-sleeve 100% cotton shirt, voltage gloves, and leather gloves, must be worn when operating power supply breaker or disconnect to prevent injury.

NOTE

The power jacks nearest to the side selected for the CC should be used.

- 2.2 Ensure the site power breaker is in the **OFF** position.
- 2.3 Perform the following:
 - Install the 480V site power cable to the connector on the AFA motor control center (MCC).
 - Ensure the power cable is connected to the site power supply outlet.
 - Ensure cable harnesses 1 and Z between mating connectors on the AFA MCC or the auxiliary enclosure and the CC are installed.
- 2.4 Place the site power supply breaker in the **ON** position.

CAUTION

To prevent damage to equipment, the boot-up time must be approximately 5 minutes.

3.0 CONTROL CENTER POWER

- 3.1 Turn the Power key on the CC to **ON**.
- 3.2 Verify H.E.R.E. STARTUP screen appears.
- 3.3 Place the M-CB actuator on front of MCC to **ON**.
- 3.4 Push Level button to view Level Screen.
- 3.5 On Level Screen, verify that power plug is mated for AFA Power Check on bottom left of screen.
- 3.6 Verify all indicating lights come **ON**.

4.0 AFA HYDRAULIC SYSTEM

4.1 Verify the following:

- Fire Suppression System control module system status lights are functioning properly. **[LCO 3.1.2]**
- No trouble lights are illuminated on the equipment. **[LCO 3.1.2]**
- The automatic/manual fire suppression system has not discharged. **[LCO 3.1.2]**

4.2 Verify the fluid level is appropriate on the sight gauge on AFA hydraulic reservoir.

4.3 Visually inspect the hydraulic system for leaks.

4.4 Push AFA pump button to **ON**.

4.5 Verify the hydraulic filter is in the green zone.

4.6 Inspect for leaks on the system.

4.7 Complete the **Surveillance Data Sheet**, EA04AD3001-SR11, for **LCO 3.1.2**, **SR 4.1.2.1** and **4.1.2.3**, as found in WP 04-AD3001.

4.8 Forward the completed Surveillance Data Sheet(s) and all associated documentation to the FSM for review and approval.

NOTE

The AFA is supported on the floor by three jacks. Jack 1 is on the rear left side (as seen facing the borehole); Jack 2 is in the front center; and Jack 3 is on the rear right side. Side-to-side leveling is accomplished by the coordinated operation of Jacks 1 and 3 in opposite directions.

Front-to-back leveling is obtained by operating Jack 2 in one direction and Jacks 1 and 3 together in the opposite direction. The overall height above the floor is controlled by operating all three jacks in the same direction by approximately the same amount.

5.0 AFA JACKS

5.1 Push MODE SELECT Switch # 1 Button to ASSY/DISASSY.

5.2 Push appropriate jack control buttons to UP to lower the jack foot pads until the jacks have taken the weight.

5.3 Remove the 20-ton forklift from the AFA.

- 5.4 Use Jacks 1, 2, and 3 and the 20-ton forklift, as necessary, to align the inside diameter of the shield collar with the borehole.

6.0 LEVELING AND ALIGNING THE AFA

- 6.1 If needed, Operate the Jacks 1, 2, and 3, and adjust Show Level button as necessary, to obtain a GREEN light only indication on TILT SENSOR ARRAY 1.
- 6.2 Push AFA PUMP Button to **OFF**.
- 6.3 Push the MODE SELECT Switch # 1 Button to **OFF**.
- 6.4 If needed, turn power key on the CC to **OFF**.

WARNING

Proper PPE , including long-sleeve 100% cotton shirt, voltage gloves, and leather gloves, must be worn when operating power supply breaker or disconnect to prevent injury.

- 6.5 Place the M-CB on MCC panel to **OFF**.
- 6.6 Place the site power breaker to OFF.
- ## 7.0 MOUNTING WTMA ON THE AFA
- 7.1 Clean the AFA base plate of all salt or debris where the WTMA rests on the AFA.
- 7.2 If needed, disconnect the 480V site power cable from the connector on the AFA MCC.
- 7.3 Using the 20-ton or 41-ton forklift, install the WTMA on the AFA.

CAUTION

To prevent damage to equipment, cable number 12 must be placed in a safe configuration when disassembling and assembling WTMA and during Emplacement operations.

- 7.4 Ensure the following are performed:
- Install cable 15 from MCC on AFA to the process development unit (PDU) on WTMA.
 - If needed, install the 480V site power cable to the connector on the AFA MCC.

WARNING

Proper PPE, including long-sleeve 100% cotton shirt, voltage gloves, and leather gloves must be worn when operating power supply breaker or disconnect to prevent injury.

- 7.5 Place the site power breaker to the **ON** position.
- 7.6 If needed, turn the power key on the CC to **ON**.
- 7.7 Verify H.E.R.E. STARTUP screen appears.
- 7.8 Place the M-CB actuator on the MCC to **ON**.
- 7.9 Push Level button to view Level Screen.
- 7.10 On Level Screen, verify that power plug is mated for AFA Power Check and WTMA Power Check.
- 7.11 Verify all indicating lights come **ON**.
- 7.12 Push MODE SELECT Switch # 1 Button to ASSY/DISASSY.
- 7.13 Push AFA pump button to **ON**.
- 7.14 If needed, readjust the AFA Jacks (1, 2, or 3), or Show Level button as necessary, to maintain level (GREEN light only) indications on TILT STATUS ARRAY 1.
- 7.15 Turn the AFA pump button **OFF**.

8.0 HYDRAULIC SYSTEM (TRANSFER CARRIAGE)

- 8.1 Verify the fluid level is appropriate on the site gauge on the Transfer Carriage (TC) hydraulic reservoir.
- 8.2 Visually inspect the hydraulic system for leaks.
- 8.3 Push the TC PUMP button to **ON**.
- 8.4 Verify the hydraulic filter is in the green zone.
- 8.5 Inspect system for leaks.

9.0 LEVELING PLATFORM ALIGNMENT

- 9.1 Push Jack 4 control button to lower the jack foot pad until the jack has taken the weight of the rear end of the WTMA from the forklift.
- 9.2 Remove the 20-ton or 41-ton forklift from the WTMA.
- 9.3 Push the AFA PUMP button to **ON**.
- 9.4 Adjust jacks and Show Level button to obtain a single GREEN light indication on TILT SENSOR ARRAYS 1, 2, and 3.
- 9.5 Push the AFA PUMP button to **OFF**.
- 9.6 Push the TC PUMP button to **OFF**.
- 9.7 Push MODE SELECT Switch #1 Button to **OFF**.

10.0 STAGING PLATFORM AND TC

CAUTION

Failure to perform the following steps could result in damage to the staging platform (SP) or TC drive mechanisms.

- 10.1 Perform the following:
 - Remove the bolts from the Leveling Platform (LP) to SP transportation hold down plates.
 - Move the plates on the LP out approximately 1/4-in. and tighten bottom bolts to secure plates.

- Remove the TC to SP attachment clamps.
- Remove all dirt from the SP and LP linear bearing rails.

10.2 Push Emplace Canister button to view emplacement screen.

11.0 EXTENSION OF TC

11.1 Push MODE SELECT Switch #1 Button to OPERATE.

11.2 Push MODE SELECT Switch # 2 Button to EMLACE.

11.3 Push the TC PUMP button to **ON**.

CAUTION

TC should not be extended more than approximately 4 in. from the end of the rails or the bearings may be damaged.

11.4 Push the TC button to EXTEND and verify the TC is moving towards the AFA.

11.5 **WHEN** the TC is approximately within 4 in. on the end of the linear bearing rails,
THEN push the TC button to **OFF**.

11.6 Push the TC PUMP button to the **OFF** position.

NOTE

Since the facility cask has not been installed yet, the controller has interlocked out the operation of the TC and SP drive mechanisms. This requires the use of the administratively controlled override (ACO) key switch. This key switch does not override the RETRACT LIMIT stop function on the SP drive mechanism.

12.0 EXTENSION OF THE SP

12.1 Obtain the ACO key.

12.2 Insert the key in the ACO switch and turn the key **ON** to obtain RED ACO on bottom left and right of screen.

12.3 Push and hold the SP control button to the EXTEND and verify the SP is moving towards the AFA.

- 12.4 **WHEN** the EXTEND LIMIT light starts flashing, and the SP automatically stops,
 THEN push the SP button to **OFF**.
- 12.5 Verify the EXTEND LIMIT light stops flashing and remains **ON**.
- 13.0 TC RETRACTION
- 13.1 Push the TC PUMP button **ON**.
- 13.2 Push the TC button to RETRACT and verify the TC is moving away from the AFA.
- 13.3 **WHEN** the TC automatically stops at its travel limit,
 THEN push the TC button to **OFF**.
- 14.0 TC CENTERING
- 14.1 Push the TC button to EXTEND.
- 14.2 Verify the TC is moving towards the AFA.
- 14.3 **WHEN** the rear end of the TC is approximately even with the end of the SP,
 THEN push the TC button to **OFF**.
- 14.4 Verify the TC has stopped moving.
- 14.5 Push the TC PUMP button to **OFF**.
- 15.0 STAGING PLATFORM RETRACTION
- 15.1 Push the SP control button to RETRACT and verify the SP is moving away from the AFA.
- 15.2 **WHEN** the RETRACT LIMIT light starts flashing and the SP automatically stops,
 THEN push the SP button to **OFF**.
- 15.3 Verify the RETRACT LIMIT light stops flashing and remains **ON**.

16.0 OPERATION OF TRANSFER MECHANISM

CAUTION

Stop the travel of the TM before the grapple wheels reach the front end of the TC to prevent damage to the TM.

- 16.1 Push the TC PUMP button to **ON**.
 - 16.2 Push the TRANSFER MECHANISM control joystick slowly toward the EXTEND.
 - 16.3 Verify the TM is moving forward out of the TC.
 - 16.4 Verify an increase in TRANSFER MECHANISM POSITION display reading on the CC.
 - 16.5 Move the TRANSFER MECHANISM control joystick slowly toward the RETRACT.
 - 16.6 Verify the TM stops and starts moving back into the TC.
 - 16.7 Verify a decrease in the TRANSFER MECHANISM POSITION display reading.
 - 16.8 **WHEN** the TM travel has stopped, **THEN** push the TRANSFER MECHANISM control joystick to the neutral position.
 - 16.9 Verify the TRANSFER MECHANISM POSITION display has returned to -1.0 to 1.0 inch.
 - 16.10 Push the TC PUMP button to **OFF**.
- ## 17.0 OPERATION OF THE GRAPPLE
- 17.1 Ensure the ACO key is **ON**.
 - 17.2 Push the GRAPPLE control button to CLOSE.
 - 17.3 Verify the GRAPPLE ON light is **ON**.
 - 17.4 Verify the grapple jaws move together and stop.
 - 17.5 Verify the GRAPPLE ON light is **OFF**.
 - 17.6 Verify the GRAPPLE CLOSED light is flashing.

- 17.7 Push the GRAPPLE control button to **OFF**.
- 17.8 Verify the GRAPPLE CLOSED light stops flashing and remains **ON**.
- 17.9 Push the GRAPPLE control button to OPEN.
- 17.10 Verify the GRAPPLE ON light comes **ON**.
- 17.11 Verify the grapple jaws move apart and stop.
- 17.12 Verify the GRAPPLE ON light goes **OFF**.
- 17.13 Verify the GRAPPLE OPEN light is flashing.
- 17.14 Push the GRAPPLE control button to **OFF**.
- 17.15 Verify the GRAPPLE OPEN light stops flashing and remains **ON**.
- 17.16 Turn the ACO key to **OFF**.
- 17.17 Remove the key.

18.0 OPERATION OF AIR SUPPLY SOLENOID VALVES

NOTE

If the air supply is not connected and the facility cask is not in place, the operation of the air supply solenoid valves can only be checked by sound and feel.

- 18.1 Push the CASK FRONT SHIELD VALVE (FSV) control button to OPEN.
- 18.2 Ensure SV301 is energized.
- 18.3 Push the CASK FSV control button to **OFF**.
- 18.4 Push the CASK REAR SHIELD VALVE (RSV) control button to OPEN.
- 18.5 Ensure SV302 is energized.
- 18.6 Push the CASK RSV control button to **OFF**.

19.0 OPERATION OF THE AFA AND TC LOCKING MECHANISM

- 19.1 Push the MODE SELECT Switch #1 Button to ASSAY/DISASSAY position.
- 19.2 Push the MODE SELECT Switch #2 Button to the **OFF POSITION**.

- 19.3 Push AFA pump button to **ON**.
- 19.4 Push the ALIGNMENT FIXTURE button to LOCK.
- 19.5 Visually verify locking mechanisms rotate to the LOCK position.
- 19.6 Push the ALIGNMENT FIXTURE button to UNLOCK.
- 19.7 Visually verify locking mechanisms rotate to the UNLOCK position.
- 19.8 Push AFA pump button to **OFF**.
- 19.9 Push the TC PUMP button to **ON**.
- 19.10 Push the TRANSFER CARRIAGE locking mechanisms button to LOCK.
- 19.11 Visually verify locking mechanisms rotate to the LOCK position.
- 19.12 Push the TRANSFER CARRIAGE locking mechanisms button to UNLOCK.
- 19.13 Visually verify locking mechanisms rotate to the UNLOCK position.
- 19.14 Push the TC PUMP button to **OFF**.
- 19.15 Initiate ARs to address any deficiencies that **CANNOT** be corrected by waste handling operations.
- 19.16 WH, perform the following:
 - Notify the WHE of any deficiencies discovered during the preoperational checks (e.g., deficiencies corrected, ARs generated).
 - Notify WHE and report status of preoperational checks.

20.0 EQUIPMENT LOGBOOK

- 20.1 Record the following in the Equipment Logbook:
 - "N/A" in the equipment run hours
 - Equipment number
 - Deficiencies noted
 - Addition of fluids and amount added

- Corrective action taken (outstanding/newly generated ARs, etc.)
- Time, date, and signature in the Equipment Logbook to document performance of the preoperational checks.

21.0 SECURE EQUIPMENT POWER

21.1 Push all buttons on CC to **OFF**.

21.2 Turn key power switch to **OFF**.