

WP 05-WH1015

Revision 13

Preparation of CH Packaging for Empty Shipment

Technical Procedure

EFFECTIVE DATE: 04/29/05

Randy Britain
APPROVED FOR USE

CONTINUOUS USE PROCEDURE

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INTRODUCTION ^{1, 2, 3}

This procedure provides instructions for performing an inspection of a TRUPACT-II/ HalfPACT and components, and instructions for assembling an empty TRUPACT-II/ HalfPACT for shipment.

The following quality record is generated by this procedure:

Attachment 1 - Empty CH Packaging Data Sheet

REFERENCES

BASELINE DOCUMENTS

- 29 CFR §1910.146, "Permit-Required Confined Spaces"
- 30 CFR §57.5015, "Oxygen Deficiency"
- 49 CFR §173.428, "Empty Class 7 (Radioactive) Materials Packaging"
- | ● NRC-Docket 71-9218, *TRUPACT-II Certificate of Compliance*
- NRC-Docket 71-9218, *TRUPACT-II Safety Analysis Report*
- | ● NRC-Docket 71-9279, *HalfPACT Certificate of Compliance*
- | ● NRC-Docket 71-9279, *HalfPACT Safety Analysis Report*
- DOE/WIPP 02-3183, *CH Packaging Program Guidance*
- Multi-Gas Monitor Instruction Manual
- Sampling Pump Instruction Manual
- CH-TRAMPAC, *Contact-Handled Transuranic Waste Authorized Methods for Payload Control*

REFERENCED DOCUMENT

- DOE/WIPP 02-3184, *CH Packaging Operations Manual*
- WP 12-HP1100, Radiological Surveys

EQUIPMENT

- Calibrated torque wrenches
 - 10-80 ft-lb or equivalent
 - 0-200 in-lb or equivalent
- Wet/dry vacuum approved for use inside the Controlled Area (CA)
- Denatured alcohol
- Vacuum grease or equivalent as approved by TRUPACT Maintenance Engineer (TPME)
- Nickel Never-Seize or equivalent as approved by TPME
- Clean rags
- Suitable blower
- Multi-Gas Monitor
- Sampling Pump

PRECAUTIONS AND LIMITATIONS

- Only personnel qualified as Waste Handling Technician/Engineer (WHT/WHE), or trainees operating under the direct supervision of a qualified WHT/WHE, are authorized to perform waste handling activities specified in this procedure.
- When applying vacuum grease to threads of plugs and covers, and their associated O-rings, the term "light coat" should be understood as no more than necessary to give the O-rings a glossy appearance or the threads a dull appearance.
- When applying nickel bearing lubricant to the threads of access covers, bolts, and/or access parts, the term "light coat" should be understood as no more than necessary to give the threads a dull appearance.
- TRUPACT-II/HalfPACT components may not be interchanged with components of other TRUPACT-II/HalfPACTs.
- Failure to rotate the counterweights on the Adjustable Center of Gravity Lift Fixture (ACGLF) to the balance position may cause the ACGLF to swing uncontrollably, resulting in equipment damage or personnel injury.

- Radiological Control must verify items to be inspected are below contamination limits as required per WP 12-HP1100, Attachment 1, before the inspection can be performed.
- WHE is to be notified of any abnormal conditions found during inspections.
- If during the inspection of TRUPACT-II/HalfPACT and associated components a discrepancy is found, or an item is questionable and additional guidance/resolution is needed, contact the TPME.
- Quality Assurance (QA) is to be notified if abnormal conditions are noted during inspections.
- The Inner Containment Vessel (ICV) or Outer Containment Vessel (OCV) Locking Rings are not to be rotated with mechanical force.
- CH Packaging identified as "Out of Service" **MUST** be tagged as such with an Equipment Inactivation Tag, QA Hold Tag, or equivalent.
- The Transportation Group **MUST** be notified of any packages identified as "Out of Service."
- If High Wattage Waste was shipped in the TRUPACT-II, it is backfilled with inert gas, and the ICV body must be verified to have > 20% oxygen level prior to entry. Additionally, there is the potential for explosive gas to be present.
- If package was used for radioactive shipment, activity on smears of upper and lower areas of payload must be verified below acceptable limits as required per WP 12-HP1100, Attachment 1, prior to entry into the ICV body.
- The second set of OCV upper and lower main O-rings shall be installed during Step 5.9, unless directed otherwise by TPME.
- The second set of ICV upper and lower main O-rings shall be installed during Step 7.8, unless directed otherwise by TPME.
- Step 10.18 can be performed at any time during the performance of this procedure.

PERFORMANCE

1.0 PACKAGING OPERATIONAL CHECKS AND EXAMINATIONS

- 1.1 Waste Handling (WH), record Outer Containment Assembly (OCA) serial number on Attachment 1.

SIGN-OFF - WH

- 1.2 WH, record torque wrench serial numbers and calibration due dates on Attachment 1.

SIGN-OFF - WH

- 1.3 WH, verify packaging maintenance is current and label is in good condition by checking maintenance labels adjacent to name plate and initial on Attachment 1.

SIGN-OFF - WH

- 1.4 Radiological Control Technician (RCT), record survey number and survey date on Attachment 1.

SIGN-OFF - RCT

- 1.5 RCT, **IF** surveys for items in Steps 2.1, 3.1, or 4.1, have been completed previously, **AND** results are below contamination limits, **THEN** enter applicable data for each step on Attachment 1.
- 1.6 RCT, **IF** surveys have **NOT** been completed previously, **THEN GO TO** Section 2.0, 3.0, or 4.0 as applicable.

NOTE

Sections 2.0 through 8.0 (and included steps) must be completed, but may be performed in any order as long as radiological control steps are not bypassed.

2.0 OCA LID INSPECTION AND CLEANING

NOTE

Sign-off on Step 2.1 indicates activity on smears on OCV lid interior, ICV lid exterior, RAF assembly quick connect and RAF is below acceptable limits. (Reference WP 05-WH1011, Step 2.4.24, and "note" above this step).

WH may perform steps in Sections 5.0 and 7.0 necessary to inspect and clean hardware associated with both ICV and OCA lids at any time following this sign-off.

2.1 RCT, **IF** survey has not been completed previously, **THEN** survey OCV lid interior and exterior and record applicable data on Attachment 1.

SIGN-OFF - RCT

NOTE

OCA vent port plug o-ring and ICV outer vent port plug o-ring may be inspected, cleaned and re-lubricated along with its associated parts from Sections 5.0 and 7.0.

2.2 WH, inspect OCA lid for the following:

- Visible deformation
- Dents or abnormal flat spots > 1/2 inch
- Abnormal scratches or gouges
- Obvious punctures, tears, or cracks in exposed welds
- Plastic burn-out plugs (3) in place and intact
- Fiberglass lift pocket tubes in place
- Distortions or cracks on or around lifting attachments
- Lid lift pocket covers attached and serviceable
- OCV locking Z-flange screws in place and torque paint unbroken; or, if no torque paint, screws torqued to 22 lb-in.

- Guide plates and screws in place and screws torqued to 21 lb-in.; or verify no looseness in plate and screws recessed
- Seal surfaces for scratches/gouges perpendicular to machining marks

2.3 Remove foreign material from the following:

- Lock Ring Flange
- Sealing Surfaces
- Test Port Access Threads

2.4 Verify arrow above seal test port aligns with UNLOCKED arrow on lock ring.

2.5 Initial Attachment 1 to document OCA lid components and hardware satisfactory.

SIGN-OFF - WH

3.0 ICV LID INSPECTION AND CLEANING

NOTE

O-rings are considered clean when they are absent of free-standing vacuum grease, dirt, debris, and other foreign matter.

3.1 RCT, **IF** survey has not been completed previously, **THEN** survey ICV lid interior and exterior and record applicable data on Attachment 1.

SIGN-OFF - RCT

3.2 WH, inspect ICV lid for the following:

- Visible deformation
- No punctures
- Abnormal scratches or gouges
- Distortions on or around lifting attachments
- Upper spacer and screws installed and torque paint unbroken; or, if no torque paint, screws torqued to 10 lb-in.
- Foam debris seal installed and undamaged
- Lock Ring undamaged
- Damaged or missing screws from wiper O-ring holder
- Seal surfaces for scratches/gouges perpendicular to machining marks.

- 3.3 Remove foreign material from the following:
 - Lock Ring Flange
 - Debris Seal
 - Sealing Surfaces
- 3.4 Remove ICV wiper O-ring.
- 3.5 Clean ICV wiper O-ring and inspect for wear or damage that could impair its function.
- 3.6 **IF** O-ring is damaged,
THEN GO TO corresponding work instruction (WI), and
RETURN TO Step 3.9.
- 3.7 Lubricate wiper O-ring with a light coat of vacuum grease.
- 3.8 Install wiper O-ring.
- 3.9 Initial Attachment 1 to document ICV lid components and hardware are satisfactory.

SIGN-OFF - WH

<p style="text-align: center;">NOTE</p> <p>Sections 4.0 and 6.0 may be performed concurrently.</p>

4.0 OCA BODY INSPECTION AND CLEANING

- 4.1 RCT, **IF** survey has **NOT** been previously completed,
THEN survey OCA body exterior and ICV body interior and record applicable data on Attachment 1.

SIGN-OFF - RCT

- 4.2 WH, remove upper and lower main O-rings and set aside for cleaning and inspection.
- 4.3 WH, inspect OCA body for the following:
 - Visible deformation
 - Obvious punctures or tears
 - Obvious cracks in exposed welds
 - Dents or abnormal flat spots > ½ inch
 - Abnormal scratches or gouges
 - Plastic burn-out plugs (6) in place and undamaged
 - Forklift pocket inserts (8) intact and threads undamaged
 - Lock Ring threaded inserts (6) intact and threads undamaged
 - Tears or fraying > ¼ inch on the ceramic fiber gasket
 - Lock Ring stop(s) undamaged

- Upper and lower O-ring grooves and seal surfaces for scratches/gouges perpendicular to machining marks.

4.4 Remove any foreign material from the following:

- Test Port and threads
- Vent Port and threads
- Lock Ring Flange
- Sealing surfaces
- O-ring grooves

4.5 Initial Attachment 1 to document OCA body inspection is satisfactory.

SIGN-OFF - WH

5.0 OCA COMPONENTS INSPECTION AND CLEANING

NOTE

O-rings are considered clean when they are absent of free standing vacuum grease, dirt, debris, and other foreign matter.

NOTE

OCA components and hardware may have been previously inspected and cleaned after Step 2.1.

NOTE

OCA vent port plug o-ring may be inspected, cleaned and re-lubricated along with its associated parts.

5.1 Clean and inspect the following for wear or damage that could impair their function:

- OCV vent port cover and O-rings
- OCA vent port access plug
- OCV vent port plug and handling O-ring
- OCA test port access plug
- OCV test port plug and O-ring
- Lock ring bolts (6)

5.2 **IF** components are damaged,
THEN GO TO corresponding WI, and **RETURN TO** Step 5.4.

5.3 Apply a light coat of vacuum grease to the following:

- OCV vent port plug threads
- OCV vent port cover threads and sealing O-ring
- OCV test port plug threads and O-ring

- 5.4 Verify annulus debris shield is installed and undamaged.
- 5.5 Apply a light coat of nickel bearing lubricant to the following:
 - OCA lock ring bolt threads (6)
 - OCA test port access plug threads
 - OCA vent port access plug threads
- 5.6 Clean upper and lower main O-rings and vent port plug seal O-ring, and inspect for damage that could impair containment integrity.
- 5.7 **IF** O-rings are damaged,
THEN GO TO corresponding WI, and **RETURN TO** Step 5.9.
- 5.8 Lubricate upper and lower main O-rings and vent port plug seal O-ring with a light coat of vacuum grease.
- 5.9 Install upper and lower main O-rings and vent port plug seal O-ring.
- 5.10 Verify upper and lower main O-rings are properly installed.
- 5.11 Initial Attachment 1 to document OCA component and hardware inspections are satisfactory.

SIGN-OFF - WH

6.0 ICV BODY INSPECTION AND CLEANING

- 6.1 **IF** ICV body was backfilled with inert gas on the previous shipment,
THEN perform the following:
 - 6.1.1 WHE, record and verify Oxygen Monitor S/N and calibration due date on Attachment 1.

SIGN-OFF - WHE or N/A

- 6.1.2 WHE, verify on Attachment 1, Oxygen Monitor daily calibration and sample pump operational check is complete.

SIGN-OFF - WHE or N/A

- 6.1.3 WHE, measure the ICV body oxygen concentration.
 - 6.1.4 **IF** the ICV body oxygen concentration is 20% or less,
THEN ventilate as necessary using a suitable blower.

6.1.5 WHE, verify on Attachment 1, the ICV body is ventilated to > 20% oxygen, if necessary.

SIGN-OFF - WHE or N/A

6.2 Remove upper and lower main O-rings and set aside for cleaning and inspection.

6.3 Inspect ICV body for the following:

- Lock ring stop(s) undamaged
- Lock ring threaded inserts (3) installed and threads undamaged

6.4 Remove foreign material from the following:

- Test port threads
- Vent port threads
- O-ring grooves
- Filter ports
- Sealing surfaces
- Lock ring flange

6.5 Inspect the following for deformation, scratches, or burrs:

- Upper and lower O-ring grooves and seal surfaces for scratches/gouges perpendicular to machining marks
- Vent port threads
- Seal test port threads
- Lock ring flange
- Lower spacer installed with no punctures in top plate
- Lower spacer screws installed and no detectable gap between screw head and spacer top plate

6.6 Initial Attachment 1 to document ICV inspection is satisfactory.

SIGN-OFF - WH

7.0 ICV COMPONENTS INSPECTION AND CLEANING

NOTE

O-rings are considered clean when they are absent of free-standing vacuum grease, dirt, debris, and other foreign matter.

NOTE

ICV components and hardware may have been previously inspected and cleaned after Step 2.1.

- 7.1 Clean and inspect the following for wear or damage that could impair their function:
- ICV vent port cover and seal
 - ICV vent port outer plug
 - ICV vent port inner plug and O-ring
 - ICV seal test port plug and O-ring
 - ICV lock ring bolts (3)
- 7.2 **IF** components are damaged,
THEN GO TO corresponding WI, and **RETURN TO** Step 7.4.
- 7.3 Apply a light coat of vacuum grease to the following:
- ICV vent port cover threads (and O-ring if installed)
 - ICV outer vent port plug threads
 - ICV inner vent port plug threads and O-ring
 - ICV seal test port plug threads and O-ring
- 7.4 Apply a light coat of nickel-bearing lubricant to threads of ICV lock ring bolts (3).
- 7.5 Clean and inspect upper and lower main O-rings and ICV vent port outer plug O-ring for damage that could impair containment integrity.
- 7.6 **IF** O-rings are damaged,
THEN GO TO corresponding WI, and **RETURN TO** Step 7.9.
- 7.7 Lubricate upper and lower main O-rings and ICV vent port outer plug O-ring with a light coat of vacuum grease.
- 7.8 Install upper and lower main O-rings and ICV vent port outer plug O-ring.
- 7.9 Verify upper and lower main O-rings are properly installed.
- 7.10 Initial Attachment 1 to document ICV components and hardware inspections are satisfactory.

SIGN-OFF - WH

8.0 ICV CAVITY INSPECTION

8.1 Check ICV cavity for water by visually inspecting the absorbant material inserted into hole in lower spacer assembly.

NOTE

Disposal of absorbent material and water will be at the direction of the RCT with WHE concurrence.

8.2 **IF** water is inside ICV,
THEN notify WHE and remove water as follows:

- Remove water through center hole of lower spacer assembly using approved wet/dry vacuum.
- Attach absorbent material to a rod and insert in hole in center of lower spacer assembly.

8.3 **IF** water is found in ICV,
THEN GO TO Subsection 3.1 of DOE/WIPP 02-3184, perform steps, and **RETURN TO** Step 8.4.

8.4 Initial Attachment 1 to document ICV cavity is free of water.

SIGN-OFF - WH

8.5 Verify all preshipment inspections are complete and initial Attachment 1.

SIGN-OFF - WH

9.0 ICV LID INSTALLATION

NOTE

If items are loaded into the ICV, the ACGLF may be used with the long or short legs.

NOTE

If the ACGLF with short legs is used to load items into the ICV, a separate technician shall guide the cables into and out of the ICV to prevent damage to the lower seal flange.

9.1 Equipment Installation

9.1.1 If applicable, load pallets, guide tubes, and other items into ICV.

9.1.2 If installing payload pallets, perform the following:

- Visually inspect pallets for obvious damage.
- Ensure lifting pins are tight and do not rotate.
- Ensure all accessible components are in place and correctly installed.
- Ensure laminate is not lifted, separated, or torn.
- Document pallet ID numbers (if installed) on Attachment 1.

SIGN-OFF - WH

9.1.3 If installing Standard Waste Box (SWB) dunnage, perform the following:

- Visually inspect SWB ratchet straps for current inspection date and good working condition.
- Ratchet straps will either be inspected prior to re-use or inspected ones will be obtained.
- Document ratchet straps ID numbers on Attachment 1.
- Verify the bumper pads are on the top rib of the upper SWB and on the bottom rib of the lower SWB.
- Ensure appropriate rigging is returned to each generator site (i.e., INEEL rigging to INEEL)

SIGN-OFF - WH

9.1.4 After installation of straps verify the following:

- Inspection tag and/or cable are not caught between the SWB ratchet strap clip and SWB lift clip.
- A minimum of three wraps of nylon webbing around the mandrel (visual indication is no free tail).
- The handle is in the upright locked position, ensure both locking latches are fully down in the ratchet teeth.
- Verify webbing is in tension.

SIGN-OFF - WH

9.1.5 Record packaging contents in Remarks section of Attachment 1.

CAUTION

Failure to remove tools/hardware prior to lid installation may damage packaging.

9.2 Match ICV lid and body serial numbers.

9.3 Record ICV serial number on Attachment 1.

SIGN-OFF - WH

CAUTION

Operator shall verify two ACGLF counterweights are at 180 degrees and 000 degrees (± 2 degrees) **BEFORE** lifting ACGLF or lid.

9.4 Attach ACGLF to ICV lid.

9.5 Align UNLOCKED arrows and install ICV lid onto ICV body using crane and ACGLF.

9.6 Install ICV vent port tool into ICV vent port.

9.7 Connect Vacuum Line to ICV vent port tool.

9.8 Start Vacuum Pump and evacuate to 3 to 15-in. Hg vacuum gauge.

9.9 Rotate ICV lock ring to LOCKED position.

9.10 Stop vacuum pump.

9.11 Disconnect vacuum line from vent port tool.

9.12 Remove ICV vent port tool.

9.13 Let ICV vent to atmosphere.

9.14 Install and torque the following components:

- ICV inner vent port plug; torque to 55-65 in-lb.
- ICV seal test port plug; torque to 55 to 65 in-lb.
- OCV seal test port plug; torque to 55 to 65 in-lb.
- ICV lock ring bolts (3); torque to 28-32 ft-lb.

- 9.15 Install ICV outer vent port plug; torque to 55 to 65 in-lb.
- 9.16 Install ICV vent port cover; torque to 55 to 65 in-lb.
- 9.17 Initial on Attachment 1 that ICV hardware and OCV seal test port plug are torqued within designated range.

SIGN-OFF - WH

10.0 OCA LID INSTALLATION

- 10.1 Match OCA lid and body serial numbers.
- 10.2 Record OCA serial number on Attachment 1.

SIGN-OFF - WH

CAUTION

Operator shall verify two ACGLF counterweights are at 180 degrees and 000 degrees (± 2 degrees) **BEFORE** lifting ACGLF or lid.

- 10.3 Attach ACGLF to OCA lid.
- 10.4 Align UNLOCKED arrows and install OCA lid onto OCA body.
- 10.5 Install OCV vent port tool into OCV vent port.
- 10.6 Connect Vacuum Line to OCV vent port tool.
- 10.7 Start Vacuum Pump and evacuate to 3 to 15-in. Hg vacuum gauge.
- 10.8 Rotate OCV lock ring to LOCKED position.
- 10.9 Stop vacuum pump.
- 10.10 Disconnect vacuum line from vent port tool.
- 10.11 Remove OCV vent port tool.
- 10.12 Let OCV vent to atmosphere.
- 10.13 Install OCV vent port plug; torque to 55 to 65 in-lb.
- 10.14 Install OCV vent port cover; torque to 55 to 65 in-lb.

10.15 Install the following:

- OCA test port thermal plug and access plug; torque access plug to 35 to 45 ft-lb.
- OCA vent port thermal plug and access plug; torque access plug to 35 to 45 ft-lb.
- OCA lock ring bolts (6); torque to 28-32 ft-lb.
- OCA lid lift pocket covers.

10.16 Initial on Attachment 1 that OCV/OCA hardware is torqued within designated range.

SIGN-OFF - WH

10.17 Verify preshipment preparations complete and unit is ready for transport, and initial Attachment 1.

SIGN-OFF - WH

10.18 Performers of procedure, enter printed name, signature, date, and initials on Attachment 1.

11.0 REVIEW

11.1 WHE, perform the following:

- Review Attachment 1 for completeness and sign Review/Validation block.
- Hand-carry or fax a copy of Attachment 1 to Transportation Engineer for Traveler Folder.
- Forward Attachment 1 to Records Coordinator.

Attachment 1 - Empty CH Packaging Data Sheet

STEP	DESCRIPTION	INITIAL
1.1	OCA Serial Number:_____	WH
1.2	Torque Wrench S/N:_____ Due Date:_____ Torque Wrench S/N:_____ Due Date:_____	WH
1.3	Maintenance Labels are present and maintenance current	WH
1.4	Survey No.:_____ Date:_____	RCT
2.1	Activity on smears of OCA lid interior, ICV lid exterior, RAF assembly quick connect and RAF below acceptable limits.	RCT
2.5	OCA Lid components and hardware satisfactory	WH
3.1	Activity on ICV lid contamination smears within acceptable limits	RCT
3.9	ICV lid components (and hardware, if not previously performed) satisfactory	WH
4.1	Activity on ICV interior and OCA exterior smears within acceptable limits	RCT
4.5	OCA body inspection satisfactory	WH
5.11	OCA components and hardware satisfactory	WH
6.1.1	Oxygen Monitor S/N:_____ Due Date:_____	WHE or N/A
6.1.2	Oxygen Monitor daily calibration verified and sample pump operational check completed	WHE or N/A
6.1.5	ICV Body ventilated to > 20% oxygen, if necessary	WHE or N/A
6.6	ICV inspection satisfactory	WH
7.10	ICV components and hardware satisfactory	WH
8.4	ICV Cavity free of water	WH
8.5	Preshipment inspections complete	WH
9.1.2	Pallet ID numbers:_____	WH or N/A
9.1.3	Ratchet Straps ID numbers:_____	WH or N/A
9.1.4	Ratchet Straps verification	WH or N/A
9.3	ICV Serial Number:_____	WH
9.17	ICV hardware torqued within designated range	WH
10.2	OCA Serial Number:_____	WH
10.16	OCV/OCA hardware torqued within designated range	WH
10.17	Preshipment preparations complete and unit ready for transport	WH

Performers enter printed name, signature, date, and initials:

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
Printed Name	Signature	Date	Initials

REMARKS:_____

CONTENTS:_____

REVIEW/VALIDATION: _____ / _____ / _____

WHE (Print Name) Signature Date