

# Polyethylene High Integrity Container Overpack Handling Procedure

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**Revision 15**

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Authored By: Signature on File 3/5/2018  
Marvin Morgan, NPS Supervisor Barnwell Date  
Operations

Reviewed By: Signature on File 3/5/2018  
Robert W. DeFrenn, NPS Manager Barnwell Date  
Operations

Approved By Signature on File 3/5/2018  
Greg Lane, V.P., Field Services Date

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**1. SCOPE**

**1.1 Purpose**

This procedure provides guidelines for the utilization of Polyethylene High Integrity Container Overpacks for shipping and burial of 55-gallon drums, 24" diameter steel pressure vessels, and loose material. Adherence to these guidelines serve to protect the integrity of the polyethylene container and ensure the container meets the requirements of EnergySolutions' South Carolina Department of Health And Environmental Control Certificate of Compliance.

**1.2 Applicability**

1.2.1 This procedure applies to all EnergySolutions personnel and EnergySolutions customers handling, using, or shipping Polyethylene High Integrity Container Overpacks for radioactive waste disposal.

1.2.2 This procedure is to be considered as an addendum to specific utility container handling and interim storage procedures.

**2. REFERENCES**

2.1 ES-QA-PR-005, Records

2.2 EnergySolutions Operating Procedures for Solidification Processes, Demineralization Processes, and Dewatering Processes, as specified by the appropriate Project Manager.

2.3 Applicable Utility Handling and Storage Procedures.

**3. DETAILED GUIDELINES**

**Note: Loading of any materials into the overpack should follow the guidelines detailed below.**

The EnergySolutions Technical Service Representative (TSR) or user representative shall complete the attached User's Checklist (Attachment 5.3) to ascertain compliance with Sections 3.1 through 3.4. The user's representative shall ensure the containers are stored properly and the waste is compatible with applicable sections of this procedure. It is the TSR's/representative's responsibility to sign, date, and return the completed checklist with the shipment.

**3.1 General Storage and Handling**

3.1.1 Polyethylene High Integrity Containers (HICs) shall not be stored on or near sharp objects or protrusions that could scrape, cut, or puncture the container.

- 3.1.2 Each Polyethylene HIC shall be stored on a flat, smooth, supportive surface.
- 3.1.3 As much as practical, the HICs should be kept out of direct sunlight to prevent ultraviolet light degradation. Additionally the HICs should be kept under cover to prevent exposure to rainfall, snow, ice and freezing and thawing. If HIC is supplied with a black UV covering this is intended for short term storage only.
  - 3.1.3.1 No Polyethylene HIC shall be stored in direct sunlight for a period greater than one year.
  - 3.1.3.2 When the HIC is ready for disposal shipment, the utility must enter on the User's Checklist the number of days the HIC was stored in direct sunlight. This number must not exceed the maximum time span allotted for the container.
  - 3.1.3.3 At the utility's request, *EnergySolutions* shall supply a statement indicating the maximum length of time the HIC may be exposed to direct sunlight. This will be calculated by subtracting the number of days the Polyethylene HIC is exposed to sunlight between the date of manufacture and the date it is shipped, from 365 days.
- 3.1.4 Exposure of the HICs to chemicals listed in Attachment 5.4, Table I must comply with the following:
  - 3.1.4.1 No surface contact with organic solvents or oils including gasoline. If contact should occur, rinse off immediately and contact *EnergySolutions* for guidance.
  - Note: Any leakage of organic solvents should be cleaned up immediately to prevent accidental contamination of the HIC surfaces.**
  - 3.1.4.2 No exposure to sensible (detectable by human senses) vapors of the organic solvents.
  - 3.1.4.3 If it is necessary to store polyethylene HICs in the same room with organic solvents, the HICs should be stored in a manner such that, should leaks of the solvent container occur, the solvents would not come into contact with the HIC surfaces. A soap and water solution will be used for the removal of ordinary dirt.
- 3.1.5 Care shall be taken when loading and transporting the containers with a forklift a flat, smooth, supportive surface must be placed under the HIC.

- 3.1.6 Only the manufactured metal lifting device supplied with the HIC is acceptable for lifting the HIC. Contact *EnergySolutions* if the lifting device has been damaged or shows signs of deterioration prior to shipment. The manufactured metal lifting slings supplied with the HIC are acceptable, but other metal cables, chains, or wire ropes shall not be used unless specifically approved by *EnergySolutions*.
- 3.1.7 Two empty Polyethylene HICs may be stacked for storage provided the bottom HIC is at least the same diameter of the top HIC.
- 3.1.8 No objects or materials shall be placed into Polyethylene HICs for ultimate disposal that may cause chemical (See Attachment 5.4, Table 1) or physical damage to the container.
- 3.1.9 All due care and caution shall be taken upon physical entry or in handling of these HICs to ensure that the HIC is not damaged.
- 3.1.10 When shipping or transporting all Polyethylene HIC Overpacks shall have the lids installed and tightened.
- 3.1.11 The maximum gross weight shall be 2500 pounds.

## **3.2 Preliminary Inspection**

Prior to using the Polyethylene HIC, the TSR or the utility's representative shall:

- 3.2.1 Perform a visual inspection of the HIC for obvious flaws or defects.

**Note:** **Contact *EnergySolutions* Liner Operations management for guidance if flaws or defects are discovered.**

- 3.2.2 Record the HIC and lid serial numbers on the User's Checklist (Attachment 5.3).
- 3.2.3 Confirm the HIC lid is equipped with a HEPA Filter and vent holes are present in the lid.
- 3.2.4 Check the vent orifice and lid vent holes to be sure they are clean and free of debris.
- 3.2.5 Assure the HIC lid closure tool, applicable shoring and cable assemblies are available.
- 3.2.6 If applicable Loosen the 3/8" nut on the rolled angle ring located at the top of the HIC.

### 3.3 Loading Procedure for 55-Gallon Drums

#### 3.3.1 Drum Sling Assembly Method

- 3.3.1.1 Remove the overpack lid.
- 3.3.1.2 Remove drum pallet and styro-foam spacers from overpack.
- 3.3.1.3 Visually inspect sling assembly to ensure that no damage was sustained during shipping.
- 3.3.1.4 Lay drum pallet flat onto ground. Orient cables to one side, being sure not to cross or overlap cables.
- 3.3.1.5 Spray the HIC threads with silicone lubricant or apply a thin coating of petroleum jelly to the threads.
- 3.3.1.6 Insert loading funnel into HIC mouth, if needed.
- 3.3.1.7 Spread drum sling assembly and attach crane hook to pear ring of sling.
- 3.3.1.8 Place drums onto drum pallet assembly base per selected method.
- Note: Drum lid retaining ring bolts should be positioned away from cables.**
- 3.3.1.9 Lift drum slings into place, and visually check to ensure cables are equally positioned around drums.
- 3.3.1.10 Load drum pallet into overpack.
- 3.3.1.11 Remove the loading funnel (if installed).
- 3.3.1.12 Spray the lid threads with silicone lubricant or apply a thin coating of petroleum jelly to the threads.
- 3.3.1.13 Install top shoring, as required, to within one (1) inch from the gasket sealing groove of the overpack mouth.
- 3.3.1.14 Attach lid tool to overpack lid.
- 3.3.1.15 Install the overpack lid with lid match mark and HIC "start" match mark aligned.

3.3.1.16 Ensure lid is seated into HIC and rotate lid clockwise, using lid tool, until the lid match mark and HIC "seal" match marks are aligned.

3.3.1.17 If applicable Tighten snugly the 3/8" nut on the rolled angle ring. |

**3.3.2 Loading Without Drum Pallet**

3.3.2.1 Remove the overpack lid.

3.3.2.2 Ensure bottom shoring is placed in the bottom of the HIC.

3.3.2.3 Spray the HIC threads with silicone lubricant or apply a thin coating of petroleum jelly to the threads.

3.3.2.4 Insert loading funnel into HIC mouth, if needed.

3.3.2.5 Load drums into overpack.

3.3.2.6 Remove loading funnel (if installed).

3.3.2.7 Spray the lid threads with silicone lubricant or apply a thin coating of petroleum jelly to the threads.

3.3.2.8 Install top shoring, as required, to within one (1) inch from the gasket sealing groove of the overpack mouth.

3.3.2.9 Attach lid tool to overpack lid.

3.3.2.10 Install the overpack lid with lid match mark and HIC "start" match mark aligned.

3.3.2.11 Ensure lid is seated into HIC and rotate lid clockwise, using lid tool, until the lid and HIC "seal" match marks are aligned.

3.3.2.12 If applicable Tighten snugly the 3/8" nut on the rolled angle ring. |

**3.4 Loading of 24" Diameter Pressure Vessels**

3.4.1 Remove the overpack lid.

3.4.2 Ensure bottom shoring is placed in the bottom of the HIC.

3.4.3 Spray the HIC threads with silicone lubricant or apply a thin coating of petroleum jelly to the threads.

- 3.4.4 Insert loading funnel into HIC, if needed.
- 3.4.5 Load pressure vessel into the overpack.
- 3.4.6 Remove loading funnel (if installed).
- 3.4.7 Spray the lid threads with silicone lubricant or apply a thin coating of petroleum jelly to the threads.
- 3.4.8 Install top shoring, as required, to within one (1) inch from the gasket sealing groove of the overpack mouth.
- 3.4.9 Attach lid tool to overpack lid.
- 3.4.10 Install the overpack lid. Ensure the lid match mark and HIC "start" match marks are aligned.
- 3.4.11 Rotate lid clockwise, using lid tool, until the lid match mark and HIC "seal" match mark are aligned.
- 3.4.12 If applicable Tighten snugly the 3/8" nut on the rolled angle ring.

### **3.5 Loading Procedure For Loose Material**

Call Energy*Solutions* Project Manager for instructions.

### **3.6 Post-Operational Guidelines**

- 3.6.1 The TSR or utility representative shall ensure that a loaded Polyethylene HIC shall not be lifted or moved until:
  - 3.6.1.1 The external surface temperature is less than 140 degrees F.
  - 3.6.1.2 The internal temperature of the contents is less than 140 degrees F.
- 3.6.2 Attach overpack lifting assembly or other Energy*Solutions* approved assemblies to overpack lifting cables and load into cask per applicable cask procedures.
- 3.6.3 Ensure the "Certification Statement for Disposal of Polyethylene High Integrity Container Overpacks" (Attachment 5.2) is correct, complete, and forwarded with the shipment.
- 3.6.4 Ensure the User's Checklist (Attachment 5.3) is correct, complete, and forwarded with the shipment.



**4. RECORDS AND REPORTS**

- 4.1 Liner Operations shall ensure that each customer of an EnergySolutions High Integrity Container has the effective revision of the C of C and this procedure.
- 4.2 The user has on file with the CNS Licensing Department a "Certification Statement for Polyethylene High Integrity Container Overpacks" (Attachment 5.1).
- 4.3 The user has completed and submitted with the shipment documents a "Certification Statement for Disposal of polyethylene High Integrity Container Overpacks (Attachment 5.2).
- 4.4 The user has correctly completed the User's Checklist (Attachment 5.3), which may be used as an inspection form and submitted with the shipment.
- 4.5 All records generated by this procedure shall be stored and maintained in accordance with Reference 2.1.

**5. ATTACHMENTS**

- 5.1 Polyethylene High Integrity Container Overpack Certification Statement
- 5.2 Certification Statement for Disposal of Polyethylene High Integrity Container Overpacks
- 5.3 Users Checklist
- 5.4 Table I – Materials Not Compatible with Polyethylene High Integrity Containers

**Attachment 5.1**

**POLYETHYLENE HIGH INTEGRITY CONTAINER  
OVERPACK CERTIFICATION STATEMENT**

("Company") hereby certifies that for each Polyethylene High Integrity Container purchased directly or indirectly from *EnergySolutions*, and for which disposal is proposed, attempted, or completed at the Barnwell, South Carolina, Low-Level Radioactive Waste Burial Facility, or for which any use in connection with the collection, storage, processing or transportation of low-level radioactive waste is proposed, attempted or completed, it has read and will comply with: (1) the effective Certificate of Compliance issued by the South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, No. DHEC-HIC-PO-006 (The "C of C"), (2) the effective revision of *EnergySolutions* Procedure FO-OP-019, "Polyethylene High Integrity Container Overpack Handling Procedure", and, (3) the effective South Carolina Radioactive Materials License No. 097 (For current revision levels contact CNS Barnwell Licensing). Company further certifies that it will not make any modification or change in the Polyethylene High Integrity Container design, materials, or usage from the design, materials and usage described in the C of C without prior approval of *EnergySolutions* and the South Carolina Department of Health and Environmental Control. Company understands that the Polyethylene High Integrity Containers purchased either directly or indirectly from *EnergySolutions* will be maintained, stored, transported, and used in accordance with the above requirements. When the High Integrity Container is disposed at the Barnwell, South Carolina, Low-Level Radioactive Waste Burial Facility, Company will complete the Certification Statement for Disposal of Polyethylene High Integrity Container Overpacks (Attachment 5.2) prior to such disposal.

Date: \_\_\_\_\_

Company: \_\_\_\_\_

By: \_\_\_\_\_

Its: \_\_\_\_\_

Attachment 5.2

**CERTIFICATION STATEMENT FOR DISPOSAL OF  
POLYETHYLENE HIGH INTEGRITY CONTAINER OVERPACKS**

For the Polyethylene High Integrity Container Overpacks to be disposed of at Chem-Nuclear's Barnwell, South Carolina, Low-Level Radioactive Waste Burial Facility and identified by Serial Numbers \_\_\_\_\_, (Company) \_\_\_\_\_ hereby certifies that its use of such containers is in compliance with (1) the effective Certificate of Compliance issued by the South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, No. DHEC-HIC-PO-006, (2) the effective revision of EnergySolutions Procedure FO-OP-019, "Polyethylene High Integrity Container Overpack Handling Procedure", and (3) the effective South Carolina Radioactive Material license No. 097. The effective revisions of these documents can be verified by contacting CNS Barnwell Licensing.

Date: \_\_\_\_\_

Company: \_\_\_\_\_

By: \_\_\_\_\_

Its: \_\_\_\_\_

**NOTE: COMPLETE AND RETURN WITH SHIPMENT.**

**Attachment 5.3  
USER'S CHECKLIST**

<u>ITEM</u>	<u>INITIALS/DATE</u>
1. High Integrity Containers Stored Properly (User's Rep)	_____
2. Total Cumulative Days of Sunlight (UV) Exposure _____	_____
3. Proper Lifting Devices Used	_____
4. Externals Inspected	_____
5. Container Serial Number _____	_____
6. Lid Serial Number _____	_____
7. Lid Vent in Place. Reference Section 3.2.3	_____
8. Lid Vent Orifice and Lid Vent Holes Free of Debris. Reference Section 3.2.4	_____
9. Lid Tool And Equipment Available	_____
10. Certification Statement for Polyethylene High Integrity Container Overpacks on file with CNS (Appendix A)	_____
11. Completed Certification Statement for Disposal of Polyethylene High Integrity Container Overpacks (Appendix B) forwarded with shipment	_____
12. Internal Media Properly Loaded	_____
13. Lubricant Applied to Container & Lid	_____
14. Lid Tightened	_____
15. HIC Surface Temperature Less Than 140Degrees F	_____
16. Contents Less Than 140 degrees F	_____
17. Maximum Gross Weight Not To Exceed 2500 Pounds	_____
18. High Integrity Container Loaded in Cask	_____
19. Proper Shoring and Bracing	_____

**NOTE: WHEN THE HICS ARE USED UNDER A BROKER'S QUALITY ASSURANCE PROGRAM, IDENTIFY THE BROKER IN THE COMMENT SECTION.**

OPERATION COMPLETED

_____	_____
Signature	Date

COMMENTS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Complete Form and Forward With Shipment

Attachment 5.4

TABLE I

Materials Not Compatible With Polyethylene High Integrity Containers

Acetone	Furfuryl Alcohol
Amyl Acetate	Fuel Oil
Amyl Chloride	Gasoline
Aqua Regia	Hydrofluoric Acid (Concentrated)
Benzene	Iodine
Bromine Liquid	Methyl Bromide
Camphor Oil	Methyl Chloride
Carbon Disulfide	Methyl Ethyl Ketone (MEK)
Carbon Tetrachloride	Methylene Chloride
Chlorine Liquid	Nitric Acid (Concentrated)
Moist Chlorine Gas	Nitrobenzene
Chlorobenzene	Octyl Cresol
Chloroform	Oleic Acid
Chlorosulfonic Acid	Oleum
Cyclohexanone	Petroleum Ether
Dimethylamine	Phenol
Ethyl Acetate	Propylene Dichloride
Ethyl Butyrate	Sulfuric Acid (60%)
Ethyl Chloride	Tetrahydrofurane
Ethyl Ether	Titanium Tetrachloride
Ethylene Chloride	Toluene
Ethylene Chlorohydrin	Trichloroethylene
Ethylene Dichloride	Xylene
Flourine	Turpentine
Furfural	Tetralin

**NOTE: PETRO CHEMICAL (OIL, GASOLINE, ETC.) ARE ACCEPTABLE IN  
TRACE QUANTITIES NOT TO EXCEED 1.0%**