


# Operating Guidelines For Use Of Polyethylene High Integrity Containers

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**1. PURPOSE AND SCOPE**

**1.1 Purpose**

This procedure provides guidelines for the utilization of *EnergySolutions* polyethylene High Integrity Containers (HICs) for resin transfers, demineralization processes, interim storage, and other identified uses by *EnergySolutions*. Adherence to these guidelines serves to protect the integrity of the polyethylene HIC and ensure the HIC meets the requirements of *EnergySolutions'* South Carolina's Department of Health and Environmental Control's Certificate of Compliance.

**1.2 Scope**

1.2.1 This procedure applies to all *EnergySolutions* personnel and *EnergySolutions* customers handling, using, storing or shipping polyethylene HICs.

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

2.2 Applicable Utility Handling and Storage Procedure(s)

2.3 ES-QA-PR-005, Records

**3. DETAILED GUIDELINES**

The *EnergySolutions* Technical Service Representative (TSR) or utility representative shall complete the User Checklist (Attachment 7.1) to ascertain compliance with Sections 3.1 through 3.4. It is the TSR's/utility representative's responsibility to sign, date and include the checklist with the shipment. The utility representative shall ensure the waste stream is compatible with applicable sections of this procedure.

3.1 **General Storage and Handling.**

- 3.1.1 Polyethylene HICs shall be inspected within ten business days following the unloading from the shipping vehicle at the customer site. Refer to Section 3.2 of this procedure for inspection criteria. The customer representative or EnergySolutions TSR shall inspect the HIC for any obvious damage, issues or concerns. If any damage, issues or concerns are addressed during this inspection notify the appropriate EnergySolutions Project Manager or Liner Operations management with the results. EnergySolutions will help the customer, Project Manager or TSR to quickly resolve any damage, issues or concerns.
- 3.1.2 Polyethylene HICs shall be handled and stored in accordance with Reference 2.2 and this procedure
- 3.1.3 Polyethylene HICs shall not be stored on or near sharp objects or protrusions that could scrape, cut, or puncture the container.
- 3.1.4 Each HIC shall be stored on a flat, smooth, supportive surface.
- 3.1.5 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 the HIC is supplied with a black UV covering this is intended for short term storage only.
  - 3.1.5.1 No polyethylene HIC shall be stored in direct sunlight for a period greater than one year.
  - 3.1.5.2 At the utility's request, EnergySolutions shall supply a statement indicating the maximum length of time the HIC may be exposed to direct sunlight. Period will be calculated by subtracting from 365 days the number of days the polyethylene HIC is exposed to sunlight between the date of manufacture and the date it is shipped.
  - 3.1.5.3 When the HIC is ready for shipment, the utility must enter on the User's Checklist (Attachment 7.1) the number of days the HIC was stored in direct sunlight. This number must not exceed the maximum time span allotted for the HIC.
- 3.1.6 Exposure of the polyethylene HICs to chemicals listed in Attachment 7.4 must comply with the following:
  - 3.1.6.1 No surface contact with organic solvents or oils including gasoline. If contact should occur, rinse off immediately and contact EnergySolutions for guidance.

3.1.6.2 No exposure to sensible (detectable by human senses) vapors of the organic solvents.

3.1.6.3 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 containers occur, the solvents would not come into contact with the HIC surfaces.

**Note: Any leakage of organic solvents should be cleaned up immediately to prevent accidental contamination of the HIC surfaces.**

3.1.7 When loading or transporting the HIC with a forklift, a flat, smooth, supportive surface must be placed under the HIC.

3.1.8 Only the manufactured metal lifting device supplied with the HIC is acceptable. Contact *EnergySolutions* if the lifting device has been damaged or shows signs of deterioration prior to shipment. Other metal cables, chains, or wire ropes shall not be used unless they are specifically approved by *EnergySolutions*.

3.1.9 A fillhead or *EnergySolutions*-approved items are the only objects to be placed or stored on the HIC, with the exception of Step 3.1.10.

**Note: When fillheads are utilized, hoses and other related attachments shall be supported to ensure undue stress is not placed on the HIC fillplate.**

3.1.10 Two empty HICs may be stacked for storage provided the diameter of the bottom HIC is equal to or greater than the diameter of the top HIC.

3.1.11 No objects or materials shall be placed into the HIC for ultimate disposal that may cause chemical (see Attachment 7.4) or physical damage to the HIC.

3.1.12 All due care and caution should be taken upon physical entry or in handling of these HICs to ensure that the HIC is not damaged.

3.1.13 Lifting a HIC that contains enough media/water to cover the lowest dewatering lateral(s) may result in lateral damage. It is strongly recommended that the HIC be completely filled and dewatered prior to lifting. Should it become necessary to move a HIC prior to dewatering, contact *EnergySolutions* for guidance.

- 3.1.14 Waste filled HICs may be shipped to various facilities for processing, storage, disposal, etc. Since these facilities may have differing acceptance requirements, the HIC user should ensure that each HIC and its waste contents meet the applicable acceptance requirements for that receiving facility at the time of shipment.
- 3.1.15 Each user shipping a HIC to Barnwell Waste Management Facility for waste disposal shall have on file within the Licensing Department a “Polyethylene High Integrity Container Certification Statement” (Attachment 7.2).
- 3.1.16 If the dewatering process for dewatered waste has been completed and the HIC has not been shipped for disposal within a reasonable time frame (e.g. 6 months), EnergySolutions recommends that a dewatering verification evolution be performed at the time of shipment.
- 3.1.17 When storing HICs, ensure the lid is fully installed.
- 3.1.18 PL 14-170 and PL 14-215 HICs equipped with the modified baskets for compatibility with a Radlok 179/195 grapple are limited to maximum gross weights of 10,800 lbs and 13,000 lbs respectively.

**3.2 Preliminary Inspection**

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

Note: For this section use Attachment 7.1 to document the results.

- 3.2.1 Perform a visual inspection of HIC internals where feasible to verify component parts are intact.
- 3.2.2 Perform a visual inspection of HIC externals for obvious flaws or defects.
- 3.2.3 Record HIC serial number on attached User's Checklist (Attachment 7.1).
- 3.2.4 Confirm the serial numbers on the HIC side, top and lid match.
- 3.2.5 Confirm lifting sling with cables attached are fitted into the grooves of the HIC with all components intact.

**Note: Some HICs do not have grooves. Bail orientation is not critical for these HICs.**

- 3.2.6 Confirm HIC lid closing tool is available for lid installation after processing.

- 3.2.7 Inspect lid tool for sharp edges/loose fittings prior to use.
- 3.2.8 Confirm the HIC lid is equipped with a vent and that the vent orifice and vent holes are clear of any obstructions.

**3.3 Process Controls**

- 3.3.1 Waste streams shall not contain materials listed in Attachment 7.4 except as noted. If such materials are noted, contact EnergySolutions prior to proceeding. (Document EnergySolutions contact on User's Checklist) (Attachment 7.1).
- 3.3.2 The waste stream temperature should be kept as low as practical. The maximum measured acceptable temperature is 140°F.
- 3.3.3 Complete operation per References 2.1, if applicable.
- 3.3.4 Manual Lid Installation:
  - 3.3.4.1 Spray threads with silicone lubricant, or apply a thin coating of petroleum jelly to the threads.
  - 3.3.4.2 Align lid mark with HIC "START" mark. Rotate lid clockwise until lid match mark and HIC "SEAL" mark align (minimum rotation of 270°).

**Note: Lid may rotate beyond seal mark. Contact EnergySolutions if 270 degree rotation is not achieved or match marks fail to align.**

- 3.3.5 Remote Pneumatic Lid Installation (Attachment 7.5)
  - 3.3.5.1 Spray threads with silicone lubricant, or apply a thin coating of petroleum jelly to the threads.

**Note: EnergySolutions recommends torquing the four (4) drive spud bolts to approximately 10 ft. lbs. after the four (4) lock levers have been engaged in the step below.**
  - 3.3.5.2 Place the closure tool on the HIC lid and ensure the drive spud clips are within the HIC lid drive cavities. Engage the four lock levers (horizontal position). It may be necessary to loosen the four drive spud adjustment bolts in order to set the locks.
  - 3.3.5.3 Tighten the drive spud adjustment bolts sufficiently enough to hold the HIC lid securely when the tool is lifted.

**Caution: Check dose rate on top of HIC and take all precautionary measures to guard against unnecessary exposure.**

3.3.5.4 Place the HIC lid tool with lid on the HIC and bump the air motor counter-clockwise to align with "START" match mark.

**Caution: Do not exceed the maximum air pressure rating of the closure tool motor. High torque is generated by the closure tool motor, and failure to adequately restrain the lid closure tool handles with a fixed support, or by manual resistance, may result in personal injury.**

3.3.5.5 Brace the HIC lid tool handle against an unyielding support, or have each handle held by a technician/helper, and operate the air motor in a clockwise direction until the "SEAL" match mark aligns (minimum rotation of 270°).

**Note: Lid may rotate beyond seal mark. Contact EnergySolutions for guidance if 270 degree rotation is not achieved or match marks fail to align.**

3.3.5.6 Use a remote handling tool to release the four lock levers (vertical position).

3.3.5.7 Remove the HIC lid closure tool.

#### 3.4 Post-Operational Guidelines

3.4.1 A loaded HIC shall not be lifted or moved until:

3.4.1.1 The external surface temperature is equal to or less than 140°F. (Attachment 7.1)

3.4.1.2 The internal temperature of the contents is equal to or less than 140°F. (Attachment 7.1)

3.4.2 Complete User's Checklist (Attachment 7.1) and forward with shipment.

#### 4. MECHANICAL FILTER STORAGE AND DISPOSAL

Users of the polyethylene High Integrity Containers may utilize the HICs for mechanical filter storage and disposal under the conditions described below:



- 4.1 Notify EnergySolutions Liner Operations of the proposed use of the HIC for filter storage.
- 4.2 Supply EnergySolutions Liner Operations with pertinent details of the filter assemblies as requested. These details will include the dimensions and weight as a minimum. Any details/dimensions on sharp edges or protrusions will also be supplied. A sketch may be required.
- 4.3 The shipper is responsible for ensuring that mechanical filters or other hardware are adequately secured to prevent damage to the HIC during shipping and disposal. If applicable, record compliance with this requirement under Step 13 of Attachment 7.1.
- 4.4 Complete Steps 3.3.4 or 3.3.5 as appropriate.

**5. STACKABLE AND STEEL ENCASED HICS**

EnergySolutions has two designs for Stackable HICs.

- 5.1 One design incorporates a heavy duty lifting basket, which can be identified by its one inch thick vertical basket supports. This design allows HICs to be stacked two high. A base plate between the HICs must be used when stacking heavy-duty basket stackable HICs.
  - 5.1.1 Place the base plate on top of the lower HIC, the centering lugs must be inside the grapple ring.
  - 5.1.2 Place the second HIC on the base plate, making sure that all four legs are on the base plate and the HIC is centered.
- 5.2 The second design of Stackable HICs incorporates a steel shell, which encloses the HIC. This design permits HICs to be stacked four high. Options for the steel encased stackable HIC include self centering guides, remote grapple handling and a stacking pallet which is used when stacking a small HIC upon a larger HIC.
  - 5.2.1 The preferred method of moving the steel encased stackable HICs is with an EnergySolutions liner grapple. Lifting cables need to be requested at the time of ordering the steel encased HIC if a grapple is not available. However, there are two types of lifting cable arrangements. One type uses lifting eyes, which thread vertically into the grapple ring, and the other type uses lifting eyes, which thread horizontally into the side of the steel shell.

**Note: The lifting eyes that thread into the grapple ring vertically can only be used to move an empty HIC. The lifting eyes that thread into the steel shell horizontally can be used to move both empty and full HICs.**

**Note: Steel encased HICs using horizontally mounted lift cable eyes cannot be loaded into a comparable size transport cask with the lifting cable assembly installed.**

- 5.3 Whenever possible, the horizontally installed lifting cable assembly should be attached to the HIC prior to processing waste. To install the lifting cable assembly, thread a lifting eye into the side of the HIC shell at four places. Torque the lifting eye to 90 foot pounds. Attach the lifting cables.
- 5.4 Remove the lifting cable assembly prior to loading the HIC into a comparable size transport cask.
- 5.5 If self-centering hardware is utilized, take the following precautions:
  - 5.5.1 Whenever possible, install the self-centering hardware prior to adding waste to the HIC.

**Note: Do not hammer, drive or use any unreasonable force to insert the self centering hardware as this hardware must be removed prior to the HIC being loaded into a transport cask.**
  - 5.5.2 Use the EnergySolutions provided tool, or equivalent, to remove the self centering hardware prior to placing the HIC into a transport cask.

**Note: Be aware that during the stacking process a self centering wedge may have become jammed.**
  - 5.5.3 A stacking pallet must be used when placing a small HIC upon a larger HIC.
- 5.6 If self-centering hardware is not utilized, stackable HICs must be stacked within approximately ½ inch of center.

**6. RECORDS AND REPORTS**

- 6.1 Liner Operations shall ensure that each customer of an EnergySolutions polyethylene IC has the effective revision of the C of C and this procedure.
- 6.2 The user has on file with EnergySolutions Liner Operations Department a "Polyethylene High Integrity Container Certification Statement" (Attachment 7.2).
- 6.3 The user has completed and submitted with the shipment documents a "Certification Statement for Disposal of Polyethylene High Integrity Container" (Attachment 7.3).

- 6.4 The user has correctly completed the "User's Checklist" (Attachment 7.1), which may be used as an inspection form, and submitted with shipment.
- 6.5 All applicable records generated for HICs being shipped to the Barnwell Waste Disposal Facility for disposal shall be maintained in accordance with Reference 2.3.

**7. ATTACHMENTS AND FORMS**

- 7.1 User's Checklist
- 7.2 Polyethylene High Integrity Container Certification Statement
- 7.3 Certification Statement for Disposal of Polyethylene High Integrity Containers
- 7.4 Non-Compatible Materials for HICs
- 7.5 Sketch

**Operating Guidelines for Polyethylene HICs**

**Attachment 7.1  
USER'S CHECKLIST**

<u>Item</u>	<u>Section Reference</u>	<u>Initials</u>	<u>Date</u>
1. HICs Stored Properly	(3.1.1-3.1.5, 3.1.13)	_____	_____
2. Proper Lifting Devices Used	(3.1.8)	_____	_____
<b>Note: Only the manufactured metal lifting device supplied with the HIC is acceptable. Contact EnergySolutions if the lifting device has been damaged or shows signs of deterioration prior to shipment.</b>			
3. Internals Inspected (where feasible)	(3.2.1)	_____	_____
<b>Note: For FEXM HICs, ensure internal hose is reinforced and properly connected.</b>			
4. Externals Inspected	(3.2.2)	_____	_____
<b>Note: If HIC arrives at the utility in a shipping cask to be processed and shipped in the same cask, the external inspection may be N/A.</b>			
5. HIC Serial Number _____	(3.2.3)	_____	_____
6. Serial numbers on HIC side, top and Lid match	(3.2.4)	_____	_____
7. Lifting Sling Properly Fitted	(3.2.5)	_____	_____
8. Lid Vent in Place	(3.2.8)	_____	_____
9. Lid Vent Orifice and Lid Vent Holes Free of Debris	(3.2.8)	_____	_____
10. Lid Tool Available and Acceptable	(3.2.6 - 3.2.7)	_____	_____
11. Waste Stream Sample OK	(3.3.1)	_____	_____
12. Waste Stream Temperature _____ °F	(3.3.2)	_____	_____
13. Mechanical Filters or Other Hardware Stabilized, if Applicable	(4.3)	_____	_____
14. Step 3.3.4 or 3.3.5 is complete		_____	_____
15. HIC Surface Temperature is less than 140°F	(3.4.1.1)	_____	_____
16. Contents Less Than 140°F	(3.4.1.2)	_____	_____
17. Total Cumulative Days of Sunlight (UV) Exposure _____	(3.1.5.2 & 3.1.5.3)	_____	_____
18. Manufactured Date of Polyethylene High Integrity Container _____		_____	_____
19. Polyethylene High Integrity Container Certification Statement on File with EnergySolutions	(Attachment 7.2)	_____	_____
20. Completed "Certification Statement for Disposal of Polyethylene High Integrity Containers" Forwarded with Shipment	(Attachment 7.3) (6.3)	_____	_____
21. HIC weight is within limits specified in 3.1.18, if applicable.	(3.1.18)	_____	_____
<b>Note: When the HICs are used under a broker's quality assurance program, identify the broker in the comment section.</b>			

OPERATION COMPLETED: \_\_\_\_\_  
Signature Date

Comments: \_\_\_\_\_

Complete form and forward with shipment.

Attachment 7.2

**POLYETHYLENE HIGH INTEGRITY CONTAINER  
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, 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, No. DHEC-HIC-PL-001 (the "C of C"), (2) the effective revision of *EnergySolutions* Procedure FO-AD-002, "Operating Guidelines for Use of Polyethylene High Integrity Containers," and (3) the effective Radioactive Materials License for the facility to which the HIC is to be shipped. 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*. 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 polyethylene High Integrity Container is disposed, Company will complete the Certification Statement for Disposal of polyethylene High Integrity Container (Attachment 7.3) prior to such disposal.

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

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

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

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

Attachment 7.3

**CERTIFICATION STATEMENT FOR DISPOSAL  
OF  
POLYETHYLENE  
HIGH INTEGRITY CONTAINERS**

For the Polyethylene High Integrity Container identified by serial numbers \_\_\_\_\_,  
(Company) \_\_\_\_\_  
hereby certifies that its use of such HICs is in compliance with (1) the effective Certificate of Compliance issued by the South Carolina Department of Health and Environmental Control, No. DHEC-HIC-PL-001; (2) the effective revision of EnergySolutions Procedure FO-AD-002, "Operating Guidelines for Use of Polyethylene High Integrity Containers," and (3) the effective Radioactive Materials License for the facility to which the HIC is being shipped.

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

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

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

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

**Note: Complete and return with shipment.**

## Attachment 7.4

## NON-COMPATIBLE MATERIALS FOR HICs

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

**Note:** Polyethylene high integrity containers shall not be subjected to concentrated free standing oil. However, this does not prohibit the materials in the HIC from containing incidental or trace amounts of oil or petroleum based materials which have absorbed in the waste materials, provided that the amount of absorbed oil and petroleum based materials does not exceed one percent (1%) by waste volume in the HIC.

Attachment 7.5  
SKETCH

