



HYDRERA ENERGY SERVICES (US) CORP.

Standard Operating Procedure *Harpoon Tank Teardown*

Division: United States

SOP Title: Harpoon Tank Set up

Effective Date:	January 1, 2021
Review Date:	January 1, 2022

Change History:

SOP Number	Effective Date	Significant Changes	Review/Created by:
Harpoon-002	January 1, 2021	Initial version	Kai Magnussen, Dan Kubek
Harpoon-002	May 22, 2021	Revision 1	Kai Magnussen, Dan Kubek
Harpoon-002	July 27, 2021	Revision 2	Kai Magnussen, Dan Kubek
Harpoon-002	July 5, 2022	Revision 3	Cody Phillips, Billy Logsdon
Harpoon-002	February 21, 2023	Revision 4	Kai Magnussen

1. **Purpose:** The purpose of this Standard Operating Procedure is to provide guidance to a field technician to properly set up HydrEra's Harpoon Tank System.

2. **Introduction:** HydrEra Energy Services (US) Corp (HES) believes that, the Health and Safety of every employee/contractor is of extreme importance. Towards this idea and with a safe workplace as one of our main goals, every employee, contractor, supervisor, and manager is committed to supporting our HSE Program. Injury prevention and maintaining a safe and healthy working environment for all our employees, benefits HES, and all who work for and



with us. Every employee/contractor of the company is responsible for personal safety and the safety of fellow workers. The responsibility begins with the company president and continues through each level of management to reach every employee/contractor, including even the newest personnel. This responsibility cannot be delegated or otherwise set aside. This same corporate attention to safety transcends to the protection of the general public and also to the physical resources belonging to or leased to HES. It is the position of HES that the company's safety policies and procedures will, as a minimum, comply with all federal, provincial, and local regulations applicable to employee/contractor safety. The HSE program calls for the participation of all employees/contractors working toward an environment in which every job or task is performed in the safest practical manner by a well-trained workforce using the proper equipment. The benefits of such efforts are numerous and obvious.

- 3. Scope:** This SOP precludes that the worker has the required training, tickets, and authorization prior to beginning any operations. This SOP is not meant to take the place of or minimize the need for supervision, training, and/or client/customer site requirements. It is also in no way comprehensive (as defined by "cannot be added to"). This SOP can be added to as long as the additions further enhance the following: Safety, environmental protection, productivity, (without compromising the first two).

ATTENTION: Use the personal protective equipment (PPE) and safety procedures for all steps at all times. ANSI/CSA approved hard hat, rated safety glasses, hard toe footwear, gloves, and fire-rated (FR) clothing are required at all times on job service locations. Hoisted loads are required to have a minimum of one tag line. Personnel are required to be properly harnessed and anchored when exceeding a height of 3 meters. Visual inspections are to be done by all workers on tools and equipment before being put into use. This includes but is not limited to hand tools, ladders, AST tanks, and auxiliary equipment.



Harpoon Installation Process

Harpoon Tank teardown must be performed by trained individuals and overseen by a HydrEra-trained supervisor. No more than two (2) Short Service Employees (SSE) to be present for a Harpoon teardown.

Harpoon Teardown Steps:

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Required Tool List

- 4 – 4lbs sledge hammers
- 4 – Crow bars
- 4 – Fall arrest harnesses with harnesses
- 4 – Tool lanyards
- 1 – Impact driver
- 1 – Sockets for mayway and suction bolts (3/4", 1-1/8", 1-5/16")
- 1 – Crescent wrench (or box wrenches in the above sizes)
- 1 – Shovel
- 1 – Rake
- 1 – Push broom
- 4 – 2x4x8 Blocks for cribbing
- 1 – Leister heat gun with roller and TPU patches



1. Removal Of Residual Fluids / Liner Cleaning

- This process must take place prior to the teardown of any Harpoon, whether containing fresh water or any other fluids.

***IMPORTANT:** Harpoon liners are made of durable TPU material but are vulnerable to damage if care is not taken when cleaning. If you have any questions or concerns, please contact a HydrEra representative prior to commencing a Harpoon cleaning operation. Liners must be cleaned in the erected position to ensure all liner material is exposed for cleaning.*

Prior to entering the Harpoon Tank:

- Use a four-gas monitor with sniffer attachment to ensure the environment in the tank is safe for personnel to enter. Record findings
- Discuss during safety meetings the potential hazards and controls of cleaning out the liner
- Ensure boots do not have any rocks or other sharp objects wedged within treads
- Take pictures of the inside of the tank prior to entering to use in the HydrEra teardown report

Manual cleaning:

- ***NOTE: due to the presence of sharp edges, the use of squeegees will no longer be accepted on Harpoon TPU liners. Soft bristle push broom are the only hand tools that should be used on the liner**
- Ensure brooms, hoses and all other equipment have no sharp edges exposed
- Tape off any exposed edges that could potentially cause harm to the liner
- Identify which suction box is a better candidate to hook a vac truck to. Consider the grade of the pad, level of the boxes and exterior accessibility



- If using a vac truck hose inside the tank, ensure it does not seal tight to the liner as this could cause liner damage
- Using brooms and leaf blowers, push water and debris towards the selected suction box, to be removed by the vac truck. NOTE: do not place a leaf blower directly on the liner while it is running. Prior to setting any equipment down, ensure there are no hot spots that could melt and affect liner integrity
- Clear water and debris out from all areas of the liner, including under the flaps around the exterior edge
- No bleach or other harsh chemical cleaners are to be used on the TPU liner material. Use **HYDRERA APPROVED CLEANING AGENTS ONLY**

Pressure washing:

- Wash liner from the top down. Depending on the level of contamination this may require an initial spray from an articulating man basket, followed up by a ground level cleaning
- Only **HYDRERA APPROVED CLEANING AGENTS** should be used to clean the TPU liner, no bleach or harsh chemical cleaners
- Use a wide-angle nozzle, minimum 20-degree fan pattern
- Maximum water temperature of 160 F (70 C)
- Always keep the nozzle at least 3 feet from the TPU liner
- Do not set a running pressure washing wand directly on the liner
- Combine the pressure washing procedure with the manual cleaning above to complete the cleanout of a dirty Harpoon TPU

***Failure to follow the above steps will result in damage to the TPU liner, in which case the party responsible will be held liable for repairs or replacement. If an operator/customer is handling the cleaning process, please provide them with this document as well as HydrEra contact information**



IMPORTANT: If any damage of any kind occurs, no matter how small, it must be immediately photographed, recorded and reported to HydrEra personnel. HydrEra will properly document and repair the issue prior to the next use





2. Fill Tube Removal:

- Approx. 2-3 workers.
- Support the upper tubes using equipment.
- Hold in place while 1-2 workers use man-lift and remove the Victaulic connection outside of tank. Ensure that individuals in/operating the man-lift are properly trained and use proper PPE for working at heights.
- Once the fill tube is free, safely lift from the top of the tank to the ground, and attach the tubes in the transport mount on the manway panel.



3. Releasing the Liner(s):

- Approx. 3-4 workers.
- Ensure that the tank liner is empty of fluid. Cleaning or removal of fluid must be done prior to releasing the liner.
- Unbolt the manifold inlets and the manway connection.
- Inspect the interior of the liner for any damages or blemishes.
- **IMPORTANT:** liner interior must be photographed and sent to Dan Kubek and/or Kai Magnussen for liner tracking. Any repairs needed must be photographed and properly repaired and documented. A photo of the finished roll must also be provided.
- Ensure there are no personnel inside the tank.
- Keep the perimeter liner strap secured.
- Release all the vertical straps around the tank, keeping the looped straps installed on the liner loops after removal. These will stay in place on the liner through folding and transport to the next setup.



- Once the entire liner is released from the vertical straps, remove the perimeter strap. Begin lifting the liner over the walls, and allow it to fall to the ground. **IMPORTANT:** no personnel are permitted to be inside the tank while liner is being dropped. Ensure tank interior is clear before dropping liner.
- Once the liner is fully on the base of the tank, ensure that the edges of the liner are not in any danger of being damaged by the removal of the panels.



- Finish liner folding once panels are removed.
- For double lined tanks, release the primary liner first. Fold and roll this liner inside the tank. If primary is a disposable TPU liner, roll up and remove for disposal. If primary is a reusable TPU, roll up and set aside for transport



4. Panel Removal:

Panel Handling Procedures - Telehandler

- Harpoon panels and attachments are engineered to work safely with 12,000 lb telehandler models including JLG, JCB and Xtreme brands. Panels will connect to HydrEra telehandler attachment for lifting and placement. The telehandler attachment will lock into the center of the panel, with the swing handle engaging the locking mechanism. Once locked in all adjustments can be made using the machine. All personnel must stay back 30 ft during critical lifts (standing the panel) and must keep all body parts clear when making adjustments with the telehandler.
- **IMPORTANT:** When transitioning the panel from vertical to horizontal position, the entire panel must be kept up and off the ground. Panels must only be moved around the work area in the vertical position. Failure to adhere to these guidelines may cause injury or damage to the equipment.
- Harpoon panels can be loaded and offloaded from trucks using the Harpoon attachment or using 4-point lift rigging on the panel d-rings.
- Review Telehandler load chart and SOP. Ensure operators are experienced and licensed to operate specific equipment. One person only should be designated to provide the telehandler operator with signals, however anyone can shut the operator down at any time.

Panel Handling Procedures – Crane

- Harpoon panels are engineered to be safely installed using a crane or picker. Minimum crane sizes to be used are a 30 ton for multiple sets or 100 ton to set the entire Harpoon tank from one position. The crane rigging will attach to the two d-rings on the top rail of the panel.
- The crane operator must complete a lift plan prior to moving any Harpoon panels.
- Stack panels within the crane's reach. Panels should be laid down towards the crane or cross-ways to the cranes position, not away from the crane. Plan for this when stacking panels to be loaded onto trucks.
- While the crane operator lays the panel, all personnel must remain well outside the panel fall radius, front, rear and on both sides. Panel may shift during this lift.
- Tag lines must be used to guide panel from its place on the tank to where it will be laid down. One person only should be designated to provide signals to the crane operator, however anyone can shut the operator down at any time.

- Approx. 5-6 workers including equipment operators.
- Panels can be safely removed using a 12,000 lb telehandler (JLG) or a crane. When working with a crane, the operator must complete a lift plan prior to lifting the first panel.
- Remove all connection plates except the top, bottom and two plates evenly spaced in the middle. Connection plates will slide off the shorter male connection, turn and secure on the longer male connection. **IMPORTANT:** The remaining four plates cannot be removed until the telehandler or crane is securely joined to the panel.



- Ensure plates are properly secured for transport.
- Review Telehandler load chart and SOP. Ensure operators are experienced and licensed to operate specific equipment.
- Attach telehandler #1 to any panel except the manway panel. Lift panel vertically and move away from the tank. Lay panel down onto the transportation walls. Repeat until 4 panels are standing. Personnel will work in the man basket to remove the plates, securing them for transport as they go. **IMPORTANT:** No workers are permitted to enter the space beneath the man basket while overhead work is being performed.



- **IMPORTANT:** When transitioning the panel from vertical to horizontal position, the entire panel must be kept up and off the ground. Panels must only be moved around the work area in the vertical position. Failure to adhere to these guidelines may cause injury or damage to the equipment.
- Telehandler #1 will attach to the main panel, while telehandler #2 or crane removes the final eight panels. Telehandler #1 will then remove the main panel, which must be stacked last on the top of the panels.

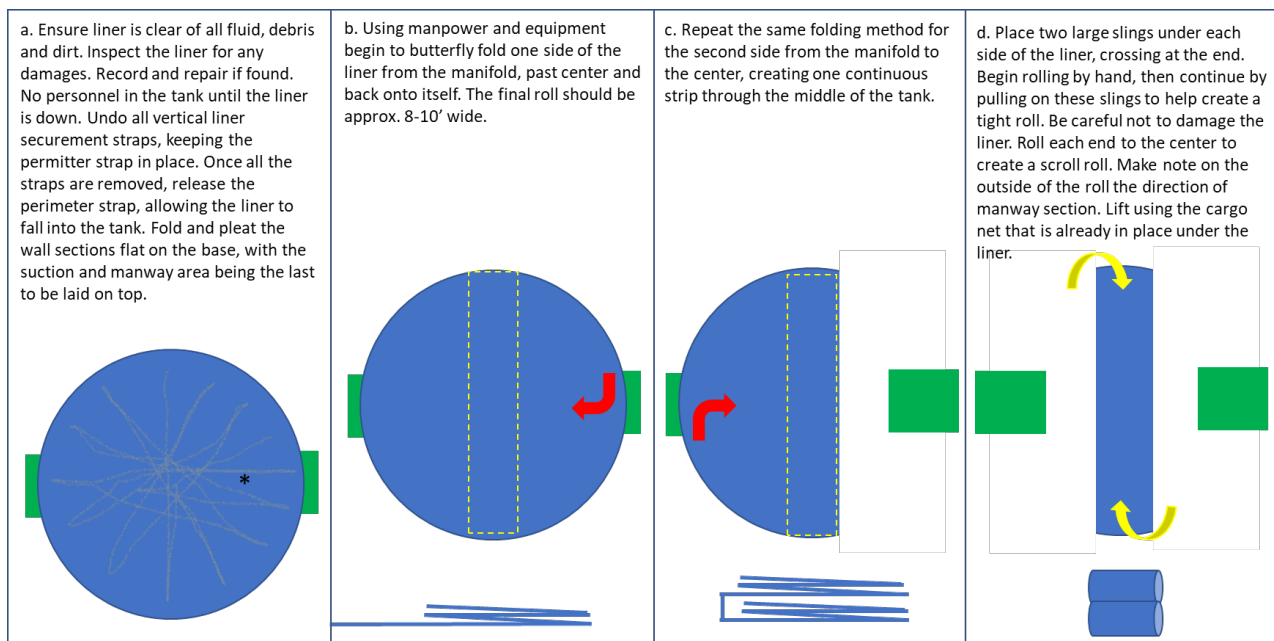


- Panels must be stacked 5 high on three trucks on the transport skids. Ensure stack is lined up properly for an evenly weighted load.



5. Liner Folding:

- Approx. 5-6 workers.
- The liner will be sitting with the wall sections folded on top of the floor section. The liner has strategically placed handles for use during the folding process.
- Fold the liner perpendicular to the manifolds. Butterfly fold one side of the liner over center, and back until you have one straight edge, with half the liner stacked on top of it.
- Repeat with the second side, butterfly folding on top of the first half. The result will be a neatly folded stack 8-10 feet wide, stretching the length of the tank, lining up between the two manifolds. See birds-eye-view diagram below.
- Roll each end of the liner towards the middle of the tank pad, to complete the liner into a “Scroll Roll” at the center of the tank. The liner cargo net will be in place under the liner for lifting and transport.
- Make note on the liner of where the manway opening is located in the roll. This will ensure an efficient deployment on the next project.
- Using the cargo net the liner will be 4-point lifted into the liner transport bin or onto the truck.
IMPORTANT: If liner is being loaded directly onto the truck, it must be placed on geotextile on a flat, smooth surface with no sharp objects present







6. Groundcloth Folding:

- Once the liner has been removed, inspect the groundcloth for damage. Document and repair any damages.
- Repeat the same folding procedure for the groundcloth as the liner above.

7. Removing the Manifolds:

- Approx. 1-2 workers.
- **IMPORTANT:** Ensure manifolds have been thoroughly washed out with a pressure washer. This is especially important when removing manifolds from a tank that contained anything other than fresh water
- Visually inspect the manifolds for any damages from freezing, strikes or missing caps/blinds. Record and document any damages with photos and report to HydrEra personnel.
- Clear any dirt and debris off of the manifolds, ensuring the inlet ports remain clear.
- Lift the manifolds from their sub-surface position.
- Load manifolds onto the truck along with the other Harpoon parts.

8. Finalizing the Teardown:

- Approx. 2-3 workers
- Fill in the sub-surface area where the manifolds were installed.
- Ensure all parts and pieces are safely and securely loaded.
- Ensure no garbage or debris is left on location and that the customer is pleased with the state of the area.

**If any issues arise or you have any questions or concerns please contact
Dan Kubek (587-990-5765) or Kai Magnussen (516-540-9944)**



Appendix A

- A minimum 18" of fresh water added to the Harpoon upon completion of setup
- Final walk through of the interior of the Harpoon must performed by a HydrEra trained supervisor
- Once a hydrotest has been performed and 24 hours has passed, HydrEra is cleared of any and all liner liability. At this point the integrity of the Harpoon system has been proven
- A minimum fluid level of 36" must be maintained during normal operation, aside from final emptying/cleanout
- Harpoon not to sit less than one third full for more than 72 hours
- Install/teardown reports to be signed off on by Select rep/customer
- All SOP's to be signed off on by Select in all regions
- If Harpoon is allowed to freeze the liner integrity may be compromised and must be recertified at a cost to the customer
- Any and all damage to the Harpoon tank or liner system that is deemed to be caused by user error will be repaired/resolved at the cost of the customer