Authored By: Chris Lamb	**Blanchard Refining Company LLC** **Galveston Bay Refinery**	Doc No.: RSW-000014-GB Rev No: 3
Doc Custodian: Safety Supervisor	**PR-1 Confined Space Entry**	Refinery Safe Work Procedure
Approved By: Honor Sheard		
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1.0 Purpose

This practice provides the basis for safe entry into confined spaces and rescue.

2.0 Scope

This procedure applies to all persons working on Galveston Bay Refinery (GBR) property.

3.0 Procedure

3.1. General Requirements

3.1.1. Before any person physically enters any confined space at the Galveston Bay Refinery (GBR), a confined space entry permit must be issued in accordance with PR-3 Safe Work Permit Practice.

3.1.2. All confined space entries require an entry supervisor and an attendant(s), in addition to the entrants to be logged into the appropriate section on back of the safe work permit.

3.1.3. All confined space entries require at least one attendant outside of the space for the duration of the entry. Additional attendants are required if one attendant cannot perform all of the required duties.

3.1.3.1. Attendants must wear a fluorescent, brightly colored vest for identification purposes.

3.1.3.2. At least one attendant for each confined space entry shall be equipped with a radio or air siren to summon rescue service. If the entrants are out of sight of the attendant, at least one of the entrants shall be similarly equipped.

3.1.4. Employees entering a confined space (entrants) must be logged in and out of the designated area on the back of the work permit by the attendant when entering and exiting the confined space. Documentation of the time and date in which the space was entered or exited is required. The same documentation is required of attendants in the spaces provided on the back of the permit.

3.1.4.1. Additional Confined Space Sign-in/Sign-out for Authorized Entrants Form (Attachment E) may be used when the Confined Space Sign-in/Sign-out for Authorized Entrants on the back of the Safe Work Permit does not provide enough space to track the entrants. This form(s) must be turned in with the Safe Work Permit when it is closed out.

3.1.5. A confined space which is normally open and could be entered inadvertently (e.g., vessel skirts) must have a sign/label reading “Danger Do Not Enter”.

3.1.6. Confined Space Attendant Reference Sheets will be developed for all Confined Spaces and include the following information at a minimum:

NOTE: Confined Spaces that did not previously nor currently contain a hazardous substance requiring an SDS (e.g., fin fans, cooling water shrouds/ cells, external floating roofs, vessel skirts, new equipment not yet put in service etc.) ***do not*** require a reference sheet.

- Unit Name
- Equipment Name & Number
- Picture of Equipment
- Equipment Drawing (if available)
- Previous Material in Vessel including Signs and Symptoms of Exposure
- Non-Entry/ Fall Protection Plan, and

- Emergency Contact Information

3.1.6.1. Confined Space Attendant Reference Sheets shall be located at all active entry points to the Confined Space.

3.1.6.2. Excavations may utilize the Safe Work Permit in lieu of a Confined Space Attendant Reference sheet if all same information, as referenced above, is captured on the Safe Work Permit.

3.1.6.3. See Attachment H for a template of the Confined Space Attendant Reference Sheet.

3.1.7. Proper signs (See Attachment D) must be posted at all points of entry when they are opened or are intended to be occupied.

3.1.7.1. Signs will be maintained and provided by the owning department.

3.1.7.2. All personnel must follow the directions printed on each sign.

3.1.7.3. When the point of entry is first opened, the red “Do Not Enter” sign will be posted by the individual(s) opening the space (Servicing Group personnel).

3.1.7.4. The owning department will ensure the red “Do Not Enter” sign is posted.

3.1.7.5. When the permit is complete and the space is ready to enter, the owning department will provide the attendant with a green “Approved for Entry” sign. The attendant will remove the “Do Not Enter” sign and post the green “Approved for Entry” sign when they are on duty and monitoring the space.

3.1.7.6. When an attendant is not on duty, all entrants must be evacuated, the “Do Not Enter” sign posted.

3.1.7.7. If it is determined that the Safety Department must reassess the space, the owning department will re-post the red “Do Not Enter” sign.

3.1.7.8. When the entry is complete and the opening is closed and secured, the signs must be removed by the servicing group or owning department.

3.1.8. Lighting equipment shall be:

3.1.8.1. Approved for ignitable/ combustible properties for the potential hazards of the confined space (gases, vapors, dust.)

3.1.8.2. Lighting equipment shall be sufficient to allow entrants to see well enough to work safely and exit the space quickly in the event of an emergency.

3.1.8.3. Lighting equipment shall be sufficient to enable employees to see well enough to work safely and to exit the space quickly in an emergency.

3.1.9. Emergency Egress lighting shall be available as back-up to primary lighting in the event the space loses primary lighting during an emergency and shall be:

3.1.9.1. Approved for ignitable/ combustible properties for the potential hazards of the space.

3.1.9.2. Lighting equipment shall be sufficient to enable employees to exit the space quickly in an emergency

3.1.10. A battery back-up lighting system shall be used when feasible. In the event a battery back-up lighting system is not feasible a headlamp which is compatible with the hazards of the space shall be worn on the hard hat. A handheld flashlight is

acceptable in lieu of a headlamp in cases where welding protection equipment or other PPE prevent the use of a headlamp.

3.1.11. Barriers or shields must be in place to protect entrants from hazards outside of the space (e.g., Jersey barriers for confined space excavations along roadways.)

3.2. Preparatory Work and Precautions

3.2.1. All preparatory work and precautions must be complete before an entry permit can be issued.

3.2.2. Each piece of equipment to be entered must be properly isolated in accordance with PR-14 Energy Isolation.

3.2.3. Lines to the confined space must be blinded or physically disconnected as close to the equipment as practical to effectively prevent any material from entering the confined space. Any blind location or disconnect other than at the first flange from the confined space will be reviewed by a Safety Department representative, the Owning Department, and Maintenance.

3.2.3.1. See PR-14 Energy Isolation, Section 5.3.4 for additional requirements.

3.2.4. The confined space must be purged, steamed, washed, etc., as necessary to properly free it of all contaminants. Special attention and preparation must be given to the removal of liquid product, sludge and residue.

3.2.5. While clearing confined spaces, it is essential to control escaping gas and vapors in the surrounding area, prevent unauthorized personnel in the area, control all sources of ignition in the surrounding area, monitor the atmosphere, and don the appropriate PPE for working in and around such areas.

3.2.6. All lighting for a Confined Space Entry must be adequately tagged with a “Do Not Disconnect” tag at the source. See Attachment E.

3.2.7. Electrical equipment used in confined spaces must comply with the requirements of RSP-1162, Electrical Safe Work Practices. Help with anticipating physical hazards associated with confined-space entries can be found in Attachment A Potential Confined Space Hazards and Attachment C Anticipated Physical Hazards Associated with Confined Space Entries into Storage Tanks.

3.2.8. Physical hazards (e.g., engulfment, down comer lines, fan blades, sumps, counterweights, structural damage, catalyst, coke, refractory on walls, etc.) must also be considered and precautionary measures put in place to alleviate their impact on a confined space entry.

3.2.9. Sewer entry differs from other permit entries (with the exception of plugging and ballooning with materials of construction that are compatible with the hazards) in that there rarely exists any way to completely isolate the space to be entered. Atmospheres may suddenly and unpredictably become lethally hazardous (engulfment, toxic, flammable or explosive). Additional hazard assessment and advance planning are necessary. Items the additional assessment shall address are:

- Continuous atmospheric monitoring by at least one entrant.
- Use of escape self-contained breathing apparatus with at least 10 minute air supply to utilize in the event of sudden atmospheric changes.
- Sewer entries may not be performed when hot work is taking place near the sewer being entered or any branch sewer connected to the sewer being entered.
- Attendant must have a plant radio in order to be aware of and notify entrants when any planned or unplanned fire suppression activities occur that could

impact the sewer system being entered.

- Imminent rain events that could flood the sewer system.

3.2.10. Several pieces of equipment can be isolated with common blinds provided that the separate pieces of equipment are treated as a single confined space and the following conditions can be met.

3.2.10.1. The entire space shall be atmospherically tested and continuously monitored.

3.2.10.2. The space must be isolated and all engulfment, mechanical, and internal configuration hazards must be addressed.

3.2.10.3. All lines and bleeders must be purged, cleared and drained as required.

3.2.10.4. The piping between the equipment and blind locations must be free draining with no pockets or low point traps.

3.2.10.5. When working on multiple pieces of equipment, hot work may not be performed on any of the equipment between the blind locations until the equipment can be isolated from the rest of the system, the personnel are cleared from the other spaces or until it can be ascertained that the personnel not performing the hot work are protected.

3.2.10.6. There are no branch connections between the equipment to be entered that cannot be properly isolated.

3.2.10.7. An attendant or multiple attendants shall be positioned so that they can adequately monitor the entrants.

3.2.10.8. A single permit shall be prepared for the entire space unless the confined space warrants otherwise, for example, a catalytic regenerator.

3.2.10.9. Entrant sign-in/sign-out sheets for multiple active entrance/exit locations shall be coordinated, maintained and controlled by an assigned attendant to ensure that all entrants are accounted for at the completion of entry operations.

3.3. Testing and Monitoring

3.3.1. All confined space atmospheres must be tested prior to entry. Refinery and contractor personnel will conduct testing and monitoring of the atmosphere.

3.3.2. Testing equipment shall be calibrated, used and maintained in accordance with EQ-7 Portable Gas Testing and the manufacturer's recommendations.

3.3.3. All confined spaces are considered hazardous atmospheres until pre-entry testing and verification demonstrates otherwise.

3.3.3.1. The Contractor Coordinator, Maintenance Planning, and Owning Department (as applicable), shall identify and evaluate any hazards associated with a confined space prior to opening such a space.

3.3.4. The Owning Department will conduct initial testing and monitoring for entry into confined spaces and after an event that may have changed the conditions in the space.

3.3.4.1. Initial testing and monitoring is required:

3.3.4.1.1. The first time a space is opened.

3.3.4.1.2. If the space is closed, latched, and re-opened.

3.3.4.1.3. If the space is de-isolated (ANY blinds or lockout devices removed).

3.3.4.1.4. After any situation that could lead to new, unexpected hazards in the space.

3.3.4.1.5. When requested/recommended by the Safety Department, Owning Department, or Servicing Group.

3.3.4.2. The Owning Department will:

3.3.4.2.1. Complete initial atmospheric monitoring.

3.3.4.3. The Safety Department will:

3.3.4.3.1. Witness the initial atmospheric monitoring.

3.3.4.3.2. Complete the Safe Work Permit Confined Space Tracking Log for confined space entries. See section 3.6.9 of PR-3 Safe Work Permit Procedure for more information.

3.3.4.4. After the initial permit is issued, the Owning Department will continue to require the same precautions (i.e., PPE, rescue equipment, etc.) in subsequent permits until Safety has given the approval to change the requirements. See PR-3 Safe Work Permit Procedure.

3.3.5. Conduct initial atmospheric testing from outside the space with the ventilation turned off. When conducting initial pre-entry atmospheric testing, the ventilation must be turned off long enough (at least 15 minutes) to ensure steady state conditions.

3.3.6. Always test the air at various levels to ensure the entire space is safe. Contaminants with different vapor densities will settle at different levels in the space.

3.3.7. Based on the configuration of the confined space, it may be necessary to enter and perform additional testing to ensure that contaminates are below acceptable levels. Conduct this entry testing after all other conditions of the safe work permit are satisfied and a safe work permit has been issued.

3.3.8. When the initial atmospheric testing results are acceptable and representative, determine if the work to be done in the space will introduce additional hazards.

3.3.9. All confined spaces shall be tested for the following materials in the order listed:

3.3.9.1. oxygen deficiency

3.3.9.2. Flammable gases/vapors (% Lower Explosive Limit),

3.3.9.3. CO and H_2S

3.3.9.4. Temperature

3.3.9.5. Other toxic substances (Benzene, SO2, etc.) will be tested as required by the nature of the process.

3.3.9.6. Other potential hazards (, radiation, combustible dust, pH, etc.) shall be tested for as necessary.

3.3.9.6.1. If dust obscures vision within five feet, the atmosphere is considered hazardous and mitigation (i.e. ventilation, respiratory equipment) is required. See PPE-5 Respiratory Protection.

3.3.10. See PPE-5 for exposure limits for common refinery contaminants.

3.3.11. Continuous atmospheric monitoring equipment with proper alarms (LEL, H2S, O2, CO and SO2 if applicable), shall be used at all times whenever an entrant is inside a confined space.

3.3.11.1. Continuous monitoring instruments must be direct-reading devices that have a visual readout and audible alarm which can be set to alarm at unacceptable entry conditions. The monitors must alarm for high levels of LEL, H2S, and CO (and SO2 if applicable). They must also alarm for high or low concentrations of oxygen.

3.3.11.1.1. Hand aspirators are not permitted for use in confined spaces.

3.3.11.1.2. If direct reading instruments are not capable of monitoring for contaminants of concern, contact Safety/Industrial Hygiene for suggested alternatives.

3.3.12. Though continuous monitoring is required in confined spaces, the following schedule will be applied by the Owning Department after the initial tests.

3.3.12.1. Test the interior of the confined space if entry did not occur within two (2) hours of the initial test.

3.3.12.2. Test the interior of the confined space at mid-shift (at a minimum).

3.3.12.3. Test the interior prior to re-entry after an absence of two hours or more.

3.3.12.4. Test the interior of the confined space after an event that may have changed the conditions in the space.

3.3.12.5. Consider re-testing for other hazards on a case-by-case basis and specify on the safe work permit, if required.

3.3.13. In addition, the work party has the right to be present for atmospheric testing before entry into a confined space. The work party also has the right to request atmospheric testing at any time regardless of whether it is prior to entry or during a job in which the space had already been entered.

3.4. Inert or Immediately Dangerous to Life or Health (IDLH) Atmospheres

3.4.1. Due to the extreme hazardous nature and additional preparations that need to be made for entry into this type of atmosphere, the guidelines regarding inert atmospheres are contained in a separate procedure. For more information refer to PR-5 Inert Confined Space Entry.

3.4.2. Except for planned inert entries, atmospheres with IDLH concentrations may be entered only in emergency situations and then only with a safety pre-plan developed with the contractor, Safety Department and Owning Department Manager.

3.4.2.1. In that case, entry will require full respiratory protection and eye and skin protection. Atmospheres where the toxicity is not known will not be entered unless it's absolutely necessary to enter the space

3.5. Explosive or Flammability Limits

3.5.1. LEL concentrations inside a confined space cannot exceed 0% for hot work or 10% for cold work

3.5.2. If cold work is taking place, less than or equal to 10% LEL is acceptable provided the entrants wear the appropriate PPE (e.g., additional respiratory protection), the source of the LEL is known, and every effort has been made to reduce the LEL to 0%.

3.6. Oxygen Concentrations

3.6.1. Concentrations below 19.5% require following the Inert Confined Space Entry procedure if it is absolutely necessary to enter.

3.6.2. No entry is permitted if oxygen levels exceed 23.5%.

3.6.3. If oxygen levels are less than 20.4% or more than 21.4%, the reason must be determined to assure that the conditions cannot worsen during work activities.

3.7. Respiratory Protection and PPE

3.7.1. Respiratory protection must be used when entering a confined space where concentrations of airborne contaminants exceed the allowable limits in PPE-5 Respiratory Protection Attachment B. Steps such as ventilation must be taken to reduce the concentration of the airborne contaminants.

3.8. Ventilation

3.8.1. Continuous mechanical ventilation is required for all confined space entries (except for inert confined space entries) unless its use would pose a hazard such as from obstructed manways or blowing dust

3.8.1.1. Whenever practical, a bottom and a top manway should be opened, the vessel should be vented, and an air mover installed at a manway to ensure air flow.

3.8.1.2. All air ventilation equipment must be grounded/bonded to the vessel with an approved grounding strap.

3.8.1.3. Boiler or Furnace Fire Boxes with natural draft ventilation, excavations, and the tops of external floating roof tanks do not require the use of continuous mechanical ventilation.

3.8.1.4. Mid-shift & subsequent shift tests do not require air moving equipment to be turned off.

3.8.2. When ventilation is required, the permit writer and entry supervisor shall ensure that the inducted air does not represent a health concern from sources such as vehicle exhaust or process emissions.

3.8.3. Attendants shall require confined space occupants to immediately leave the space when ventilation systems fail.

3.8.4. Do not supply air movers from the plant air system. Failure to comply with this requirement could result in serious injury or death.

3.8.5. All air hose connections to ventilation equipment (or the power cord for electrically driven equipment) for a Confined Space Entry must be adequately tagged with a “Do Not Disconnect” tag at the source. See Attachment E.

3.9. Use of Toxic and/or Flammable Materials in Confined Spaces

3.9.1. Work in confined spaces frequently requires the use of toxic or flammable materials. These include but are not limited to coatings, linings, paints, cements, and solvents.

3.9.1.1. These chemicals must be approved for use. See ADM-3 Hazard Communication Program (HAZCOM) Policy.

3.9.2. Quantities of toxic or flammable materials brought into or used in confined spaces must be limited to the smallest amount consistent with efficient use.

3.9.3. Containers will be designed to minimize evaporation and spillage. Safety cans or small squeeze bottles shall be used when applicable.

3.9.4. Continuous ventilation must be provided in sufficient quantity and designed to control

fire and health hazards.

3.9.5. Atmospheres shall be tested and/or evaluated to provide positive assurance that hazards do not exist.

3.9.5.1. Airborne contaminants greater than the PEL/TLV specified in PPE-5 Attachment B require respiratory protection. Consult the Safety or IH Team for guidance.

3.10. Temperature Extremes Inside Confined Spaces

3.10.1. Confined space entry is not permitted if the temperature of the atmosphere inside the space exceeds 110 degrees Fahrenheit.

3.10.2. Laser type temperature recording devices should be used when it is suspected that shells, refractory, floors or any other surface in the confined space may present additional hazards upon contact with the surfaces.

3.11. Hot Work

3.11.1. When welding or cutting is performed in a confined space utilizing cutting torches and the work is stopped and the space is vacated for more than 15 minutes, the torches and hoses must be removed or the hoses (oxygen and fuel gas or inerting gases) disconnected from the regulators.

3.11.2. Compressed gas cylinders used in welding or cutting processes must be stored outside the vessel or confined space and away from the points of entry and exit.

3.11.3. Consideration must be given to the effect on the vessel's atmosphere of introducing non-breathing air quality air into the vessel. Compressed air exhausted from tools may contain significant concentrations of carbon monoxide or oil mist

3.11.4. Welding in a confined space requires the use of supplied air respirators or a written ventilation plan that provides 2000 cubic feet per minute (cfm) per welder of forced air ventilation from a clean source.

3.11.5. See Attachment B for guidance on written ventilation plans.

3.11.6. Every effort must be made to remove or minimize combustible material in a confined space before attended hot work is performed.

3.11.6.1. If combustible material inside a confined space can't be removed, it must be protected from a potential ignition source in the space (i.e. falling slag, sparks, etc.).

3.11.6.1.1. Confined spaces that have a large quantity of combustible materials must have a charged fire hose or other water source available to immediately extinguish a combustible fire.

3.12. Lightning Precautions

3.12.1. It is the responsibility of the Owning Department & Entry Supervisor to cease confined space entries when a Lightning Alert is issued.

3.12.2. Refer to EPR-4 for more information.

3.13. Naturally Occurring Radioactive Material (NORM)

3.13.1. Where exposure to NORM is reasonably foreseeable, appropriate measures will be taken to restrict or limit employee exposure. Entry into a confined space requires the use of appropriate Personal Protective Equipment if the dose rate inside the vessel/confined space exceeds 50 μR/hr, or until steps have been taken to reduce the NORM level to below the allowable limit. Consult the IH Team for guidance.

3.14. Boiler or Furnace Fire Boxes

3.14.1. Blinding and cleaning of boiler or process tubes is not required for entry unless invasive work will be done on the tubes inside the space.

3.14.2. During pigging operations, entrants shall be allowed entry up to the point the tubes are ready to be pressurized. Once tubes are under pressure, entrants shall be held out of the space until one pass of the pig has been completed as a verification of tube integrity. When tube integrity is verified, entrants shall be allowed back into the space during pigging operations.

3.14.3. For scope requiring Hydrotesting of the tubes Refer to PR-14 Energy Isolation, Section 7.2.2.1.

3.15. Cooling Towers

3.15.1. Entry into non-operating cooling tower cells or fan shroud – these provisions apply only when the water in the cell and the fan are shut-off.

3.15.1.1. If other cells within the same cooling tower are operating during entry, then the chemical injection system must remain active for continued control of biological growth in the operating cooling tower cell(s). Periodic monitoring of the water during entry must be considered to ensure neutral pH levels are being maintained. If pH levels of the water in the cooling tower change significantly the entry shall be suspended until the conditions are addressed.

3.15.1.2. If work activities within the non-operating cell will disturb biological material (e.g., algae), then half-mask air-purifying respirator with HEPA filters must be worn. Disturb in this context means any activity that could create particles/aerosols fine enough to be inhaled. Examples of this include hydro blasting and sawing inside a non-operating cell. Building or dismantling scaffolds would not meet this criterion.

3.16. Floating Roof Tanks

3.16.1. Covered Internal Floater

3.16.1.1. Under no conditions shall permission be given to enter a covered internal floater with a plastic, Petrex, aluminum or fiberglass internal roof while the tank is in service or has product in it.

3.16.1.2. A Confined Space Entry Permit may be issued for entry into a covered internal floater with a steel pan or pontoon roof if all of the following conditions are met:

3.16.1.2.1. It is preferred that the pan be not more than ten feet below the fixed roof. In all cases it should be as high as possible. This requirement may be waived if clean water only is in the tank (such as during hydrostatic testing).

3.16.1.2.2. All lines to and from the tank must be locked out/tagged out at the tank.

3.16.1.2.3. All mixers must be shut off and isolated in accordance with the Energy Isolation procedure.

3.16.1.2.4. Self-contained breathing apparatus (SCBA) or a supplied air respirator with five-minute escape provisions must be used on all entries except for hydro-test water.

3.16.1.2.5. A winch with fall protection capability must be in use when ascending and descending ladders into the tank.

3.16.1.2.6. Entrants must wear a full-body safety harness and lifeline. If there is an entanglement hazard, the entrants may remove the lifeline after reaching the pontoon or floating roof provided one person stays at the bottom of the ladder with the lifeline as an observer for the others. The lifeline must be re-attached before exiting back up the ladder. A breathing apparatus harness is not acceptable as a full body harness.

3.16.1.2.7. An outside attendant must be stationed on the top platform with immediate communications and rescue capabilities available (radio, back-up person, etc.).

3.16.1.2.7.1. SCBA or supplied air respirator must be available to the person on the roof if required for entrants.

3.16.1.2.8. Entrants shall not be allowed to descend onto an internal floating roof, which is out of floatation (sitting on its legs) until the space below the roof has been opened and ventilated and atmospheric testing has been conducted both above and below the open-top floating roof and conditions allow the issuance of an entry permit.

3.16.1.3. A full-body harness and lifeline will rarely be used for rescue purposes for confined space entries below the floating roof of an internal floating roof storage tank and may be waived by a Safety Department Rep.

3.16.2. Storage Tanks with External Floating Roofs

3.16.2.1. Entry onto a storage tank's external-floating roof is a confined space when the roof is more than four feet from the top of the tank regardless of the hazards above/below the external-floating roof (i.e., whether product is or is not below the floating roof).

3.16.2.2. All lines to and from the tank must be locked out/tagged out at the tank so that the possibility of pumping in or out of the tank is eliminated.

3.16.2.3. All mixers must be shut off and isolated in accordance with the Energy Isolation procedure.

3.16.2.4. Prior to descent, the external floating roof shall be visually inspected from the platform for potential physical hazards and stability. If there is any doubt about integrity of a floating roof, contact the Inspection Department to ensure the metal thickness is within API specifications to walk on.

3.16.2.5. Entrants shall not be allowed to descend onto an external floating roof, which is out of floatation (sitting on its legs) until the space below the roof has been opened and ventilated and atmospheric testing has been conducted both above and below the open-top floating roof and conditions allow the issuance of an entry permit.

3.16.2.6. Full-body harnesses and lifelines will rarely be used for rescue purposes for confined space entries above and/ or below the roof of an open top floating roof storage tank and may be waived by a Safety Department Rep.

3.16.3. Entry onto external floating roofs for tasks of short duration (e.g., gauging and sampling) conducted by the Owning Department can be allowed with the following requirements:

3.16.3.1. Product receipts must have ceased one (1) hour prior to any entry onto the roof.

3.16.3.2. Notification to the appropriate personnel with control over product movement that an entry on to an external floating roof is being made by Products Control Department personnel.

3.16.3.3. Entry is conducted using the "Buddy System", meaning that one Product Control Department employee enters on the roof and one stays at the top of the tank acting as the attendant.

3.16.3.4. Initial air monitoring for oxygen and LEL and toxics as appropriate is conducted within five feet of the tank roof prior to any employee entering onto the roof

3.16.3.5. The entrant is equipped with a continuous air monitoring device which will alarm if conditions change while the entrant is on the roof.

3.16.3.6. The entrant leaves the roof if conditions change or the continuous air monitoring device alarms.

3.16.3.7. Notification is made to the appropriate personnel with control over product movement that the entry is complete and that all employees have exited the roof.

3.17. Piping

3.17.1. Piping (16" or greater in diameter) and so configured that it can be bodily entered shall be considered a confined space.

3.18. Trailer Skirting

3.18.1. The space underneath trailers is not classified as a confined space if 8 foot sections (at a minimum) of skirting on 2 opposing sides are removed.

3.19. Cooling Water Tower Shrouds

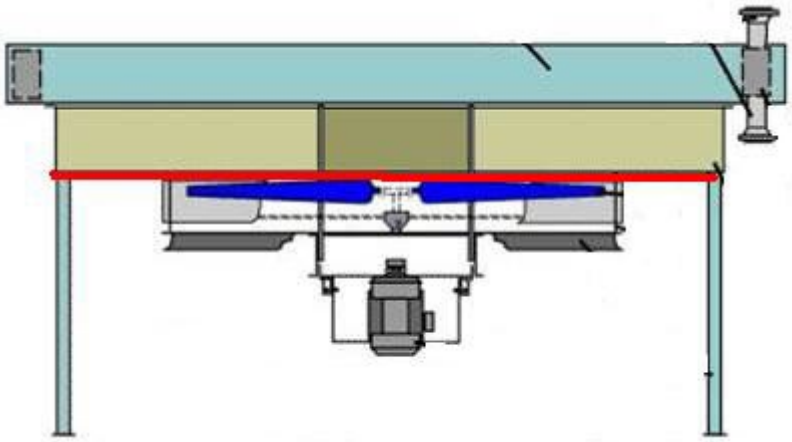
3.19.1. Cooling water tower fan shrouds with a door sheet removed and the fan isolated are not considered confined spaces as long as the employees stay above the deck and do not enter the cooling water tower cell.

3.20. Exchanger Shells

3.20.1. Exchanger shells that have been blinded or air gapped per Confined Space & Energy Isolation requirements, opened on both ends, cleaned, are large enough for a person to walk into and out of the exchanger shell unimpeded, are not considered confined spaces.

3.21. Fin Fans

3.21.1. For fin fans with the configuration shown below, confined space entry is required when personnel enter and perform work above the fan hub. Any work performed on or below the fan hub (fan blades, motor, pulleys, gearbox) is not considered a confined space entry.



The Red Line indicates the confined space plane. All work above the red line (fan hub) will require confined space entry. All work on or below the Fan hub (Fan blades, motor, pulleys, gearbox) will **NOT** require confined space entry.

3.21.2. Fins fans with other configurations require a confined space entry permit when entering from above or below.

3.22. Refractory Work Inside Confined Spaces

3.22.1. Additional hazard assessment and advance planning are necessary to determine the refractory materials and potential work exposures (e.g., pH, arsenic, free silica, heat deterioration). (Include Safety Department involvement prior to entry).

3.23. Confined Space De-classification

3.23.1. Tanks and excavations located outside of active/current process areas may be de-classified as non-confined spaces by the Marathon Safety Department. Other types of confined spaces cannot be de-classified. Although a de-classified space is no longer considered a confined space, work permits are required in accordance with PR-3 Safe Work Permit Practice.

3.23.1.1. De-classification is reserved for tanks undergoing long term tank maintenance projects and large excavations outside of battery limits during construction periods.

3.23.2. All entrants shall leave de-classified spaces any time an uncontrolled hazard arises. De-classified spaces that have been evacuated because of an uncontrolled hazard must be re-evaluated by a representative of the Safety Department before they can be re-entered.

3.23.3. To de-classify a tank or excavation, the following must be completed:

3.23.3.1. A meeting with a GBR Safety Department representative, Job Coordinator, Contractor Foreman, Excavation Competent Person (as needed) and Operations Supervision will take place to make the final determination of de-classification.

3.23.3.2. Additional precautions (PPE, additional monitors, barriers, shields, lighting requirements, rescue equipment, etc.) will be determined during the de-classification meeting.

3.23.3.3. The Safe Work Permit Confined Space Tracking Log will be updated to state that the space has been de-classified.

3.23.3.4. Tanks outside of active/ current battery limits may be de-classified after the following additional tasks have been completed. All work preceding de-classification will occur as outlined elsewhere in this procedure. If the permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated, it may be de-classified as long as the hazards remain eliminated. Control of atmospheric hazards through forced air ventilation does not constitute elimination of the hazards.

3.23.3.4.1. Continuous atmospheric monitoring with a four-gas monitor is required inside the tank once it has been de-classified.

3.23.3.4.2. The tank must be cleaned and free of residues and materials. The survey will assess all parts of the tank including pontoons, roof seals, roof legs and/or gauge poles which are sealed to the floor, and residues on the floor, walls and roof.

3.23.3.4.3. **Note:** Entry into pontoons will still require a confined space entry permit.

3.23.3.4.4. An atmospheric test shall be conducted.

3.23.3.4.5. A door sheet (approximately 10’ x 8’) must be cut in the side of the tank.

3.23.3.5. Excavations outside of active/current battery limits may be de-classified if the excavation does not have “limited or restricted means for entry or exit.”

3.23.3.5.1. The excavation must have a sufficient protective system (e.g., sloped, or sheeting) and have at least one sloped vehicle ramp (i.e., large enough to support a full size truck).

3.23.3.5.2. The excavation must have ladders or ramps every 25 feet along its perimeter.

3.23.3.5.3. All work in a de-classified excavation requires initial and periodic atmospheric tests following the hot-work requirements of PR-3 Safe Work Permit Practice. Continuous monitoring is still required in de-classified excavations.

3.23.3.5.4. Trenches cannot be de-classified.

3.23.3.6. Once the tank or excavation has been de-classified, a notice, stating the date, time and individuals making the determination will be posted at the opening of the tank or excavation, using the sign in Attachment J: Example of Declassified Space Notice or equivalent.

3.23.4. At any time a hazard arises in a de-classified space, all entrants shall leave the space and before re-entry a Safety Department representative shall re-evaluate the space.

3.24. Large, Complex and High Worker Density Confined Spaces

3.24.1. Additional hazard assessment and advanced planning are necessary for Confined Spaces that have any of the following characteristics:

3.24.1.1. 50 or more entrants simultaneously per shift

3.24.1.2. Confined Space Entry inside the Confined Space (e.g., work inside cyclones inside a regen.)

3.24.1.3. Complex scaffold systems, including seal decks that separate the Confined Space.

3.24.2. The additional hazard assessment, Attachment F, must be completed by an MPC Safety Professional and MPC Maintenance Representative knowledgeable in the work scope when any one of the above characteristics are met. The hazard assessment must consider at least the following:

3.24.2.1. Personnel accountability in the event of an emergency.

3.24.2.2. Personnel protection from falling debris, tools, equipment.

3.24.2.3. Alerting systems that can be heard and seen by all entrants in the event of an emergency.

3.24.2.4. Additional Attendants and Fire Watches stationed inside the space.

3.24.2.5. Additional Fall Protection requirements.

3.24.2.6. Adequacy and quantity of access/ egress locations.

3.24.2.7. Complexity of ventilation system(s) and any hazards the system itself would introduce.

3.24.2.8. Consideration of a Confined Space Monitoring System that has CCTV, air monitoring, audio& visual alarms, and voice communication systems.

3.24.2.9. Enhanced fire prevention/ protection systems

3.25. Confined Space Rescue

3.25.1. Only trained personnel may enter a confined space for rescue purposes. Non-entry rescue may be performed provided the rescuer is trained to properly use such equipment.

3.25.2. As per RSP-1121-020, MPC will not enter into Inert Confined Spaces.

3.25.3. An adequate number of rescue personnel must be available within the refinery during an active confined space.

3.25.3.1. Note: Adequate number is a minimum of 3 personnel.

3.25.4. MPC employees who are designated Confined Space Rescue Team Members must

(a) Be trained in basic first aid and CPR, and

(b) Practice making permit space rescues, in representative permit spaces, before attempting an actual rescue in refining/process type Confined Spaces, and at least once every 12 months, by means of simulated rescue (e.g., remove dummies, manikins, or actual persons).

3.25.5. Emergency/rescue personnel

(a) operate according to the site emergency response plan, and

(b) can only enter the confined space (with unknown or hazardous atmospheres) when

equipped with

− SCBAs, or

− positive-pressure airline respirators equipped with escape bottles and other appropriate personal protective equipment, and

− only when an Attendant is stationed by the confined space.

3.25.6. Rescue services will handle the rescue under guidance of the

(a) Fire Chief,

(b) Senior ERT member, or

(c) Rescue Team Leader.

3.25.7. SDSs will be made available to medical facilities treating exposed employees, if applicable.

3.25.8. Retrieval systems or methods shall be used whenever an entrant enters a confined space, unless the retrieval equipment would increase the overall risk of entry, or would not contribute to the rescue of the entrant (such as an airline entanglement or interior space obstructions).

3.25.9. All entrants entering a confined space shall wear a harness and retrieval line for a more efficient rescue.

3.25.9.1. The retrieval systems shall not be used if the risk of entry or entanglement greatly outweighs the benefits of rescue (such as an airline entanglement or interior space obstructions).

3.25.10. Use wristlets/anklets in lieu of the harness when the use of the harness is infeasible or creates a greater hazard and the use of wristlets/anklets is the safest and most effective alternative.

3.25.11. Only the GBR Safety Department (including directly supervised employees) may waive the harness and/or retrieval line requirements.

3.25.12. If a confined space entrant is exposed to a substance for which a Material Safety Data Sheet (SDS) is kept, the written information shall be made available to the medical facility treating the individual.

3.25.13. For spaces with entry points less than 18 inches in diameter, special vessel-specific rescue plans are required and must be reviewed by the Rescue Team.

NOTE: The GBR Emergency Response Team standard CSE rescue plans/protocols address spaces with entry points greater than 18 inches in diameter.

3.25.14. Non-entry Rescue

3.25.14.1. The end of the retrieval line must be attached to a mechanical device or fixed point outside of the space. This is so the attendant may begin rescue as soon as they become aware that a rescue is necessary.

3.25.14.2. All entries of a vertical type greater than 5’ shall use a mechanical retrieval device.

3.25.15. Entry Rescue

3.25.15.1. At no time shall any untrained person attempt a confined space rescue by entering the space.

3.25.15.2. At least 3 rescue personnel must be available within the refinery during an active confined space.

3.25.15.3. In an emergency situation, the attendant or entry supervisor will immediately notify the Security Operations Center to request rescue services. The attendant or entry supervisor shall then state his/her name and the exact location of the confined space.

3.25.15.3.1. The attendant or entry supervisor should then contact the owning department to alert them of the incident.

3.25.16. Third Party Rescue

3.25.16.1. If a third party rescue service is utilized, MPC must evaluate the prospective rescuer's ability to respond in a timely manner, proficiency and condition of rescue equipment.

3.25.16.2. The third party rescue team must notify MPC immediately in the event that the rescue service becomes unavailable.

3.25.16.3. Third party rescue teams must be allowed to access all spaces in order to develop rescue plans and practice rescue operations.

3.25.16.4. The rescue team shall be informed of the potential hazards at the site.

3.26. Contractors

3.26.1. GBR's responsibilities to contractors who perform confined space work are as follows:

3.26.1.1. GBR shall inform the contractor that confined spaces must only be entered after obtaining a confined space entry permit.

3.26.1.2. A Marathon representative shall inform the contractor of the hazards identified with a particular confined space. The contractor must also be made aware of any experiences that GBR has had with the space.

3.26.1.3. Inform the contractor of any precautions or procedures GBR has taken for the protection of employees in or around the spaces where contractor personnel are working.

3.26.1.4. Coordinate GBR/contractor workers so that each company is aware of the others' operations. This will prevent one company from endangering the other.

3.26.2. In addition to complying with this procedure, each contractor who performs confined space work shall:

3.26.2.1. Along with a Safe Work Permit, obtain any available information regarding the confined space hazards and entry operations.

3.26.2.2. Verify that the specified conditions on the permit are adequate and have been met and are understood and followed.

3.26.2.3. When a manway or other point of entry is first opened, post a red "Do Not Enter" sign.

3.26.2.4. Coordinate GBR/contractor workers so that each company is aware of the others' operations. This will prevent one company from endangering the other.

3.26.2.5. During multi-craft work, the crafts creating any hazards must notify the Entry Supervisor and take measures to evacuate the space so that corrective action can be taken to mitigate hazards.

3.26.2.6. Inform GBR of any hazards confronted or created in the spaces either through a debriefing or during entry operations.

3.26.2.7. Inform the owning department or other authorized personnel if and when the nature of the job changes the conditions under which the confined space entry was originally authorized.

3.26.2.8. Each contractor is responsible for following Safety procedures and all other Galveston Bay Refinery procedures.

3.26.2.9. Each contractor shall supply their employees with all required safety and personal protective equipment (e.g., respiratory, eye, skin protection, monitoring equipment).

3.26.2.10. Use and maintain all safety and air monitoring equipment in compliance with manufacturer's recommendations and EQ-7 Portable Gas Testing.

3.26.2.11. A contractor entrant's representative must inform the permit writer when they have completed their entry and must complete the debriefing section on the back of the permit.

3.26.2.12. Ensure that attendants are competent with all equipment (e.g., atmospheric monitoring, communications, etc.)

3.26.2.13. Each contractor shall require their confined space entrants and attendants to be trained and certified and must be able to provide proof of training.

3.27. Responsibilities

3.27.1. Owning Department

3.27.1.1. Know the confined space hazards including information on the mode and the consequences of exposure.

3.27.1.2. Provide appropriate instructions for preparation of the space for entry including clean up and isolation.

3.27.1.3. Ensure that all energy isolation requirements pursuant to PR-14 Energy Isolation have been satisfied.

3.27.1.4. Verify that the master isolation list is signed and completed.

3.27.1.5. Coordinate entry operations with the contractor, nearby operations, and any other employees or contractors working in or near the confined space.

3.27.1.6. Inform the confined space entry work party of any area or operational conditions that may impact the confined space entry operation (e.g., nearby hot work, sewer draining operations).

3.27.1.7. Identify potential hazards associated with the confined space and specify the testing and precautionary measures required to ensure the safety of the entry and the work to be done. See Attachment A and Attachment C, if applicable.

3.27.1.8. Contact the Safety department for assistance as necessary.

3.27.1.9. Contact the Inspection Department to address mechanical integrity issues relative to the confined space prior to entry (e.g., tank roof metal thickness, stability of refractory).

3.27.1.10. Ensure that required atmospheric testing is conducted prior to entry, as required.

3.27.1.11. Ensure that air monitoring equipment is properly maintained per manufacturer's recommendations and EQ-7 Portable Gas Testing.

3.27.1.12. Ensure that the permit is maintained at the job site during the entry operation.

3.27.1.13. Ensure attendants have adequate communications methods with both entrants and rescue services.

3.27.1.14. Ensure adequate attendant personnel are present and that proper emergency/rescue equipment and other personal protective equipment are specified by the permit.

3.27.1.15. Ensure GBR rescuers are available within the refinery.

3.27.1.16. Coordinate through the entry supervisor that the specified conditions on the permit have been satisfied.

3.27.1.17. Acquire all required signatures on the Safe Work Permit.

3.27.1.18. Validate that permit conditions are acceptable, sign the entry permit and help enforce confined space entry/work permit conditions

3.27.1.19. Cancel and remove the permit when the work is completed or if a prohibited work condition occurs.

3.27.1.20. Conduct a debriefing with each contractor when they have completed their work, and complete appropriate section on the work permit.

3.27.1.21. Notify supervision of any problem involved with the confined space entry.

3.27.2. Entrants

3.27.2.1. Know the hazards that may be faced during entry, including the signs or symptoms and consequences of exposure.

3.27.2.2. Follow confined space permit requirements as well as other appropriate confined space entry work practices.

3.27.2.3. Review the permit for changes following lunch and other breaks prior to re-entry.

3.27.2.4. Properly use and inspect for defects the equipment specified for the entry including but not limited to: testing, monitoring, ventilation, communications, lighting, barriers and shields, emergency rescue protocol, personal protective equipment, and full body harness/retrieval system.

3.27.2.5. Ensure that an attendant is on duty before entering a confined space. Report to the entry supervisor and permit writer any case where an attendant has abandoned his/her post during an entry.

3.27.2.6. Provide name to attendant for sign-in/sign-out log when entering/exiting a confined space.

3.27.2.7. Do not distract the attendant when not involved in the entry or work.

3.27.2.8. Communicate with the attendant so that the attendant may monitor entrant status.

3.27.2.9. Be certified by their employers to have requisite training and experience.

3.27.2.10. Respect and do not alter barriers, lockouts/tag outs, or other confined space equipment.

3.27.2.11. Exit the confined space and notify the attendant whenever the entrant recognizes any sign or symptom of exposure or danger and when a prohibited condition arises.

3.27.2.12. Exits the space as quickly as possible when ordered to do so by an attendant or entry supervisor, whenever recognizing a sign or symptom of exposure, a prohibited condition arises, and when an evacuation alarm is activated.

3.27.2.13. Exits the space as quickly as possible when a change in behavior is detected, a situation takes place outside the space that endangers entry, there is an uncontrolled hazard in the space and if the attendant leaves or cannot effectively perform his duties.

3.27.2.14. When a hazardous condition is suspected, the permit writer should be notified and the permit should be cancelled.

3.27.3. Attendants (i.e., Hole Watch)

3.27.3.1. Know the hazards that may be faced during entry, including the signs or symptoms and consequences of exposure.

3.27.3.2. Be aware of possible behavioral effects of hazardous exposure in entrants.

3.27.3.3. Know the materials last contained in the confined space and consult the SDS as necessary.

3.27.3.4. Verifies Confined Space Attendant Reference Sheet is posted at all active entry points to the confined space.

3.27.3.5. Ensure that a confined space entry permit has been issued for the confined space assigned. Also, make certain that the entry permit:

3.27.3.5.1. Has been signed by the permit writer.

3.27.3.5.2. Identifies the Confined Space Entry Supervisor.

3.27.3.5.3. The precautions noted on the permit have been satisfied.

3.27.3.5.4. Has the current date, time and location on it.

3.27.3.5.5. Is posted at the entrance of the confined space.

3.27.3.5.6. Has a current gas test recorded on it.

3.27.3.5.7. Post the Green “Approved for Entry” sign when on duty and the red “Do Not Enter” sign when not on duty.

3.27.3.6. Log in/out on the space provided on the back of the permit.

3.27.3.7. Check that entrants have required PPE/safety equipment prior to entry into the confined space.

3.27.3.8. Ensures that entrants are identified by name and logged in/out on the back of the permit.

3.27.3.9. Remain on duty outside of the space during entry until relieved by another attendant.

3.27.3.10. Continuously maintain an accurate count of entrants and their identities.

3.27.3.11. Communicate with entrants to monitor entrant status (Ex., voice, rope signals, radio, visual observation, etc.).

3.27.3.12. Monitor activities inside and outside of the space to ensure that it is safe for the entrants to remain in the space. Order entrant(s) to evacuate immediately if:

3.27.3.12.1. Detection of behavioral effects of exposure.

3.27.3.12.2. A prohibited condition arises or uncontrolled hazard arises.

3.27.3.12.3. A situation exists outside the space that could endanger entrants.

3.27.3.12.4. The attendant cannot effectively perform all of their duties and requirements.

3.27.3.12.5. Ventilation systems(s) fail.

3.27.3.12.6. The plant alarm system is activated

3.27.3.12.7. The time limitation on atmospheric testing has expired.

3.27.3.12.8. A condition is observed which is not allowed in the entry permit.

3.27.3.13. Warn and advise unauthorized persons to stay away from or to exit immediately from the confined space.

3.27.3.14. Inform entry supervisor if unauthorized persons enter the space.

3.27.3.15. Prevent the fouling or entanglement of air lines, extension cords, and/or life line.

3.27.3.16. Be trained on all applicable atmospheric monitoring equipment.

3.27.3.17. Observe atmospheric monitoring equipment frequently to be certain that the atmosphere remains safe.

3.27.3.18. If the permit writer or owning department is unable to update the atmospheric test, remove entrants from the space and contact operations for a gas test.

3.27.3.19. Summon rescue and emergency services when entrants need assistance.

3.27.3.20. Perform non-entry rescues.

3.27.3.21. Notify supervision of any problems involved with the confined space entry.

3.27.3.22. Return confined space entry permit to the permit writer with all sign-in/sign-out sections complete. Upon completion of the job, or when work will not be performed on the next shift, the field copy of the work permit located at the job site will be removed and turned over to the permit writer.

3.27.3.23. Perform no other duties that might interfere with primary duty to monitor and protect entrants.

3.27.4. Entry Supervisor must be a trained MPC Employee (Maintenance Foreman, Owning Department Supervisor, Contractor Coordinator (including Directly Supervised Contractors acting as Coordinators), or any equivalent acting supervisor) who is qualified in fulfilling the responsibilities listed in this section and must be identified on the Safe Work Permit anytime MPC or contractor personnel are in a Permit Required Confined Space. Overall, Entry Supervisors are required to ensure that the permitted

confined space is safe to enter, and acceptable entry conditions are maintained during entries.

3.27.4.1. Coordinates entry operations when more than one group will enter the confined space.

3.27.4.2. Ensures entry operations remain consistent with the Safe Work Permit and acceptable entry conditions are maintained.

3.27.4.3. Verifies that Entrants or Entrant Representatives (Service Group Reps), along with Attendants understand the scope, requirements, and limits of the work defined in the Safe Work Permit.

3.27.4.4. Reports, at the end of entry operations, any hazards confronted or created during entry.

3.27.4.5. Knows the hazards that may be faced during entry including the mode, signs, symptoms, and consequences of exposure.

3.27.4.6. Verifies by checking that:

3.27.4.6.1. appropriate entries have been made on the Safe Work Permit.

3.27.4.6.2. all atmospheric testing/air monitoring specified by the Safe Work Permit have been conducted.

3.27.4.6.3. ongoing air monitoring required by the Safe Work Permit is being conducted as specified.

3.27.4.6.4. all procedures, precautions, hazards, and equipment specified by the Safe Work Permit are in place.

3.27.4.6.5. internal temperature of confined space is within identified policy and permit limits.

3.27.4.6.6. confined space lighting is in place, adequate, and powered by a reliable a power source.

3.27.4.6.7. energy sources for ventilation and lighting are clearly identified and have required “Do Not Disconnect” tags in place at source location

3.27.4.6.8. generators supplying power for lighting and ventilation equipment are adequately fueled to operate uninterrupted for the duration of the shift.

NOTE: Reliable operation of this equipment and its equipment being powered is critical and should be frequently inspected to ensure the equipment’s condition has not been damaged or deteriorated.

3.27.4.7. Terminates the entry if all entry operations covered by the Safe Work Permit are complete.

3.27.4.8. Terminates entry if a condition not allowed by the Safe Work Permit arises in the area or in or near the confined space.

3.27.4.9. Verifies with operations that rescue services are available and a means to summon is operable.

3.27.4.10. Removes unauthorized individuals who enter or attempt to enter a confined space after being notified by Attendants.

3.27.4.11. Provides appropriate briefing when responsibility for a confined space entry operation is transferred to ensure that the operations remain consistent with the Safe Work Permit.

3.27.4.12. Field verifies that energy isolation is complete. This may be done during the JJSV or separately.

3.27.4.13. Ensures job completion is communicated to the Permit Writer.

3.27.4.14. Reviews contractors scaffold plan with Work Party (Operations, Service Group Rep and Entry Supervisor) to understand access points, fall protection requirements and potential additional safety considerations.

3.27.4.15. Ensures permitted confined space work has been stopped and entrants have exited the space during a lightning alert, unless CSE work has been allowed to continue via EPR-4 requirements. See EPR-4 Lightning Precautions for further details.

3.27.4.16. Identifies self as Entry Supervisor and communicates contact information to Operations, Attendants and Entrants/Entrant Rep.

3.27.4.17. Legibly documents name, company, date, and logs On/Off time in Confined Space Entry Supervisor section of Safe Work Permit.

3.27.4.18. Must be within GBR site while Authorized Entrants are in permitted confined space and accessible by contact information provided.

3.27.4.19. Periodically enters confined space to inspect conditions and work.

3.27.4.20. Ensures scaffolding within the Confined Space

3.27.4.20.1. Meets GBR policy requirements and tagged appropriately identifying fall protection requirements and hazards.

3.27.4.20.2. Is constructed per agreed Work Party design, with consideration given to work scope, access, egress, rescue, fall and dropped object distance.

*** Good Practice:** Have sketch of internal scaffolding with permit to brief ERT in the event of rescue.

3.27.5. Safety Department

3.27.5.1. Develop the Confined Space Reference Sheets.

3.27.5.2. Administer and update this procedure.

3.27.5.3. Review requirements and authorize all initial entries.

3.27.5.4. Periodically audit job sites to determine compliance with procedure.

3.27.5.5. Audit entry operations and permits and revise the program, as necessary, to correct deficiencies on an annual basis.

3.27.5.6. Review requirements and authorize initial permits involving IDLH and inert entry. For more information on IDLH and inert entry, please refer to PR-5 Inert Confined Space Entry.

3.27.5.7. Waive the use of a harness and/or retrieval line if the use of the harness and/or retrieval line creates a greater hazard (e.g., entanglement), and consult the Rescue Team, if needed.

3.27.6. Training Department

3.27.6.1. With the Safety department, implement, and administer training programs to ensure safe confined space entry and work.

3.27.6.2. Ensure that employees possess the understanding, knowledge, and skills necessary for the safe performance of the duties assigned (e.g., Quiz, Test.) Training must result in the understanding of the:

3.27.6.2.1. Hazards in the space and methods used to isolate, control, or other ways to protect employees from these hazards, and

3.27.6.2.2. Dangers of attempting rescue for employees not authorized to do so.

3.27.6.3. Maintain training certifications for the ERT and the confined space rescue team.

3.27.7. Rescue Team

3.27.7.1. Maintain rescue equipment.

3.27.7.2. Verify that rescue equipment is available.

3.27.7.3. Coordinating actual rescue activities.

3.27.7.4. Ensuring the safety of the rescue team members.

3.27.7.5. Attending/participating in confined space rescue training and training exercises.

3.27.7.6. Responding to confined space rescues when requested.

3.27.7.7. Reviewing vessel specific rescue plans.

3.27.8. Fire Chief –

The Fire Chief is responsible for:

3.27.8.1. Conducting an annual assessment of rescue team capabilities.

3.27.8.2. Maintaining documentation of this evaluation.

4.0 Definitions

4.1. *Attendant* – Is an individual stationed outside one or more permit spaces who assesses the status of the entrants and who must perform the duties specified in 1926.1209.

4.2. *Confined Space* – Is large enough and so configured that an employee can bodily enter and perform assigned work. It is not designed for continuous employee occupancy and has limited or restricted means for entry or exit (for example, tanks, vessels, towers, sewers, excavations 4 feet deep, vessel skirts, vaults and pits are spaces that may have limited means of entry) Typically tank dikes are not considered confined spaces.

4.3. *Entrant* – Is an individual who is authorized by the entry supervisor to enter a permit space.

4.4. *Entry (Applies only if the space meets the definition of a Confined Space)* – The introduction of a person into a confined space. The entrant is considered to have entered as soon as any part of the individual's body breaks the plane of an opening into the confined space.

4.5. *Entry supervisor* – An MPC Employee(Maintenance Foreman, Owning Department Supervisor, Contractor Coordinator or equivalent acting as supervisor) or designated Directly Supervised Employee (DSE) that has been properly trained in the "responsibilities" section of this procedure.

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4.6. *Hazardous Atmosphere* – An atmosphere that may expose employees to the risk of death, incapacitation, or impairment of ability to self-rescue (that is, escape unaided from a confined space), injury, or acute illness from one or more of the following causes:

4.6.1. Flammable gas, vapor, or mist in excess of 10 percent of its lower explosive limit (LEL).

4.6.2. Airborne combustible dust at a concentration that meets or exceeds its LEL.

4.6.3. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.

4.6.4. Atmospheric concentration of any substance for which a permissible exposure limit is published in OSHA Hazard Communication Standard, 29 CFR 1910.1200 which could result in employee exposure in excess of its dose or permissible exposure limit.

4.6.4.1. For air contaminants for which OSHA has not determined a permissible exposure limit, other sources of information, such as Safety Data Sheets that comply with the OSHA Hazard Communication Standard, 29 CFR 1910.1200, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

4.6.5. Any other atmospheric condition that is immediately dangerous to life or health.

4.7. *Immediately Dangerous to Life and Health (IDLH)* – Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

Note: Some materials, hydrogen fluoride gas and cadmium fume for example, may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possible fatal collapse 12-72 hours after exposure. The victim "feels normal" from recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be immediately dangerous to life or health.

4.8. *Isolation* – The process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blinding; misaligning or removing sections of lines, pipes or ducts; lockout of all sources of energy; or blocking or disconnecting all mechanical linkages.

4.9. *Naturally Occurring Radioactive Material (NORM)* - a low-level source of radiation found in soil, water, plants, petroleum, phosphate, animals, and humans. In the oil and gas industry, NORM is predominately radium-226 and radium-228, radon and their radioactive decay products (including but not limited to, lead-210 and polonium-210). In the context of this standard, all references to NORM refer only to the NORM that has been formed relative to oil and gas.

4.10. *Permit Writer* – A trained individual designated to prepare and authorize the Safe Work Permit designated for confined space entry as specified in this procedure.

4.11. *Prohibited Condition* – Any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

4.12. *Rescue Team* – The personnel designated to rescue employees from permit spaces.

4.13. *Retrieval Systems* – Retrieval system means the equipment (including a retrieval line, chest or full-body harness, wristlets/anklets, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

4.14. *Safe Work Permit* – Written permission to perform work.

5.0 References

5.1. Occupational Safety and Health Administration. 29 CFR 1910.146, “Permit-required Confined Spaces”.

5.2. Occupational Safety and Health Administration 29 CFR 1926 Subpart AA

5.3. Occupational Safety and Health Administration. 29 CFR 1910.1000, “Air Contaminants”.

5.4. Marathon Petroleum Company LP, RSP-1127-000 Confined Space

5.5. GBR PR-3 Safe Work Permit Practice

5.6. GBR PR-5 IDLH Confined Space Entry

5.7. GBR PR-14 Energy Isolation

5.8. GBR EQ-7 Portable Gas Testing

5.9. GBR PPE-5 Respiratory Protection

5.10. GBR ADM-3 Hazard Communication Program (HAZCOM)

5.11. GBR EPR-4 Lightning Precautions

6.0 Attachments

6.1. Attachment A – Potential Confined Space Hazards

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6.10. Attachment J: Sample of Declassified Space Notice

7.0 Revision History

Revision Number	Description of Change	Written by	Approved by	Revision Date	Effective Date
0	Original Issue. Superseding GBR-HESS-PR-01 and RSW-0008-TC under MOC M20182256-001.	S. P. Streacker	D. C. Staats	3/19/2018	5/1/2018
1	Updated to require 100% video recording. (Section 3.2.1 and Attachment A)	C. T. Lamb	V. J. Meeks	1/15/2020	1/20/2020
2	Removed benching reference in section 3.23.3.5.1 to align with PR 4 and OSHA regulations, added example of de-classified space sign to align with current practice and requirement, and clarified that continuous monitoring is still required if excavation is de-classified.	A. M. Chalin	H. F. Honor	10/20/2021	11/29/2021
3	Revised to review of blind/disconnect location, requirements for boiler/furnace fire boxes and exchanger shells, and updates CSE Supervisor responsibilities and definition under MOC 111550.	C. T. Lamb	H. F. Honor	9/19/2022	9/30/2022

Attachment A: Potential Confined Space Hazards

- Chemicals
  - Hydrocarbons (Naphtha, Benzene, Cracked Gas, Butane)
  - Distillates
    - typically do not release LEL but can when heated above their flashpoint (typically near 100° F)
  - Catalysts (Nickel, Molybdenum, Platinum)
  - Toxics (ammonia, H2S, SO2, CO)
  - Corrosives (Acids/Caustics)
  - Oily/Tank Sludge
    - trapped materials may not give readings initially but when but when warmed or disturbed, can begin to release flammable vapors, toxics, etc. (e.g. when cleaning tank bottoms, tanks warm from sun in summer, etc.)
  - Residual Scale (HF)
  - Refractory (arsenic, pH, silica)
  - Iron sulfide
  - Purge/Wash Materials
  - Chemical Additives/Treatments
  - Pyrophoric material
  - Inert Gases
- Metallurgy
  - Stainless Steel (various forms; 305, 315, etc.)
  - Inconel
  - Galvanized
  - Monel (nickel content)

- Work Activity
  - Arc Welding or Gouging
  - Oxy-fuel Welding
  - Refractory Chipping
  - Buffing
  - Water Blasting
  - Catalyst loading/unloading
  - Heat Treatment
  - Tank Cleaning
  - Release of toxic material due to physical disturbance within the vessel (e.g., cleaning, scraping, digging, etc.)

- Internal Configuration
  - Process or Steam Tubes
  - Refractory (structural integrity)
  - Distribution Tubes / Deflector Plates
  - Trays/Stools/Filters
  - Guide or Support Pins (for refractory, heater tubes)
  - Dampers
  - Obstructed Egress
  - Restricted work spaces
- Miscellaneous
  - Thermal Temperature Exposure
  - Walking/Working Surfaces
  - Nuclear Gauges
  - NORM (Naturally Occurring Radioactive Material)
  - Electrical
  - Heat Stress
  - Combustible Dusts (example; sulfur)
  - Structural Failure
  - Discharge of steam, high pressure air, water or chemicals
  - Inadequate or faulty personal protective equipment
  - Failure to lockout/tagout, blind, isolate properly
  - Noise in excess of acceptable levels - 90 decibels (A) weighting
  - inclement weather (e.g., high winds, lightning)
  - Inadequate lighting

Attachment B: Written Ventilation Plan Guidelines for Welding in Confined Spaces

Welding in a confined space requires the use of supplied air respirators or a written ventilation plan that provides 2000 cubic feet per minute (cfm) per welder of forced air ventilation from a clean source. Written ventilation plans should address the following:

- ventilation equipment to be used list (including manufacturer, model number, and air flow rating)
- associated illustration (not necessarily P&ID) that identifies
  - vessel openings (supply and make-up) planned for ventilation use
  - specific ventilation equipment (if any) that will be affixed to each opening
  - the intended direction of airflow through each opening
- total cubic feet per minute (CFM) calculations (to justify the number of welders proposed.)
- respiratory protection required (if any)
- air monitoring to be performed (if any)
- specific individuals must be assigned to ongoing oversight (one on days, one on nights) of the plan

Attached is a sample ventilation plan for reference:

Attachment B (continued)
Sample Ventilation Plan

VENTILATION PLAN FOR WELDING ACTIVITY INSIDE E-101

PURPOSE: to meet the "2000 cubic feet per minute (cfm) per welder" ventilation requirement defined by 29CFR1910.252 and PR-1 Confined Space Entry while welding inside confined spaces.

VENTILATION EQUIPMENT: to ventilate E-101 during internal welding activities, the following equipment will be used;

- 1 – 30" M/W on the east side of the 9th deck will be equipped with a Coppus RF 20 air-driven propeller blower, capacity of 10,600 cfm @ 80 psi
- 2 – 36" C-9 lines will each be equipped with a Coppus RF 20 air-driven propeller blower, each with a capacity of 10,600 cfm @ 80 psi.
- 2 – 10"x 300# dump nozzles will each be equipped with a 6" Texas Pneumatic TX-6AM air-horn, each with a capacity of 3,347 cfm @ 80 psi

An illustration depicting ventilation equipment, make-up air locations, and intended airflow direction can be found in Attachment 1.

NUMBER OF WELDERS: based on the calculations below, a maximum of 9 welders can be used at one time

VENTILATION EQUIPMENT	TOTAL CFM's		MAX WELDER NUMBER
3 - Coppus RF 20 blowers	3 x 10,600 =	31,800	38,494 cfm x .5[a] = 9.6
2 - TX-6AM air horns	2 x 3,347 =	6 ,694	2000 cfm/welder
		38,494	

[a] – safety factor applied to account for system inefficiencies

RESPIRATORY PROTECTION: 3M 6000 series half mask respirators with HEPA (P100) filters will be utilized by welders during welding operations. If the above ventilation requirements are not met, an upgrade to supplied air will be required.

AIR MONITORING: to verify the effectiveness of the overall ventilation plan and that respiratory protection worn is adequate, personal air monitoring for welding fume will be performed during initial

welding activities. Post receiving monitoring results, ventilation and/or respiratory protection adjustments will be made (as needed.)

ASSURANCE: the following individuals will monitor field implementation each shift to ensure plan requirements are being met;

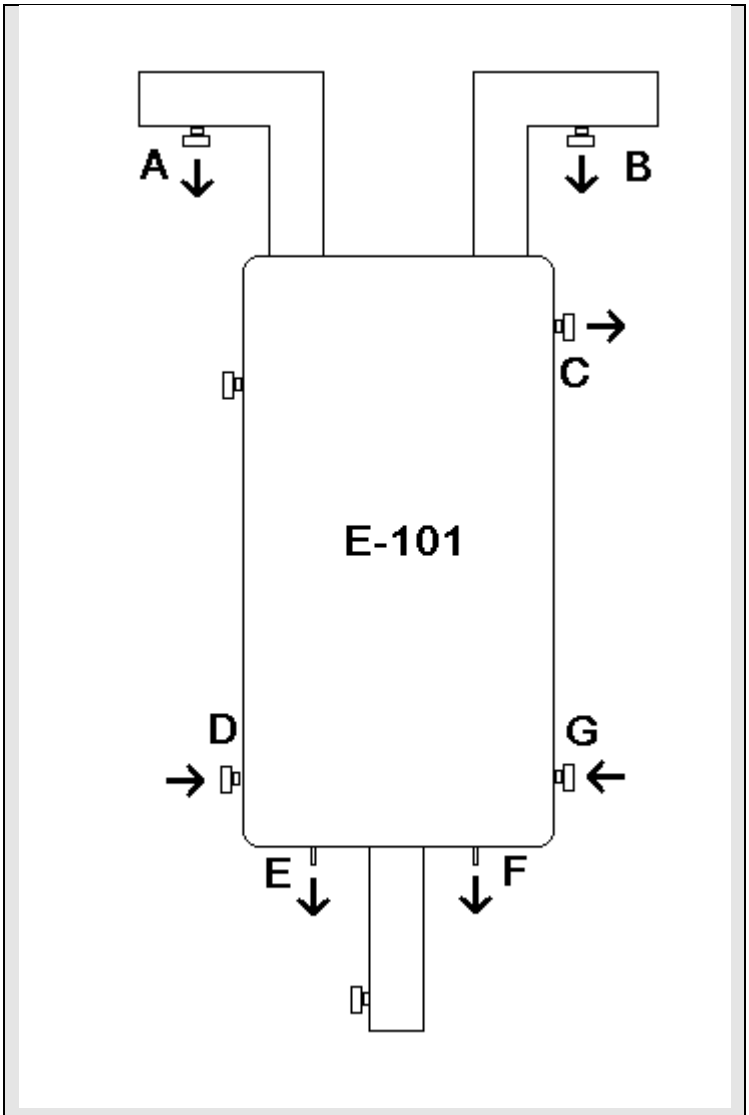
Days: John Doe, Company XYZ Safety Supervisor

Nights: James Smith, Company XYZ Field Foreman

Items that will be monitored during field implementation include;

- equipment placement – are all fans/air horns, etc. in place as defined by the planned
- equipment operation – is fans/air horn, etc turned on
- direction of airflow – is fan/air horn, etc blowing in the direction defined by the plan
- fan/vessel interface – is seal between the fan and vessel surface adequate
- air pressure – is pneumatic pressure delivered to fans/air horn = or > than plan design

Attachment B (continued)
Sample Ventilation Plan



LEGEND

A, B, C - Coppus RF 20 fans, blowing outward

E, F - 6" Texas Pneumatic TX-6AM air-horns, blowing outward

D, G – open manways

Attachment C: Anticipated Physical Hazards Associated with Confined Space Entries into Storage Tanks

Condition	Present? (Y/N)	Potential control measure
Hollow equipment – possible trapped product		
Legs for floating roof		Flush mouse hole
Legs for fixed ladder		Flush mouse hole
Gauge pole		Flush mouse hole
Gauge float		Remove early
Pipe used in structure pieces		Drill, drain, and flush
Float well		Wash interior during cleaning
Jet nozzle		Flush and vacuum during cleaning
Pontoons (inert gas, too)		Flush and vacuum during cleaning
Floats on aluminum floaters		Drain into bucket/drum and remove
Floating roof		
Seal (trapped product)		Cut, drain, and remove
Loading (rain, supplies, etc)		Check early, monitor loading
Lap joints (trapped product)		Flush during cleaning
Separate space above and below (gas test, attendant, etc.)		Test and staff
Floor – possible trapped product		
Double floor		Drill and evaluate
Sump (fall hazard, too)		Flush and vacuum, barricade
Product leak beneath floor		Drill and evaluate
Annular plate at chime		Drill and drain, cut above top chime
Wall		
Residue		Clean, remove selectively
Re-pad (trapped product)		Drill and drain
Fixed roof		
Corrosion		Inspect, distribute load
Iron sulfide deposits		Evaluate presence
Lack of handrails		Barricade, lanyard to king post
Exterior ice falling		Barricade
Servicing equipment		
Hazmat (compressed gases, flammable liquids, etc.)		Store away from entry, minimize volume
Noise		Use hearing protection
Mobile equipment		Provide lighting, back up alarms
Vacuum truck		Provide grounding, wheel chocks
Other		
Vertical entry		Use tripod and harness

Physical hazards present at all storage tanks

Electrical	Use GFI, check cords and welding leads
Access and egress	Keep clear, smooth surface
Lighting	Provide adequate
Isolation	Follow SOP

Attachment D: Entry Signs

Attachment E: "DO NOT DISCONNECT" IDENTIFICATION TAGS

SAP #90204575

SAP #90204579

Attachment F: Large, Complex, High Density Work Confined Space Hazard Assessment Checklist

Follow this hyperlink for a working copy of the Large, Complex, High Density Work Confined Space Hazard Assessment Checklist.

Marathon Petroleum Company LP

Large, Complex and High Density Work Confined Space Hazard Assessment Checklist
(RSP-1127-000-FORM01)

Hazard Assessment Conducted On:		
Completed By:		**Date:**
This space is determined to be Large, Complex and/or High Worker Density Confined Space due to the following:		
☐	50 or more Entrants per shift	
☐	Confined Space Entry inside the Confined Space (e.g. Work inside cyclones inside a Regen Vessel)	
☐	Complex scaffold systems which include seal decks that separate the Confined Space.	
The additional checked hazards have been identified and mitigation measures are in place to eliminate the hazards		
	Hazards	**Hazard Mitigation**
☐	Inability to account for Personnel (Entrant) in the event of an Emergency.	
☐	Falling debris, tools, and equipment into Entrants work area	
☐	Unable to hear and/or see the alerting system used to notify Entrants of an emergency evacuation	
☐	Hot Work or Confined Space Inside Confined Space not visible to exterior Fire Watch/Hole Watch	
☐	Fall Hazards inside the space (e.g. aligned internal manways, work inside cyclones, scaffolding construction/anchor points)	
☐	Limited egress locations based upon number of Entrants	
☐	Hazards introduced into the confined space by ventilation systems (Combustible Material, High Noise, etc.)	
☐	Hole Watch (Attendant) is unable to maintain communication with all Entrants	
☐	Unable to verify the atmosphere at locations representative of all Entrants	
☐	Radiography Impact to the Authorized Entrants	
☐		

Attachment G

This form may be used when the Confined Space Sign-in/Sign-out for Authorized Entrants on the back of the Safe Work Permit does not provide enough space to track the entrants. This form(s) must be turned in with the Safe Work Permit when it is closed out.

DATE: _____ PERMIT NUMBER: _____

Name	Company	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out

Attachment H: Confined Space Attendant Reference Sheet

Confined Space Attendant Reference Sheet

Unit Name – Equipment Name – Equiment Number

Field Picture of Equipment	Drawing of Equipment (if available)	**Report all emergencies immediately to the SOC by:** • *Pressing the "orange" button on any plant radio or;* • *Dialing 1911 on any in-plant phone* **Previous Material in Vessel:** **Signs/ Symptoms of Over Exposure:** Inhalation: Absorption/ Skin Contact: Eyes: **Non-Entry Rescue/ Fall Protection Plan:**

For any questions or non-emergency issues contact the Entry Supervisor, SWP Writer, or the Safety Department. Revision Date:

Date Initial Entry Given by Owning Department: _____ Page _____ of _____ for this Confined Space

Safe Work Permit Confined Space Tracking Log

☐Vessel ☐Tank ☐Excavation/Trench ☐Other: _____ Initial Entry Permit #: _____ WO #: _____

Description of Space: _____

Equipment # / Location: _____

Record of Gas Check(s). Record the initial gas check witnessed by Safety Department in the highlighted column below. Subsequent gas checks shall be recorded prior to downgrading of controls. Though every Space must undergo gas testing prior to any Entry, the lapse of a mid-shift check update while the space is not covered by a permit does not constitute another initial entry by the Safety Department unless the status of the isolation has changed, atmospheric conditions are suspected to have changed, or other suspected hazards have appeared.

DATE										
TIME	**AM PM**	AM PM	AM PM	AM PM	AM PM	AM PM	AM PM	AM PM	AM PM	AM PM
O_2	**%**	%	%	%	%	%	%	%	%	%
LEL	**%**	%	%	%	%	%	%	%	%	%
CO	**ppm**	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
H_2S	**ppm**	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Temp.	**°F**	°F	°F	°F	°F	°F	°F	°F	°F	°F
Benzene	**ppm**	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Other:____										
Equip. #:										
Last Calib:										
Initials:										

The Safety Department and Initial Entry Permit Writer will Review This Section Together:

Requirements & Authorized Waivers. The checked PPE and Confined Space Precautions below are *required* to enter this Confined Space. Any requirements that are downgraded or waived for the Space shall be crossed off then dated & initialed to the left of the item. The Safety Department shall also sign at the bottom to authorize any applicable waivers.

PPE

- ☑ Clear Safety Glasses (or glasses with side shields)
- ☑ Hard Hat
- ☑ Personal H_2S Monitor
- ☑ Fire Retardant Clothing
- ☑ Safety-Toed Footwear
- ☐ Hearing Protection
- ☐ Goggles (worn)
- ☐ Personal SO_2 Monitor
- ☐ Face Shield
- ☐ Lanyard for Fall Protection in space
- ☑ Gloves (type): _____
- ☐ Other Boots (list): _____
- ☐ Disposable Coveralls
- ☐ High Visibility Clothing
- ☐ Rain Suit
- ☐ Asbestos PPE
- ☐ Welder's PPE
- ☐ Electrical PPE (list calorie): _____
- ☐ Chemical Clothing (list class): _____
- ☐ Other: _____

Respiratory Protection:

- ☐ Supplied Air (list type): _____
- ☐ Air Purifying (list Mask & Cartridge Type): _____

Confined Space Precautions:

- ☐ Temperature below: _____°
- ☑ Rescue Personnel Available
- ☐ Hazards Discussed (list): _____
- ☑ Entry Approval Signage Posted
- ☑ Forced Air Ventilation Required
- ☐ Tripod with Winch Required
- ☐ Coordinate Multi-Craft Work
- ☐ Inert Entry (Restricted Area Precautions)
- ☐ Excavation(s) >4' (Ladders & Shoring Precautions)
- ☑ Attendant(s) with Vest (list #): ____
- ☑ Continuous Air Monitor
- ☑ Air Siren or Radio
- ☐ Communications Procedures (list): _____
- ☐ Explosion Proof Lighting Required
- ☑ Body Harness
- ☑ Life Line
- ☐ Other: _____

Initial Entry Approved by: _____ **Date:** _____

Waiver(s) Issued by: _____ **Date:** _____

Attachment J: Example of Declassified Space Notice

NOTICE

Declassified

This space has been declassified and is approved for entry.
Tank or Excavation Location: _____
Approved by:

Marathon Safety Department Representative Date	Contractor Foreman Date
Job Coordinator Date	Operations Supervision Date

Declassified Space Notice.docx