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1.0 Purpose

1.1 The purpose of this policy is to establish guidelines for safe and consistent isolation of refinery equipment and machinery at the Galveston Bay Refinery (GBR) to facilitate servicing, maintenance and testing.

2.0 Scope

2.1 The scope of this policy applies to the servicing, maintenance or testing of all refinery equipment and machinery that may be subject to unexpected energizing or release of stored energy causing

2.1.1 Injury to personnel,

2.1.2 Adverse environmental impact, or

2.1.3 Damage to equipment

3.0 Out of Scope

3.1.1 This policy does not apply to Minor Servicing Activities, Hot Taps, In-Service Welds and activities under Exclusive Control

4.0 Equipment Shutdown and Isolation Process

Important: See Attachment A: Minimum Energy Isolation Requirements for detailed information on isolation requirements.

4.1 Preparation:

4.1.1 The shutdown of refinery equipment, machinery, and/or systems, required for servicing/maintenance shall be conducted by the Owning Department. Master Isolation Lists must be prepared in advance by the Owning Department Representative and developed consistent with the Minimum Energy Isolation Requirements (Attachment A). The Master Isolation Lists will specify the energy isolation devices, isolation verification points and the means to verify control of hazardous energy to safely prepare the equipment for the servicing representatives.

4.1.2 Additions, deletions and changes to the isolation lists must be approved by Owning Department Shift Foreman.

4.1.3 Locations where tubing, unions, pipes, etc. have been disconnected as part of the isolation shall be included on the Master Isolation List.

4.1.3.1 Disconnected piping shall be positioned so that it does not remain in alignment with or within close proximity to the isolated equipment.

4.1.3.2 A Master Isolation List is not required while working on equipment that has a single isolation point that is locked out and tagged. Examples include, but are not limited to, AC units, lighting circuits, etc.

4.1.3.2.1 All single point LOTO shall utilize a multi-gang hasp and place the craft lock (one per craft) on the hasp along with a personal lock for each employee working on the equipment. Craft lock will remain on the equipment until craft has completed their work.

4.1.3.2.2 If/when Operations builds an MIL and with a LOTO box, the craft lock must be moved to the LOTO box.

4.1.4 Equipment should be prepared for maintenance activities per GBR specific operating procedures and in accordance with guidelines outlined in Safe Equipment Preparation RRD-1323.

4.1.5 When a single point of isolation is used for equipment that contains heavy materials/solids (see definition) additional considerations shall be taken by Owning Department Representatives as follows:

4.1.5.1 Consult Attachment N for strategies to ensure effective single point isolation of heavy materials/solids.

4.1.5.2 Instruct the Servicing Group to work the job continuously to completion when possible and minimize the time that equipment is open by providing the anticipated manpower, tools and parts at the jobsite prior to line break.

4.1.5.3 The Heavy Materials/Solids Single Point Isolation Checklist (Attachment O) provides a tool that can be used to safely plan, authorize and execute work involving isolation of equipment in heavy oil/solids service.

4.1.6 All bleeders and valves used to verify equipment has been de-pressured and will remain open during the maintenance work must, at a minimum, be tagged open with an pink MPC Bleeder Tag (Attachment J) and listed on the Master Isolation List (Attachment B) in the section of the form designated “Energy Isolation Device Identification.”

4.1.6.1 In some cases, the checks to ensure that a fully de-energized system exists will involve equipment that will not be locked or tagged out. Examples include bleeder valves that are opened to verify the system is de-pressured but will not remain open for the duration of the maintenance work or electrical motor switches that do not get locked out because the upstream electrical breaker is the energy isolation point. These isolation verification points shall be listed on the Master isolation list, along with the means used to verify control of the hazardous energy and any special instructions, in the section designated “Verification of Isolation.”

4.1.7 Tagging valves that will remain open during the maintenance work will help ensure the equipment/system remains in a controlled energy state. This practice will also help ensure that the valves are closed before the equipment/system is returned to operation.

4.1.7.1 When installing and removing primary isolation point (PIP) blinds, the appropriate vent/drain valve between PIP and the blind must be opened prior to installing/removing the blind to verify the system is de-pressured. This valve only needs to remain open and tagged if continuous bleed is needed to facilitate the blind installation/removal.

4.1.8 The practices in **4.1.5** and **4.1.6** of this stage shall only apply to routine (non-shutdown) related work.

4.2 Isolation and Lockout/Tagout: Owning Department shall perform the following:

4.2.1 Isolate the hazardous energy according to the Minimum Energy Isolation Requirements (see Attachment A) and the Master Isolation List (Attachment B).

Note: If a lock is used to prevent manipulation of an Energy Isolation Device, the lock must be closed/engaged.

4.2.2 Following the Owning Department’s isolation, arrange for the isolation of maintenance required tasks such as blinding, high voltage breaker deactivation (Operators may operate molded case circuit breakers in motor control centers and panels 480V and below; disconnecting switches 480V and below), plug installation, etc. as required by the isolation list(s) with the craft initialing the step complete and in accordance with the

Minimum Energy Isolation Requirements (Attachment A).

4.2.2.1 When installing isolation blinds ALWAYS think about how the air free and blind removal process is going to be executed. The use of a bleeder blind should be considered where feasible, if:

4.2.2.1.1 A bleeder is not present to properly air free the system. See Section 4.2.4

4.2.2.1.2 An isolation valve is known to be leaking and there is not a bleeder present between this isolation valve and the blind location. See section 4.2.4 or section 5.4.

4.2.2.1.3 See Section 5.4 for additional guidelines on the use of bleeder blinds

4.2.3 Verify that equipment and/or piping is completely de-energized and de-pressured according to the instructions in the "Verification of Isolation" section of the Master isolation list. This verification should include:

4.2.3.1 Opening a bleeder or valve in close proximity to the work location. For large/complex systems multiple bleeder and valves should be opened to ensure that the entire system is de-energized and de-pressured.

4.2.3.2 Pushing any start buttons on pumps, compressors, fans, etc.

4.2.3.3 Taking any other physical actions necessary or any actions outlined in Owning Department procedures.

Note: When using a valve(s) as the isolation point, verification of isolation must occur with the system at the normal expected operating pressure and temperature. Systems with cyclic or batch operations subject to significant variation in operating temperature and pressure require verification of isolation at the expected extremes while the system will be isolated. If isolation cannot be verified at the expected operating conditions positive isolation (such as blinding) must occur or measures taken to ensure the batch/cyclic operation does not change while the system is isolated."

4.2.4 If de-pressuring or de-energizing cannot be verified (e.g. absence of a bleeder to relieve pressure) for equipment in hydrogen, flare gas, corrosives, or high temperature hydrocarbons (>400F) service, then a **variance will be required,** and proper line breaking process must be followed with additional precautions implemented to protect workers. This may include:

4.2.4.1 Using additional/specialized PPE as dictated by the Invasive Work Risk Assessment Score or some other form of hazard assessment, or

4.2.4.2 Having fire protection onsite and attended, or

4.2.4.3 Utilizing a qualified electrician to test equipment.

4.2.4.4 The potential for liquid to remain in a de-pressured system exists, therefore the Owning Department must ensure no liquid material remains or incorporate additional measures (PPE) to protect workers.

4.2.5 For equipment in all other services,

4.2.5.1 Work may not proceed without additional signatures if equipment cannot be verified meeting the following conditions:

4.2.5.1.1 **Verified Depressured or De-Energized:** This includes situations where depressurizing cannot be confirmed (e.g., no bleeder available, isolation verification cannot be achieved

upstream of the work).

4.2.5.1.2 **Verified Isolated:** This includes cases where there is leak through the isolation method (e.g., valve not holding and alternative isolation cannot be achieved upstream of the work).

4.2.5.2 Before work may proceed under these conditions above, the refinery line breaking procedures must be followed, and additional worker protection measures must be implemented. Required precautions may include:

4.2.5.2.1 Use of additional or specialized PPE as determined by the Invasive Work Risk Assessment Score or another approved hazard assessment.

4.2.5.2.2 Fire protection onsite and continuously attended.

4.2.5.2.3 Testing or verification by a qualified electrician, where applicable.

4.2.5.3 The Owning Department Supervisor and Permit User Supervisor (refer to Work Authorization Matrix in PR-3 Safe Work Permit Procedure, Section 3.9) must sign the work permit & confirm that alternative isolation points or methods have been evaluated, the planned line breaking/depressuring approach, and mitigation methods that will be implemented.

4.2.6 Affix Orange Owning Department equipment isolation locks and MPC Energy Isolation Device tags to all subject valves, actuators, motor starters, circuit breakers, radiation sources, etc., according to the Master Isolation List(s).

4.2.7 The Owning Department will then affix an Owning Department Silver Lock and the MPC Energy Isolation Device Tag (Attachment J) to the appropriate Master Lockbox.

4.2.7.1 for regular maintenance, the MPC Return to Service Checklist Tag (Attachment E) must also be affixed to the lockbox.

4.2.7.2 for Turnaround, the MPC Return to Service Checklist Tag (Attachment E) is not required on the lockbox.

4.2.8 All servicing representatives shall then affix a Group Lock (Contractor Company Identification lock or Maintenance Task Tracking lock) to the Master Lockbox and all "Authorized Employees" shall then affix their personal lock to either the Master Lock Box or an appropriate Satellite Lockbox. All locks must be tagged or labeled for identification. This requirement is in effect for normal operations and maintenance. During TAR and major construction projects, an alternative accountability process may be used. The alternative procedure must meet the requirements of ***Chapter 4 Section 6*** of the OSHA Compliance Directive – Control of Hazardous Energy (**CPL-02-00-147**). The requirements for alternative procedures are listed in Section 13.0.

4.2.9 The Owning Department Representatives shall conduct the Joint Jobs Site review of all isolation points with affected servicing group representatives as required by PR-3 Safe Work Permit policy.

5.0 Blinding

5.1 Blinding Open Ended Lines or Equipment

5.1.1 Open ended piping or equipment that is only isolated by a single valve must be blinded with a Green Isolation Blind (see Attachment J) if the work extends past the current maintenance shift, unless it is continuously worked to completion in the field.

5.1.1.1 A pump case cover with a bleeder valve may be used in place of a blind if it

is designed for the pressure and service.

5.1.1.2 Double block and bleed may be used in place of a blind in accordance with Section 10.1.

5.1.1.3 This requirement only applies to the following services:

5.1.1.3.1 Hydrocarbons,

5.1.1.3.2 Corrosives, and

5.1.1.3.3 Toxics

5.1.1.3.4 High pressure water and steam

5.1.1.4 This requirement does not apply to TAR and project work when perimeter/blinding and decon has been completed.

5.1.1.5 Bleeders and valves that are locked or tagged open as part of the energy isolation process (e.g. to verify equipment is de-energized/de-pressured) are not subject to this requirement.

5.1.2 If a blind is installed, it must be located between the isolated valves and the equipment being worked on. Bleeders must be open prior to blind installation and must be closed following blind installation.

5.2 Hot Work and Blinding

5.2.1 Blinds should be installed according to the Minimum Energy Isolation Requirements (Attachment A) and at the closest flange to the hot work.

5.2.1.1 If blinding at the closest flange creates additional risk, those risk must be mitigated. If the blind location needs to be changed, verbal permission must be obtained by the Owning Department Shift Foreman.

5.2.1.1.1 The piping at the new location for the isolation point shall undergo the same cleaning preparation (i.e. wash, steam, etc.)

5.2.2 The isolation blind for Hot Work must be tagged with a *"Hot Work/Hydro Blind"* tag (Appendix J) listing the Owning Department and blind number.

Note: Blind location requirements do not apply when perimeter or battery limit blinds are utilized, and the unit has been decontaminated. Additional blinds closer to the hot work may be required depending on the equipment, piping configuration and condition.

5.2.3 The area between the blind and the hot work shall be cleaned and gas free tested per the requirements in PR-2 Hot Work Policy.

Note: Gas testing will be done in close proximity to the hot work location. If bleeders are not available at the location, consideration should be given to drill a hole in the line, part flange, etc. in order to verify no hazards are present. This is especially important on long piping runs or complex systems.

5.3 Confined Space Blinding

5.3.1 Blinds shall be installed according to the Minimum Energy Isolation Requirements (Attachment A).

5.3.2 The isolation blind for a confined space must be tagged with a *"Confined Space Isolation Point – Do Not Remove"* tag (Attachment J) listing the Owning Department and blind number. This isolation point (blind, plug, physical separation, etc.) cannot be removed / reconnected until the 'approved for removal' box on the blind tag has been signed by an

Owning Department representative.

5.3.2.1 Exception: The “Approved for Removal” box requirement does not apply when a status change is being performed to change a blind to a physical disconnect or a physical disconnect to a blind.

5.3.3 Vessel appendages (e.g., sight glasses, level bridles, radioactive energy sources) must be properly decontaminated and if required, blinded/disconnected prior to entry. Alternative equally effective measures may be utilized in lieu of blinding and must be included on the Master Isolation and Blind Lists.

5.3.4 Blinds shall be installed at the closest flange to the confined space. Where this is not feasible, the following procedure shall be followed:

5.3.4.1 Operations and Maintenance must agree to the alternate location.

5.3.4.2 The piping between the vessel and the blind shall undergo the same preparation as the vessel (i.e. wash, steam, etc.).

5.3.4.3 Spacers must be installed on the vessel side of the blind, unless there is another means (bleeder) proximal to the blind which allows proper piping preparation and internal gas detection.

5.3.4.4 The Owning Department shall check the opening of the piping at the blind with a gas detector.

5.3.4.5 The atmosphere must meet the same minimum requirements as the vessel prior to confined space entry permit being issued.

5.4 Bleeder Blind Guidelines

5.4.1 Where feasible, bleeder blinds should be used in situations where:

5.4.1.1 Bleeders are not present to properly air free the system, or

5.4.1.2 An isolation valve is known to be leaking and there is not a bleeder present between this isolation valve and the blind location.

5.4.2 Bleeder blinds should not be used in heavy product service or in other services that are prone to plugging.

5.4.3 Bleeder blinds shall be designed for applicable process conditions and consistent with ASME standards.

5.5 Permanent Blinds

5.5.1 Permanent blinds are typically installed in locations where it is critical to prevent leakage of material into undesired locations such as abandoned equipment or utility systems. Therefore, a system shall be in place to ensure proper management of the permanent blinds. The system shall include the following requirements:

5.5.1.1 The permanent blind shall be identified with a round red metal tag.

5.5.1.2 Blinds shall be shown on P&IDs and included on a permanent blind list so they can be verified in place after maintenance.

5.5.1.3 Permanent changes to the permanent blind list or P&IDs require an MOC.

5.5.1.4 A system to verify blinds are re-installed after maintenance.

5.5.1.4.1 For major maintenance this can be accomplished as part of the pre-startup checklist or part of an MOC.

5.5.1.4.2 For routine maintenance this can be accomplished using

operating procedures/guidelines or other methods the refinery may implement.

5.5.1.5 Permanent blind installation shall be verified as often as necessary to ensure proper management of the program, but no less than once per year.

Note: The Operations group will own the permanent blind management program and ensure the permanent blind list is kept accurate.

5.6 Work Location Tags

5.6.1 The Owning Department will visually identify equipment to be worked including hanging of a Work Location Tag (Attachment M) and identify location of all first line breaks with an MPC First Line Break Tag per PR-3 Safe Work Permit procedure, section 3.4.23.

5.6.2 Work Location Tags will be installed at all locations which involve the installation of blinds or removal or spools for isolation.

5.6.3 Owning department supervisor must verify the blind list locations have been walked out and must sign Attachment C (Blinding List Template).

5.6.4 The Owning department must be present during initial equipment/line breaks.

5.6.5 The Servicing Group will return all tags to the Owning Department upon completion of work.

6.0 Energy Isolation Verification

6.1 Master Isolation Lists shall be walked down by Owning Department and Servicing Group representatives on the first day and night shift (if applicable), prior to working on equipment to verify that energy isolation is accurate and complete. Documentation of this verification will be the signatures on the Master Isolation List (Attachment B).

6.2 If isolation changes occur, the Owning Department Shift Foreman shall approve the change, and the energy isolation points altered/changed shall be verified and walked down with Operations and the Servicing Group representatives before work is continued and on the first affected (day or night) shift following the change. Examples of changes that would require the isolation verification inspection to be repeated include:

6.2.1 Removing a lock to exercise a valve or breaker

6.2.2 Opening a lockbox

Note: Individual authorized employees must be provided the opportunity to verify isolation locations if requested.

7.0 Interim Test/Status Change of LOTO

7.1 An Interim Test, (Attachment D) shall be used when a piece of equipment that is being serviced under lockout/tag out must be temporarily energized for testing, positioning, steaming, rinsing, purging, etc.

7.2 Exceptions

7.2.1 Interim Test requirements do not apply to the hot alignment of pumps when the warm up lines are used and all other energy sources for the pump remain isolated.

7.2.2 An operating procedure may be used in lieu of the Interim Test form (Attachment D) to document actions followed during the testing of equipment. The operating procedure must contain the following steps:

7.2.2.1 Prior to testing:

7.2.2.1.1 Verify equipment is intact and non-essential items have been removed from the work area.

7.2.2.1.2 Verify all workers have removed their lock and tag and are clear of the equipment.

7.2.2.2 After testing is complete and prior to allowing work to resume:

7.2.2.2.1 Re-apply and verify proper energy isolation.

7.2.2.2.2 Verify the equipment is adequately de-energized and de-pressured.

7.2.3 The Owning Department shall ensure:

7.2.3.1 All affected employees are aware of the Interim Test and clear of the area.

7.2.3.2 All personal and servicing group locks/tags are removed from all of the applicable lockboxes.

7.2.3.3 Any item or equipment that could present a hazard during the re-energization is removed from the area.

7.2.4 The Owning Department Representative shall:

7.2.4.1 Complete a Status Change/Interim Test form (Attachment D) assign an Interim Test number and document the reason for the Interim Test on the Status Change/Interim Test Log.

Note: The Status Change/Interim Test log shall be maintained with the Master isolation list

7.2.4.2 Remove department locks, tags and keys from master lockbox.

7.2.4.3 Remove equipment isolation locks/tags from those devices necessary for re-energization.

7.2.4.4 Note the Interim Test number for each EID on the Master isolation list.

7.2.4.5 Sign and date the Equipment Safe for Interim Test section of the Status Change/Interim Test log to indicate re-energization is ready to commence.

7.2.4.6 After the Interim Test is complete, replace equipment isolation locks and tags after the energy isolation device(s) are returned to proper status.

Note: If locks/tags are reused, the name/date on the tags does not need to be changed.

7.2.4.7 Test to verify that the equipment is isolated and de-energized according to the instructions in the “Verification of Isolation” section of the Master isolation list.

7.2.4.8 Lock Master Lockbox with Owning Department Silver lock and MPC Energy Isolation Device Tag (Attachment J).

7.2.4.8.1 for regular maintenance, the MPC Return to Service Checklist Tag (Attachment E) must also be affixed to the lockbox.

7.2.4.8.2 for Turnaround, the MPC Return to Service Checklist Tag (Attachment E) is <u>not</u> required on the lockbox.

7.2.4.9 Sign and date the Isolation Restored section of the Status Change/Interim Test log.

7.2.5 After the Interim Test has been performed, the Owning Department and the Servicing Representatives shall:

7.2.5.1 Verify that equipment is isolated and de-energized.

7.2.5.2 Install required servicing group and personal locks and tags on the appropriate lockboxes.

7.3 A Status Change/Interim Test Log shall be used when an Energy Isolation Device must be inspected, repaired, removed, replaced, etc., and results in a change to the Master isolation list. The transferring of LOTO hardware from the Energy Isolation Device to the other Energy Isolation Device(s) must ensure the same integrity of the LOTO system is maintained.

7.3.1 An operating procedure may be used in lieu of the status change form to document actions followed during the reposition of LOTO. The operating procedure must contain the following steps:

7.3.1.1 Prior to testing:

7.3.1.1.1 Verify equipment is intact and non-essential items have been removed from the work area.

7.3.1.1.2 Verify all workers have removed their lock and tag from the lock box and are clear of the equipment.

7.3.1.2 After repositioning LOTO is complete and prior to allowing work to resume:

7.3.1.2.1 Re-apply and verify proper energy isolation.

7.3.1.2.2 Verify the equipment is adequately de-energized and de-pressured.

Important: A Status Change shall also be utilized to document the removal of a piece of equipment that is part of the isolation (i.e., removing a valve, closing a bleeder that was tagged open, etc.).

7.3.2 The Owning Department shall:

7.3.2.1 Identify isolation points required to maintain the integrity of the existing work scope.

7.3.2.2 Assign a Status Change number and document the Reason for Status Change on the *Status Change/Interim Test Log* (Attachment D)

7.3.2.3 Note the status change number for each EID on the Master isolation list.

7.3.2.4 Field verify that the status change is complete by ensuring that the Owning Department Shift Foreman signs the Status Change Log indicating approval to proceed with implementation.

7.3.2.5 Complete the relocation of LOTO and note the Status Change number for each EID necessary for the relocation on the Master Isolation List.

7.3.2.6 Complete line preparation and de-energization to ensure safe condition of any additional lines and/or equipment included in the new LOTO system.

7.3.2.7 Sign and date the Status Change Complete section of the Status Change Log.

7.3.2.8 Remove LOTO equipment from the Energy Isolation Device that is now part of the work scope.

7.3.2.9 Review the change with the Servicing Group Representatives associated with the job.

8.0 De-isolation

8.1 Servicing Group Representative(s):

8.1.1 Informs the Owning Department that the work is complete, and equipment and systems are ready for removal of blinds/energy isolation devices at the Owner's discretion.

8.1.1.1 The Servicing group will sign the bottom of the Blind List when isolation is no longer required.

8.1.1.2 The Servicing group will sign the bottom of the Master Isolation List when isolation is no longer required.

8.1.1.3 When either the Blind List and/or the Master Isolation List is missing, the Owner Department Supervisor must be informed. The missing paperwork shall be recreated, walked down and documented on the new Blind List and/or Master Isolation List paperwork. Once the new Blind List and/or Master Isolation List has been created and documented, a second complete Blind List and/or Master Isolation List walk down shall be performed to verify there were no changes from the original.

8.1.2 Following the removal of a bolted slip blind, blind flange, plug, etc., shall return any blind identifiers (tags) to Owning Department personnel and sign and date the appropriate blind list at each listed blind point for which they removed a blind.

8.1.3 After all work is completed, authorized employees remove their personal locks.

8.1.4 Remove Group Locks (Company or Craft locks).

8.2 Owning Department Personnel:

8.2.1 Verify work is complete by reviewing job location and through communication with the servicing representatives.

8.2.1.1 The Owning Department will sign the bottom of the Master Isolation List once it is determined work is complete and isolation is no longer required for work.

8.2.1.2 The Owning Department will sign the bottom of the Blind List once it is determined work is complete and isolation is no longer required for work.

8.2.2 Prepare equipment and systems for the removal of blinds per Safe Equipment Preparation (PR-11) policy.

8.2.3 Prior to the removal of any personal locks, Owning Department issues the servicing representatives a work permit and directs the removal of blinds/energy isolation device, reconnection of electrical power and hydraulic/pneumatic lines, and re-energization of the electrical source according the isolation list(s).

8.2.4 Prior to removing "Owning Department" locks, at a minimum, one of the following methods must be completed to verify that the equipment is fit for service following maintenance activities:

8.2.4.1 **P&ID Walk down:** Utilize the complete system P&ID for the affected area to verify and document that all affected bleeders/valves are closed, plugged and capped and all flanges parted have been checked to ensure the gasket is installed correctly and have been checked for loose bolts by completing ping and ding check.

Note: The completed and signed P&ID shall be turned into the Owning Department Shift Foreman to review and attach to the MPC Return to Service Checklist (Attachment E) and stored with the permits.

8.2.4.2 **Pressure Leak Test:** The equipment and/or piping within the maintenance scope shall be leaked tested by either:

8.2.4.2.1 Pressuring the system with a utility (steam, soft water, condensate) and visually checking for leaks.

8.2.4.2.2 When using steam, caution should be taken to ensure that equipment does not exceed 85% of the MAWP, the MAWT is not exceeded, and to avoid pulling a vacuum on the system.

8.2.4.2.3 When liquid filling equipment, a review should be completed to ensure the equipment is structurally designed to handle the volume of liquid.

8.2.4.2.4 Ensuring that the utility selected is compatible with the process and metallurgy.

8.2.4.2.5 Reference Pressure Testing of Process Equipment GBR-HESS-S-25.

Note: The use of air is not a recommended practice. The use of air requires the completion of a hazard assessment and approval of the Owning Department Area Supervisor.

8.2.4.3 **Pressure the system with nitrogen and complete a hold step.**

8.2.4.3.1 Reference Pressure Testing of Process Equipment GBR-HESS-S-25.

8.2.4.3.2 During the hold step, the system pressure should be monitored closely. Flanges parted and other connections made up during the maintenance work shall be checked for leaks using a leak detection solution (e.g. Snoop). Caution should be taken to not exceed 85% of the MAWP of the equipment/piping.

8.2.4.3.3 If a hold step cannot be completed, a system walk must be completed to identify the leak source.

8.2.4.3.4 The equipment cannot be returned to service until a successful pressure test is completed.

8.2.5 **Exception:** The requirements outlined is this section apply to routine maintenance or servicing activities in which energy isolation was applied and invasive work was performed. Further, the requirements only apply to work performed on equipment in hydrocarbon, corrosive, toxic or hot service (>140°F) and are applicable to activities performed by either Maintenance or Operations/Product Control. The following items are not subject to these requirements:

8.2.5.1 Equipment in utility service with an operation temperature below 140°F.

8.2.5.2 Items considered as minor servicing activities or exclusive control. These are not subject to energy isolation.

8.2.6 Owning Department personnel must complete the MPC Equipment Return to Service Checklist prior to removing locks and before returning equipment to service.

Note: Silver lock can be removed to obtain the Return to Service Checklist tag since this does not affect isolation of the equipment.

8.2.7 If the key for the equipment locks (Orange Locks) or Lockbox becomes missing, then section 10.6.2 must be followed.

8.2.8 Upon completion, the checklist will be submitted to Owning Department Shift Foreman for review before isolation locks are removed and attached to the associated Master Isolation List and stored with the permits.

8.2.9 Remove any remaining Owning Department equipment isolation locks from valves, actuators, motor starters, circuit breakers, etc.

8.2.10 When valves are car sealed open/closed under normal operations and are used in an isolation the valves must be:

8.2.10.1 Verified to be returned to their correct operating position per RGD-O-000002-GB GBR Management of Car Sealed Valves .

8.2.10.2 Secured using a car seal.

8.2.10.3 Update Car Seal List.

9.0 Plugs

9.1 Engineered Isolation Plugs

9.1.1 Equipment isolation by blinds, threaded caps/plugs and/or physically disconnected equipment is recommended over using an engineered isolation plug. The *Hot Work Isolation by Engineered Plug Approval Form* in Attachment F must be completed prior to utilizing an engineered isolation plug.

9.1.2 If a flanged connection is unavailable for blinding, an engineered isolation plug may be used in place of a blind for hot work.

9.1.3 An engineered plug may also be utilized when there is significant risk associated with the installation of the necessary blinds. An explanation for the risk / hazards of blinding shall be included on the *Hot Work Isolation by Engineered Plug Approval Form* in Attachment F.

9.1.4 In order to use engineered isolation plugs as the only isolation for Hot Work:

9.1.4.1 A Hot Work Isolation by Engineered Plug Approval Form in Attachment F shall be completed by Maintenance.

9.1.4.2 Engineered isolation plugs must have two seals and be designed and pressure rated for the potential pressure of the line. (**Important:** The plug must also be applicable to the equipment service (e.g. liquid, vapor, corrosive, etc.)).

Note: Single sealing, sewer/plumbers plugs shall not be used for hot work.

9.1.5 If a line cannot be made hydrocarbon free, the end of the line on which the hot work is to be performed shall be sealed with an Engineered Plug.

9.1.6 The following precautions shall be in place before hot work begins:

9.1.6.1 The open end must be made hydrocarbon free and scale must be removed.

9.1.6.2 The engineered isolation plug shall be installed outside of the heat-affected zone to ensure that the hot work will not burn or melt the sealing surface of the plug.

9.1.6.3 Provisions shall be made for the continuous venting of any accumulation of gases or vapors to a safe location away from the hot work.

Note: When it is deemed necessary to establish a purge through the engineered isolation plug, the vent line shall be safely vented to assure a flow is maintained. The method of venting the purge shall indicated on the *Hot Work Isolation by Engineered Plug Approval Form* in Attachment F.

9.1.7 If applicable, the Engineered Isolation Plug shall be equipped with a means to monitor and verify the sealing pressure to ensure maintenance of the 100% positive pressure vapor barrier. Also, a means to monitor the buildup of pressure behind the plug is required not to exceed the plug specifications.

9.1.8 A flammable gas test shall be made around the plug as part of the permit.

9.1.9 The location of the engineered isolation plug must be tagged with a blind tag and entered into the corresponding energy isolation and blind lists for the job.

9.1.10 The potential exists for engineered isolation plugs to be blown out of liners due to the buildup of pressure. Always work to one side of an inserted plug, never work in front of the plug.

9.1.11 Engineered isolation plugs used on lines containing flammable vapors shall not be left unattended past the end of the maintenance shift (work will continue until completed and the system is sealed or blinded).

9.2 Mechanical or Inflatable Sewer Plugs

9.2.1 The use of mechanical or inflatable plugs may be used for sewer isolation if they meet the following requirements:

9.2.1.1 Plugs are proper size and proper inflation rating for the application,

9.2.1.2 Plugs are petrochemical resistant,

9.2.1.3 Plugs are certified with current inspection by the manufacturer (i.e. expiration, visual defects, etc.),

9.2.1.4 Plugs will only be inflated inside of the pipe,

9.2.1.5 Have accurate calibrated pressure gauges monitoring the pressure being used,

9.2.1.6 Air line connections and hoses are not damaged and/or leaking,

9.2.1.7 Plug will be positioned so that there are no sharp edges or protrusions that may damage it,

9.2.1.8 The sewer line flow has been stopped or bypassed,

9.2.1.9 The head pressure may never exceed the rated pressure of the plug,

9.2.1.10 If head pressure will be present an anchor, support and or bracing shall be installed to secure the plug.

9.3 Isolation using Freeze Plug

9.3.1 In rare cases, a freeze plug may be used to isolate a section of piping, but this is typically conducted as a last resort and requires in depth analysis, planning and preparation.

9.3.2 A procedure variance must be completed for any isolation utilizing a freeze plug. The variance must document why freezing the line was chosen over alternative solutions, the findings and recommendations from the hazard review and the precautions to safely complete the task.

9.3.3 The following factors must be satisfied prior to using a freeze plug:

9.3.3.1 There are no valves available to isolate the line or the isolation valves are not operating properly,

9.3.3.2 The line contains a freezable product (e.g., water, amine, heavy product),

9.3.3.3 The flow/velocity in the line is at an acceptable rate for freezing,

9.3.3.4 The line pressure and metallurgy allow for the use of a freeze plug,

9.3.3.5 Only cold work is allowed on lines containing hydrocarbons, and

9.3.3.6 Continuous monitoring of the line atmosphere and plug is required to ensure the plug remains in place and is performing as designed.

10.0 Miscellaneous Requirements

10.1 Alternate use of Locked Double Block and Bleed Valves

10.1.1 The use of locked double block and bleed valve alternatives in place of blinding equipment with a blank, slip plate, blind flange, threaded cap/plug and/or physical disconnect is only allowed in those situations listed in the Minimum Energy Isolation Requirements (see Attachment A) and for isolating opened ended lines if the following precautionary measures are taken to ensure continued isolation and to protect against developing a hazardous atmosphere:

10.1.1.1 Block valves are verified closed and tight.

10.1.1.2 Bleed valves and piping are verified open and clear.

10.1.1.3 Block valves are locked closed and the bleed valve is locked open.

10.2 Electrical LOTO Procedures for TAR's

10.2.1 The refinery Electrical Department will work with the Owning Department to coordinate all work and energy isolation within substations.

10.2.2 The Owning Department will prepare unit equipment for maintenance and perform isolation and LOTO per normal procedures.

10.2.3 When the Electrical Department must isolate an MCC for electrical maintenance, the needed loads will be transferred to a temporary distribution source, the MCC main breaker will be placed in an electrically safe working condition and a LOTO will be installed.

Note: When temporary power is utilized, extreme caution must be exercised to ensure that electrical power is not being supplied to isolated equipment.

10.2.4 The Electrical Department will coordinate with the Owning Department to have all previously installed LOTO locks and tags removed from the MCC individual breakers and transferred to the lock box for the MCC main breaker. This will ensure that the energy source remains isolated at all times protecting the persons performing work in the field.

10.2.5 When the MCC is to be re-energized, the Owning Department shall remove any locks and tags on the lock box for the MCC main breaker and install their locks on the original equipment breaker for any work being performed in the field.

10.2.6 For situations where isolated equipment must be tested, positioned, temporarily operated, etc., the removal of locking devices and de-isolation must be managed via the "Interim Test" form and the task may be performed during shift change to minimize work disruptions.

10.3 Exclusive Control

10.3.1 The “Exclusive Control” exception to LOTO may only be applied to cord and plug electrical equipment. Examples include drill presses, saws, copiers, etc. that possess a cord and plug. The isolation of equipment by local switches, disconnects, valves, etc. is not considered “Exclusive Control” by OSHA.

10.4 Minor Servicing Activities

10.4.1 This procedure and **OSHA Standard 1910.147** (The Control of Hazardous Energy – Lockout Tagout) does not apply to tasks classified as Minor Servicing Activities.

10.4.2 Tasks designated as Minor Servicing Activities (routine, repetitive, integral to the process) are listed in Section 14.0 .

10.4.3 As required by **OSHA 1910.147**, alternative protective measures have been developed for Minor Servicing Activities and included in Section 14.0 .

10.4.4 Minor Servicing Activities must be attended at all times. If left unattended for any reason (breaks, lunch, relief, etc.) LOTO must be applied.

10.5 Using a Relief Valve as an Energy Isolation Device (EID)

10.5.1 A relief valve may only be utilized as an EID for the purpose of inserting a blind.

10.5.1.1 A relief valve can be considered an EID to prevent backflow from the flare header for the purposes ***of installing or removing pre-decon blinds and installing or removing relief valve blinds.***

10.5.1.2 Process operation must in a steady state and be monitored continuously during the installation of blinds to warn workers or any process upsets.

10.5.1.3 Respiratory protection and other required personal protective equipment (PPE) while installing/removing blinds shall be determined by atmospheric testing and analysis of the process equipment. Where monitoring near the flange cannot be conducted, blinds shall be installed using supplied air and bunker gear until the flare is isolated from equipment by blinds.

10.5.2 The relief valve shall be listed as an EID on the Master isolation list and must be tagged.

10.6 Lock Removal Process

10.6.1 If an individual or craft fails to remove a lock and leaves the workplace, the following procedures shall be followed (provided the lock requires removal).

10.6.1.1 The individual’s Foreman, Coordinator, Area Team Leader, Manager or On-Call person shall verify that the individual or craft is not available to remove the lock.

10.6.1.2 The individual’s Foreman, Coordinator, Area Team Leader, Manager or On-Call person shall determine if the job is complete, if equipment is ready to return to service or if an Interim Test/Status Change needs to be performed and if the lock can be removed. The individual’s Foreman, Coordinator, Area Team Leader, Manager or On-Call personal shall complete Section B of the Lock Removal Report (see Attachment G) before physically cutting the lock from a lock box or energy isolation point.

10.6.1.3 The individual’s removed lock or craft lock shall be returned to the respective Foreman along with the completed Lock Removal Report (see Attachment G).

10.6.1.4 The individual whose personal lock was cut shall be informed of the incident before resuming work at the refinery (if applicable). This shall be affirmed by having the individual sign the Lock Removal Report (see Attachment G).

Attachment G is to be stapled to the Safe Work Permit.

10.6.2 If the energy isolation lock (Orange Lock) controlling the isolated equipment has to be cut to remove Orange Locks from the isolated equipment for any reason (e.g., Missing Key or Missing Lock Box), the Lock Removal Report (Attachment G) section A must be filled out and attached to the Master Isolation List and stored with the permits.

10.6.2.1 Documentation of Orange Lock removal shall be put into the operator's and supervisor's Ops Core notes.

10.7 Energy Isolation of Radioactive Energy Source and/or Instrumentation

10.7.1 Proper applicability and scope are defined in the facility GBR-HESS-SM-01 Radiation Safety Management.

10.7.2 All personnel must contact the Radiation Safety Officer (RSO) or the Alternate RSO before manipulating a source housing (i.e. opening or closing a shutter) or entering a restricted area.

10.7.3 The RSO must authorize work that requires any part of any part of an employee's body to enter a restricted area.

10.7.4 The RSO or the ARSO must be notified at a minimum 7 days prior to entering any vessel with a nuclear source as per SM-1.

10.7.5 Only the RSO's or those who have received training may open or close source shutters.

10.7.6 When work requires employees to pass a body part in front of a source shutter, the shutter must be locked closed an tagged out by the RSO or other trained personnel.

10.7.7 When work must occur between an open shutter and the mounting vessel, employees must use tools with handles to prevent passing a body part through the beam path.

10.7.8 When work requires entering a confined space that has radiation sources, the radiation sources will be required to be isolated and listed on the Master Isolation List.

10.7.9 The RSO/ARSO or the Radiation Qualified User (RQU) must review the Master Isolation List and the Blind Lists developed for the confined space entry to ensure all radiation sources for that vessel are listed.

10.7.10 The RSO will provide energy isolation for the sources as required.

10.7.10.1 The RSO has a group of Gold locks they will use, and the key will remain under the control for the RSO or other trained personnel. It will be included in the Master Isolation List (MIL).

10.7.10.2 An Orange operations isolation lock will be placed on the radiation source, in addition to the Gold RSO lock. The key to the orange lock will be placed in the Owning Department's Master Isolation lock box and the lockbox number included on the MIL.

10.7.11 See GBR-HESS-SM-01 Radiation Safety Management for personnel monitoring requirements during work in restricted areas and while moving sources.

10.8 Abandoned In Place

10.8.1 Process Lines, Equipment and Electrical shall be blinded, plugged, disconnected or air gapped in accordance with PS 8.10 Abandon in Place policy.

11.0 Training

11.1 Training shall be provided to ensure that the purpose and function of the energy control program are understood by employees and that the knowledge and skills required for the safe application,

usage, and removal of the energy controls are acquired by employees. The training shall include the following:

11.1.1 Each authorized employee shall receive training on the local LOTO standard, the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

11.1.2 Each affected employee shall be instructed in the purpose and use of the energy control procedure and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

11.1.3 Contract companies performing work involving energy isolation must be trained and knowledgeable of the requirements of the OSHA Lockout/Tagout standard and the local LOTO standard.

11.1.4 Non-compliance with any portion of this procedure will be evaluated to determine violation(s) of a Life Critical Safety Rule (see **RSP-1700-000**) and RSW-000003-GB.

12.0 Audit Requirements

12.1 Apply the following requirements for inspections and audits:

12.1.1 Each site shall conduct inspections of their energy control procedure at least annually to ensure that the procedure and the requirements of this policy and the OSHA standard are being followed.

12.1.2 The audits must include a representative sampling (to be determined by the Safety Supervisor) of the various types of isolations (i.e., vessels, pumps, electrical, etc.), the site and its authorized employees.

12.1.3 The periodic audit shall be performed by an authorized employee other than the one(s) utilizing the energy control procedure being inspected.

12.1.4 The periodic audit shall be conducted to correct any deviations or inadequacies identified.

12.1.5 The periodic audit shall include a review, between the auditor and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected.

12.1.6 The employer shall certify that the periodic audits have been performed utilizing the *Blinding and Energy Isolation Audit Form* in Attachment K. The certification shall identify the machine or equipment on which the energy control procedure was being utilized, the date of the inspection, the employees included in the inspection, and the person performing the audit.

13.0 Alternative Group Lockout/Tagout Procedures

13.1 When complex equipment is being serviced or maintained, when there are many sources of energy, and/or when servicing/maintenance work extends over multiple shifts, OSHA permits employers to utilize an alternative procedure to each employee applying personal locks. Furthermore, OSHA recognizes the need to modify normal group energy control procedures to ensure the safety of employees performing servicing and maintenance on sophisticated and complex equipment.

13.2 The following factors shall be evaluated to determine whether the equipment being serviced or maintained is so complex as to necessitate a departure from the conventional group lockout/tagout procedures:

13.2.1 Physical size of the equipment

13.2.2 Number of employees performing the servicing/maintenance

13.2.3 Number of isolating devices to be locked/tagged out, and

13.2.4 Interrelationship of the components in the system of between different systems

13.3 The alternative system, comprised of the work permit, group lock and signature log, is an acceptable approach to personal locks, as long as the control and accountability procedures provide a level of protection equivalent to each individual authorized employee affixing their personal lock.

13.4 In order to achieve the same protection as that provided by the application of personal locks, the following elements must be in place in the alternative system to be considered similar to the normal master lock box and satellite lock box system.

13.4.1 Equipment owner performs shutdown, isolates equipment, verifies depressurization, applies equipment locks, and applies department lock to lockbox.

13.4.2 Owning department representatives review the job with the servicing and maintenance crew(s) and ensures comprehension of the energy controls necessary to conduct the work safely.

13.4.3 Note: Actions taken in 13.4.1 and 13.4.2 above must be documented on the work permit.

13.4.4 A Principle Authorized Employee (PAE) may represent workers to verify equipment isolation and depressurization, but workers must be allowed to participate and must also be informed of their right to participate.

13.4.5 Following successful completion of the verification, the PAE will apply a group lock to the Master Lock Box and fill out the Principle Authorized Employee Form.

13.4.6 Each authorized employee must sign in on the PAE form at the time of arrival to the job and sign out at departure.

13.4.7 As the work is completed, the work permit and signature logs must be reconciled jointly by the PAE and the Owning Department Representative. This is required to ensure that all authorized employees who were assigned to the job are accounted for and verified to be clear from the equipment area.

13.4.8 The PAE form must be attached to the appropriate work permits so that the accountability of exposed employees is maintained.

13.4.9 Periodic audits must be conducted and documented to ensure the system remains effective.

14.0 Minor Servicing Activities

Activity	Justification	Alternative Measures to LOTO
Replacing pressure gauge and servicing pressure transmitters	• Done during normal production (intended function of process equipment un-interrupted) • Routine, Repetitive and Integral – action is repeated on a regular basis during routine technician rounds to ensure equipment and process monitoring is available	• Verification that isolation valve is closed. • Ensure not in line of fire.
Light bulb replacement (bulbs not broken)	• Done during normal production (intended function of process equipment un-interrupted) • Routine, Repetitive and Integral – action is repeated on a regular basis during routine technician rounds to ensure safety and equipment/process monitoring	• Verification that power is off (switch, etc.). • Wear proper hand protection.
Installing and removing utility hoses, fire water hoses and drain hoses/tubing. This includes small bore piping (valves, check valves and other fittings) that are required to connect utility hoses and drain hoses to the process.	• Done during normal production (intended function of process equipment un-interrupted) • Routine, Repetitive and Integral – action is repeated on a regular basis during routine operator rounds to ensure equipment and process monitoring is available and during equipment troubleshooting	• Verification that isolation valve is closed • Ensure not in line of fire • Reference RSP-1150-010 Caustic and Utility Connections to Process Lines & Vessels
Removing plugs and caps from bleeders/valves	• Done during normal production (intended function of process equipment un-interrupted) • Routine, Repetitive and Integral – action is repeated on a regular basis during routine operator rounds for equipment or process monitoring and during equipment troubleshooting	• Verify the isolation valve is closed • Ensure not in line of fire • Installing bleeder cleaners and conducting gauging actions - operating guidelines/ training documents shall be in place to define actions and safety provisions to be followed.
Installing and removing bleeder cleaner tools		
Gauge catalyst hopper, salt drier, tank, etc.		
Removing blind flange to back flush a cooling water exchanger	• No potential for release of hazardous material • Done during normal production (intended function of process equipment un-interrupted) • Routine, Repetitive and Integral – activities are repeated during routine operator rounds or PM frequency, monitor process conditions or ensure integrity of system	• Verify energy isolation if required.
Remove coupon holder in cooling water circuit		
PM pH probes in cooling water circuits		

(Continued)

Activity	Justification	Alternative Measures to LOTO
Steam trap replacement and cold work steam tracing repairs (systems that can be isolated by two valves)	• Done during normal production (intended function of primary process un-interrupted) • Routine, Repetitive and Integral – action is repeated on a regular basis based on observations from routine operator rounds. Properly operating steam tracing is essential to operation of the process.	• Verify system is isolated and de-pressured • Wear appropriate PPE for the task.
Connect hoses for caustic, acid and chemical deliveries	• Done during normal production (intended function of process equipment un-interrupted) • Routine, Repetitive and Integral – action is repeated on a regular basis and is inherent for process operations	• Verify isolation valve(s) is isolated • Wear appropriate PPE for the task. • Operating Procedures and/or guidelines shall be in place to adequately define actions and safety provisions to be followed.
Completing hose loops for product transfer		
Blow down sight glass	• Done during normal production (intended function of process equipment un-interrupted) • Routine, Repetitive and Integral – action is repeated on a regular basis during routine rounds to ensure process monitoring is available and during troubleshooting	• Verify system is blocked in (if applicable) • Additional PPE will be utilized based on Invasive Work Risk Assessment Matrix, other form of hazard review, or other policy • Ensure not in line of fire
Steaming out sight glass, control valve, etc.		
Blow down high and low side taps of flow cell		
Troubleshooting/servicing transmitters with a manifold between root valves & transmitter that allows for isolation	• Done during normal production (intended function of process equipment un-interrupted) • Routine, Repetitive and Integral – action is repeated on a regular basis during routine rounds to ensure process monitoring is available and during troubleshooting	• Verification that isolation valves are closed • Additional PPE will be utilized based on Invasive Work Risk Assessment Matrix, other form of hazard review, or other policy • Required safety measures shall be documented on the work permit • Ensure not in line of fire
Calibration and repair of equipment in analyzer buildings		
Changing motor and blower air filters	• Done during normal production (intended function of process equipment un-interrupted) • Routine, Repetitive and Integral – action is repeated on a regular basis during routine operator rounds to maintain condition of equipment.	• Wear appropriate PPE for the task

(Continued)

Activity	Justification	Alternative Measures to LOTO
Blinding small bore fuel gas piping to process heaters	• Done during normal production (intended function of process equipment un-interrupted) • Routine, Repetitive and Integral – action is done based on observations from routine operator rounds to maintain equipment reliability.	• Verification of isolation • Guideline or training document shall be in place to adequately define actions and safety provisions that must be followed. • Apply personal lock on isolation point. If no personal lock can be applied, LOTO must be applied.
Repair/Cleaning of tips or replacement of flex hoses for burners or process heaters		
Perform troubleshooting or calibration of control valves.	• Done during normal production (intended function of process equipment un-interrupted) • Routine, Repetitive and Integral – action is repeated on a regular basis to ensure equipment is available • No potential for release of hazardous material	• Verification that isolation valves are closed. • Wear appropriate PPE. • Required safety measures shall be documented on the work permit if the servicing group is performing the work. • Ensure not in line of fire.

15.0 Terms and Definitions

15.1 Affected Employee - is an employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

15.2 Authorized Employee - is a person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance.

15.3 Bleeder Blind - is a blind designed for the isolation of a piece of equipment and contains a bleeder valve for the purpose of hydro-testing, steaming, purging, de-pressuring, etc. while still maintaining the energy isolation. The two types of bleeder blinds used at MPC are Bleeder Blind Flanges and Pancake Bleeder Blinds.

15.4 Bleeder Blind Flange - is a bleeder blind where the pipe nipple and valve are added to the inside diameter of the bolt circle on a full pressure, stamped, rated blind flange. Bleeder blind flanges are fabricated of piping components following the applicable line specifications. Bleeder blind flanges may be used as a *permanent* piping component.

15.5 Blind List - is the standardized form used to document the location, size, installation and removal of isolation and test blinds. (*Also referred to as Isolation List*).

15.6 Blinding – is the absolute closure of a pipe, line or duct achieved by fastening a solid plate, threaded plug or cap across its bore to complete cover it. The cover must at least cover the outer edge of a flange's mating surface and be capable of withstanding the maximum upstream system pressure, temperature and be chemically compatible.

15.6.1 **Blinds include:** blanks, slip plates, blind flanges, threaded caps, physical disconnects

15.7 Cold Work - is maintenance, repair, cleaning, or construction activity, not requiring the use of fire, hot surfaces, spark producing equipment, or electrical equipment that is not classified for use in the area.

15.7.1 Examples: Vibration monitoring, control valve tuning, and valve packing adjustment.

15.8 Confined Space Entry - means the action by which any part of a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space, whether or not such action is intentional, or any work activities are actually performed in the space.

15.9 Double Block and Bleed - is the closure of a line, duct or pipe by closing and locking two (2) in-line valves and by opening and locking a drain or vent valve in the line between the two closed valves.

15.10 Energy Isolating Device (EID) – is a mechanical device that physically prevents the transmission or release of energy including but not limited to the following:

15.10.1 Manually operated electrical circuit breaker,

15.10.2 Disconnect switch,

15.10.3 Manually operated switch that the conductors of a circuit can be disconnected from all ungrounded supply conductors and no pole can be operated independently,

15.10.4 Line valve,

15.10.5 Block valve,

15.10.6 Blind or,

15.10.7 Any similar device used to block or isolate energy.

15.10.8 **Note:** The following are not considered energy isolation devices: control valves, FCC slide valves, push buttons, selector switches, and other control circuit type devices.

15.11 Master isolation list - is the standardized form used to document isolated energy sources (e.g., breakers, valves, and blinds), isolation verification points and the means used to verify the control of hazardous energy (*Also referred to as Isolation List*).

15.12 Engineered Isolation Plug - is an engineered tool used to safely provide 100% positive pressure vapor barrier against residual contents in the pipe.

15.13 Energy Source - Energy sources include things such as steam to turbines, air from compressors, electric switches, hydraulic or pneumatic power to pistons.

15.14 Equipment Isolation Locks - are locks assigned to the owning department for the purpose of isolating equipment. These locks will be placed on breakers, valves, etc. and only one key will operate each lock. Equipment isolation locks shall be standardized by color, shape or size.

15.15 Exclusive Control - is work on cord and plug connected electric equipment for which exposure to the hazards of unexpected energization or startup of the equipment is controlled by the unplugging of the equipment from the energy source and by the plug being under the exclusive control of the employee performing the servicing or maintenance.

15.16 Freeze Plug - is the practice of freezing a section of the contents of a line (pipe) to isolate equipment.

15.17 Group Lock - is a lock applied to the Master Lockbox representing a servicing group.

15.18 Hazardous Energy - is any energy, including mechanical, pneumatic, hydraulic, electrical, chemical, radiation, and thermal that could cause injury to workers.

15.19 Heavy Materials/Solids - The term Heavy Materials/Solids refers to; process materials that solidify as they are cooled to near ambient temperatures and/or process materials that typically contain solids (coke, catalyst). These materials include, but are not limited to; slurry, sulfur, various gas oils, asphalt, bunker fuel, vacuum resid, pitch and any other process materials with similar physical properties.

15.20 Hot Work - is repair, maintenance, or construction activity, which requires the use of spark-producing equipment or may create an ignition source.

15.21 Invasive Work Risk Assessment - refers to a tool to be utilized to determine mitigation actions that should be taken when doing any invasive work. Once the invasive work task has been identified, use the tool to generate a numerical value for the categories of exposure concern, volume and impact. These values can then be multiplied to generate the Risk Assessment Score. This overall score is applied to the Mitigation Levels that include clear definition on the type of PPE, tools, protective actions and other mitigations that should be taken to complete the task.

15.22 Isolation/De-isolation - is valve positioning, blinding, plugging, disconnecting, installing or removal that requires process hazard lockout by its owner.

15.23 Isolation Blind – is a blind designed for the process isolation of a piece of equipment, vessel, piping, etc., during servicing or maintenance activities.

15.24 Isolation Verification Point - is a device within an isolated system that is used to verify that hazardous energy is being controlled, but it is not part of the lockout/tag out for the system because it remains in its original state/position during the servicing of the equipment. Isolation verification points are recorded on the Master isolation list.

15.25 Lockbox (Master) - is the lockbox into which all of the keys from the equipment isolation locks securing the machines or equipment are inserted and which would be secured by an Owning Department lock and Group Lock(s).

15.26 Lockout – is the placement of a physical lockout device on an energy-isolating device to ensure that the energy-isolating device and the equipment it controls cannot be operated until the lockout device is removed (One lock and one chain per energy isolation device). Lockout devices use positive means such as locks, blank flanges and bolted slip blinds.

15.27 Minor Servicing Activities - which take place during normal production operations, are not covered by this policy if they are routine, repetitive, and integral to the use of the equipment for production, provided that the work is performed using alternative measures which provide effective protection.

15.28 Owning Department - is the department that normally owns and operates equipment, machinery and/or systems.

15.29 Pancake Bleeder Blind - is a bleeder blind where the pipe nipple and valve are on the outer circumference of the blind with the vent hole drilled perpendicular and horizontal to the vent port. This type of bleeder blind is intended to slip between two mating flange faces. Pancake bleeder blinds are temporary devices typically used for equipment preparation and maintenance activities. Pancake bleeder blinds shall not be used as permanent components in a piping system.

15.30 Perimeter (Battery Limit) Blind - is a blind placed at the perimeter of a unit or system that will provide isolation for the entire unit/system. Perimeter blinding will typically occur during turnarounds and will be required for hydrocarbons, toxics, corrosives, chemicals and nitrogen. Water, steam and air may need to remain in service within areas isolated by perimeter blinds.

15.31 Permanent Blind - is a blind that is in place during normal operations. This includes blinds on drain piping, utility connections, spec blinds normally rolled in the closed position, and decommissioned equipment. This does not include blind flanges.

15.32 Personal Lock - is a lock assigned to an employee that is individually identified and keyed. This lock will only be installed and removed by the assigned individual and shall remain in place while the individual is performing work on the isolated equipment. Personal locks will normally be applied to satellite lockboxes but may also be applied to Master Lockboxes.

15.33 Ping & Ding - is a method used to check for loose bolts on flanges. A ball peen hammer is used to strike each bolt to look for movement and listen for a sound indicating the bolt is loose.

15.34 Primary Isolation Point (PIP) - is the point of isolation located immediately adjacent to the hazardous energy source.

15.35 Satellite Lockbox - is a secondary lockbox or lockboxes to which the keys to Group Locks are placed and each authorized employee affixes their personal lock.

15.36 Servicing Representatives - are the individuals working on the equipment/process. This may include operations, blending, shipping, maintenance, contractors, and salaried employees.

15.37 Status Change/Interim Test Form - is the form used to document the required steps for the temporary de-isolation of equipment for the purposes of testing, positioning, steaming, rinsing,

purging, etc. and re-isolation prior to the authorized employees resuming work on the isolated equipment. This form is also used to document changes to the Master isolation list while the equipment / system is still isolated.

15.38 Supplemental Master Isolation List - is the standardized form used to document additional isolated energy sources (e.g., breakers, valves, blinds) and/or isolation verification points that are not able to be included on the Master Isolation list. This form is typically used during complex isolations.

15.39 Tagout - is the placement of a physical tag tagout device on an energy-isolating device to indicate that the energy-isolating device and the equipment it controls may not be operated until the tagout device removed. When utilizing tagout, the perforated lower section of the tag must be removed and placed into the LOTO box. Electronic documentation of a “tag-out” is not considered a valid tag-out (i.e., red tagged on board).

15.40 Test (Hydro-test) Blind - is a blind installed for the sole purpose of tightness testing of piping and/or equipment.

16.0 References

16.1 OSHA 1910 Subpart J Control of Hazardous Energy Sources (Lockout/Tagout)

16.2 OSHA 29 CFR 1910.119(f)(4) – Process Safety Management of Highly Hazardous Chemicals.

16.3 OSHA 29 CFR 1910.146 – Confined Space Entry Standard.

16.4 OSHA 29 CFR 1910.147 – Control of Hazardous Energy (Lockout/Tagout).

16.5 OSHA 29 CFR 1910.269 – Electric Power Generation, Transmission and Distribution Standard.

16.6 OSHA 29 CFR 1910.333(b) – Electrical Safety Related Work Practices.

16.7 GBR PR-3 Safe Work Permit Practice

16.8 GBR PR-24 In-service Welding/Hot Tap Procedure

16.9 GBR SM-1 Radiation Safety Management

16.10 GBR RGD-M-000006-GB Mechanical Integrity Site Plan

16.11 Marathon Petroleum Company LP, IG-86 Interim Guidance for Safe Work Permit

16.12 Marathon Petroleum Company LP, RSP-1121-010 Blinding and Energy Isolation

16.13 Marathon Petroleum Company LP, RSP-1150-010 Caustic and Utility Connections to Process Lines & Vessels

16.14 Marathon Petroleum Company LP, RSP-1150-040 Management of Minor Leaks and Clamp/Wrap Life Cycle Management

16.15 Marathon Petroleum Company LP, RSP-1162 Electrical Safe Work Practices

16.16 Marathon Petroleum Corporation, Corporate HES&S Standard SAF-4007 Control of Hazardous Energy Sources (Lockout-Tag out)

17.0 Attachments

17.1 Attachment A – Minimum Energy Isolation Requirements

17.2 Attachment B – Master Isolation List Template

17.3 Attachment B1 – Supplemental Isolation List

17.4 Attachment C – Blind List Template

17.5 Attachment C1 – Supplemental Blind List

17.6 Attachment D – Status Change/Interim Test Form

17.7 Attachment E – MPC Return to Service Checklist

17.8 Attachment F – Hot Work Isolation by Engineered Plug Form

17.9 Attachment G – Lock Removal Report

17.10 Attachment H – Principle Authorized Employee Form

17.11 Attachment I – Lock Color Guide

17.12 Attachment J – LOTO/Blind/Bleeder Tags/MPC Energy Isolation Device Tag

17.13 Attachment K – Blinding and Energy Isolation Audit Form

17.14 Attachment L – Line Breaking Flow Chart

17.15 Attachment M – Work Location Tag

17.16 Attachment N – Isolation of Equipment Containing Heavy Materials/Solids

17.17 Attachment O – Heavy Oil Service Single Point Isolation Checklist

18.0 Revision History

18.1 This procedure is subject to an annual review per corporate policy (HES Standard 310).

Revision Number	Description of Change	Written by	Approved by	Revision Date	Effective Date
0	Original Issue. Consolidated site procedure replaces GBR-HESS-PR-14 and RSW-0002-TC and updated per Corporate RSP-1121-010 under MOC 50762.	M. G. Roache	D. C. Staats	8/1/2018	11/26/2018
1	Added clarifications regarding who verifies the blind list locations have been walked out and must sign Attachment C (5.6.3) and who must be present during initial line break (5.6.4), to address REC 159025.	J. D. Madden	V. J. Meeks	5/17/2019	5/31/2019
2	Added Energy Isolation Verification requirements for systems in Batch-Cyclic Operations to address PSA and investigation recommendations under MOC 71217.	J. D. Madden	V. J. Meeks	3/11/2020	3/16/2020
3	Revised to update Return to Service Checklist, align with PR-11 Safe Equipment Preparation and added clarification under MOC 81035.	J. D. Madden	E. R. Kaysen	9/28/2020	11/7/2020
4	Added clarification regarding lock closure, radiation sources to address REC's 243843, 240931 and 240933 and clarify how to address missing blind list and/or MIL's, and variance requirements when using certain valves for energy isolation devices.	J. D. Madden	E. R. Kaysen	7/21/2021	9/2/2021
5	Removed requirement limiting energy isolation devices to hand actuated gate valves or ball valves and clarified definitions of energy isolation device valves, lockout and tagout to align with RRD-1323-000.	J. D. Madden	H. F. Sheard	10/20/2021	10/22/2021
6	Adds clarifications on how to address and document removal of orange lock when the key and/or lockbox is missing.	J. D. Madden	H. F. Sheard	12/14/2021	12/15/2021
7	Revised to address RSP update for heavy oil services, audit findings and local action items under MOC 106509.	J. D. Madden	H. F. Sheard	5/12/2022	8/22/2022
8	Updated to align with updated RSP-1121-010 under PMOC 176817.	J. D. Madden	H. F. Sheard	Mm/dd/yyyy	Mm/dd/yyyy

Attachment A – Minimum Energy Isolation Requirements

Minimum Energy Isolation Requirements								
STREAM TYPE:	CORROSIVES	HAZARDOUS WASTE	HIGH TEMP or PRESSURE UTILITIES	HYDROCARBON	TOXICS	NON-FLAMMABLE	UTILITIES	OTHER
EXAMPLES:	HF, SULFURIC SPENT OR FRESH CAUSTICS	API, DAF, WASTE WATER LIQUIDS & SOLIDS	BOILER FEEDWATER, STEAM	HYDROGEN, FUEL GAS, FLUE GAS, LPG, LUBE OIL, NAPHTHA, CRUDE, SLURRY, ETC.	ANTIMONY, AMMONIA, HYDROGEN SULFIDE, AMINE, CHLORINE, BENZENE, NITROGEN	COOLING WATER, FRESH GLYCOL	INSTRUMENT AIR, PLANT AIR, UTILITY WATER, FIREWATER	MISC. ADDITIVES
COLD WORK	LOCKOUT	LOCKOUT	LOCKOUT	LOCKOUT		LOCKOUT	LOCKOUT (2)	LOCKOUT
HOT WORK	BLIND	BLIND	LOCKOUT	BLIND		LOCKOUT	LOCKOUT (2)	BLIND
CONFINED SPACE ENTRY	BLIND	BLIND	BLIND (1)	BLIND		BLIND	BLIND (1)	BLIND

Minimum Energy Isolation Requirements					
ENERGY TYPE:	ELECTRICAL	RADIATION	MECHANICAL	HYDRAULIC	PNEUMATIC
EXAMPLES:	MOTOR CIRCUITS, BUSSES, BATTERY CIRCUITS, FEEDERS, CONTROL CIRCUITS, ETC.	Nuclear gauge, ETC.	FLYWHEELS, TROLLEYS, SPRING-TENSIONED EQUIPMENT, CLUTCHES, ELEVATED MACHINE MEMBERS, PUMP IMPELLERS, ETC.	FCCU SLIDE VALVE(S) CONTROL SYSTEM, HYDRAULIC MOTORS, OTHER HYDRAULIC SYSTEMS, ETC.	AIR DRIVEN ACTUATORS, ETC.
COLD WORK	LOCKOUT (2)	LOCKOUT OR SOURCE REMOVAL	LOCKOUT	LOCKOUT	LOCKOUT
HOT WORK	LOCKOUT (2)	LOCKOUT OR SOURCE REMOVAL	LOCKOUT	BLIND(1)	BLIND(1)
CONFINED SPACE ENTRY	LOCKOUT	LOCKOUT OR SOURCE REMOVAL	LOCKOUT	BLIND(1)	BLIND(1)

NOTE:

(1) Where (1) is located in the table, see Section 10.1 for additional information.

(2) Where (2) is located in the table, there may be some utility streams and electrical installations which are not capable of, or configured for Lockout isolation. In the rare event Lockout isolation cannot be utilized for a particular utility stream then Tagout isolation methods may be used. For electrical situations that cannot be locked out, an additional measure of isolation must be implemented (e.g., removal of circuit element, removal of fuse, disconnect wire, opening a second disconnecting device).

(3) Entry into the shroud area of cooling towers (e.g., for gear box repairs, motor PMs) does not require blinding. The water to the cell must be locked out and the fan must be locked out. Entry into an in service cooling tower is acceptable, if the following conditions are met:
- Water to the cell is locked out,
- Platforms and walkways are structurally sound, and
- Appropriate PPE is utilized.

(4) Blinds are not required to isolate fire water/water to flow test nozzles in towers/vessels with the approval signatures from the Ops/Products Control and Maintenance Supervisors. The remainder of the tower/vessel must be blinded for confined space entry. Following the completion of flow tests, blinds must be installed in the test nozzle locations.

(5) Isolation requirements do not apply to gases utilized for inerting equipment and vessels.

(6) Lockout/Tagout is acceptable for confined space entry above the roof on internal and external floating roof tanks.

Attachment B – Master Isolation List Template

Master Isolation List Template, Doc. No. RSW-FORM-000054-GB

Attachment B1 – Supplemental Isolation List

Supplemental Isolation List, Doc. No. RSW-FORM-000055-GB

Attachment C – Blind List Template

Blind List Template, Doc. No. RSW-FORM-000056-GB

Attachment C1 – Supplemental Blind List

Supplemental Blind List, Doc. No. RSW-FORM-000057-GB

Attachment D – Status Change/Interim Test Form

Status Change/Interim Test Form, Doc. No. RSW-FORM-000058- GB

Attachment F – Hot Work Isolation by Engineered Plug Form

Hot Work Isolation by Engineered Plug Form, Doc. No. RSW-FORM-000060-GB

Attachment G – Lock Removal Report

Lock Removal Report, Doc. No. RSW-FORM-000061-GB

Attachment H – Principle Authorized Employee Form

Principle Authorized Employee Form, Doc. No. RSW-FORM-000062-GB

Attachment K – Blinding and Energy Isolation Audit Form

Blinding and Energy Isolation Audit Form, RSW-FORM-000063-GB

Attachment N – Isolation of Equipment Containing Heavy Materials/Solids

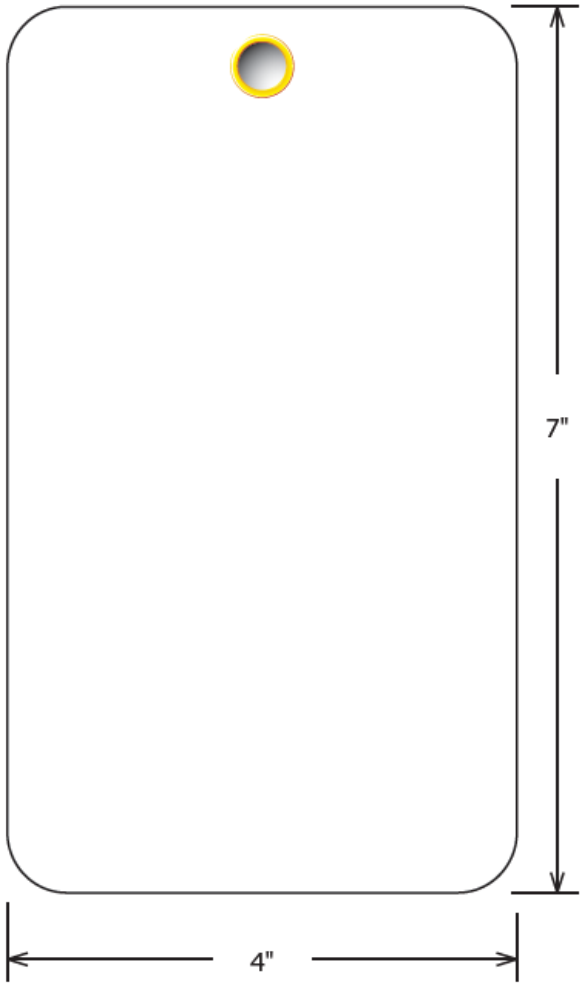
Isolation of Equipment Containing Heavy Materials/Solids, Doc. No. RSW-FORM-000109-GB

Attachment O - Heavy Materials/Solids Single Point Isolation Checklist

Heavy Materials/Solids Single Point Isolation Checklist, Doc. No. RSW-FORM-000110-GB

Attachment E –Return to Service Checklist Tag

(Front)



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MPC RETURN TO SERVICE TAG

Owning Department personnel must complete this MPC Equipment Return to Service Checklist prior to returning equipment to service. Upon completion, the checklist will be submitted to Owning Department Shift Foreman for review and then attached to the associated Master Isolation List and stored with the Safe Work Permits. Refer to section 8.2.5 Exception for form requirements.

Check Item	Verification
Post JJSV completed, area housekeeping acceptable?	☐ YES ☐ NO
Temporary piping, hoses or tubing has been removed from the equipment.	☐ YES ☐ NO ☐ N/A
Verify blinds are removed and/or permanent blinds are reinstalled	☐ YES ☐ NO ☐ N/A
Pressure gauges/Thermal couples have been installed.	☐ YES ☐ NO ☐ N/A
Verify all bleeders are installed and plugs are installed.	☐ YES ☐ NO ☐ N/A
Relief paths including PSV's are car sealed and verified open.	☐ YES ☐ NO ☐ N/A
Rotating equipment guards & insulation are in place for personnel protection.	☐ YES ☐ NO ☐ N/A
Verify gaskets are installed?	☐ YES ☐ NO ☐ N/A
Verify bolts are tight (ping/ding)	☐ YES ☐ NO ☐ N/A
Pump/Motor Oil and Seal Pot Levels filled to correct level?	☐ YES ☐ NO ☐ N/A
Verify all safety cables are properly installed on chain operated valves?	☐ YES ☐ NO ☐ N/A
MOC Ready for Startup?	☐ YES ☐ NO ☐ N/A
Final leak testing and O2 freeing has been completed and any leaks found repaired?	☐ YES ☐ NO ☐ N/A
Complete, at a minimum, one of the following methods: Pressure Leak Test, Pressure the system with nitrogen and complete a hold step, a system P&ID walk down. (Print P&ID and signed).	☐ YES ☐ NO

OPERATOR NAME _____

(Back)

Attachment I – Lock Color Guide

Galveston Bay Refinery Lock/Key Scheme				
Lock Name	**Use/Purpose**	**Color**	**Keys**	**Key Holders**
Marathon Authorized Employee Personal lock	Attached by individual authorized employees to lockbox corresponding to job individual is working on.	**RED**	Each lock keyed uniquely, only one key available.	Authorized employee
Contractor Employee Personal Lock	Attached by individual authorized employees to lockbox corresponding to job individual is working on.	**Any Color Except Orange**	Each lock keyed uniquely, only one key available.	Authorized employee
Operations Isolation Locks	Used by Operations Department to secure energy isolating devices in the off of blocked position.	**ORANGE**	Each lock keyed alike per lockbox key	Operations Lock Box
Operations Lockbox Locks	Used by Owning Department to prevent access to content of a lockbox. IS the "first lock on and last lock off"	**Silver**	Keyed alike by complex or unit.	Unit Supervision
Maintenance Task Tracking lock	Used by All GBR craft reps to indicate task tracking. These locks are engraved with the Craft Name (Machinist, Pipefitter, I&E)	**BROWN**	Keyed alike for all Craft Reps	All of Craft Reps
Electrical Contractor Task Tracking Lock	Used by Contractor Electrician to secure energy control in the off or blocked position	**Yellow**	Each Contractor may have a set of keyed uniquely or keyed alike locks that are different from other contractor's locks	Contractors
Radiation Isolation Lock	Used by Radiation Safety Officer to secure radioactive energy sources	**Gold**	Safety Department controls the keys	Radiation Safety Officer (RSO)
Contractor Company Identification Lock	Attached by the Contractor Company Supervisor to lockbox corresponding to job the company is working on.	**Any Color Except Orange**	Keyed alike for all Craft Reps or each lock keyed uniquely	Contractor Supervisor

Note: Galveston Bay Refinery utilizes American Brand Locks for Energy Isolation

Attachment J – LOTO/Blind/Bleeder Tags/MPC Energy Isolation Device Tag

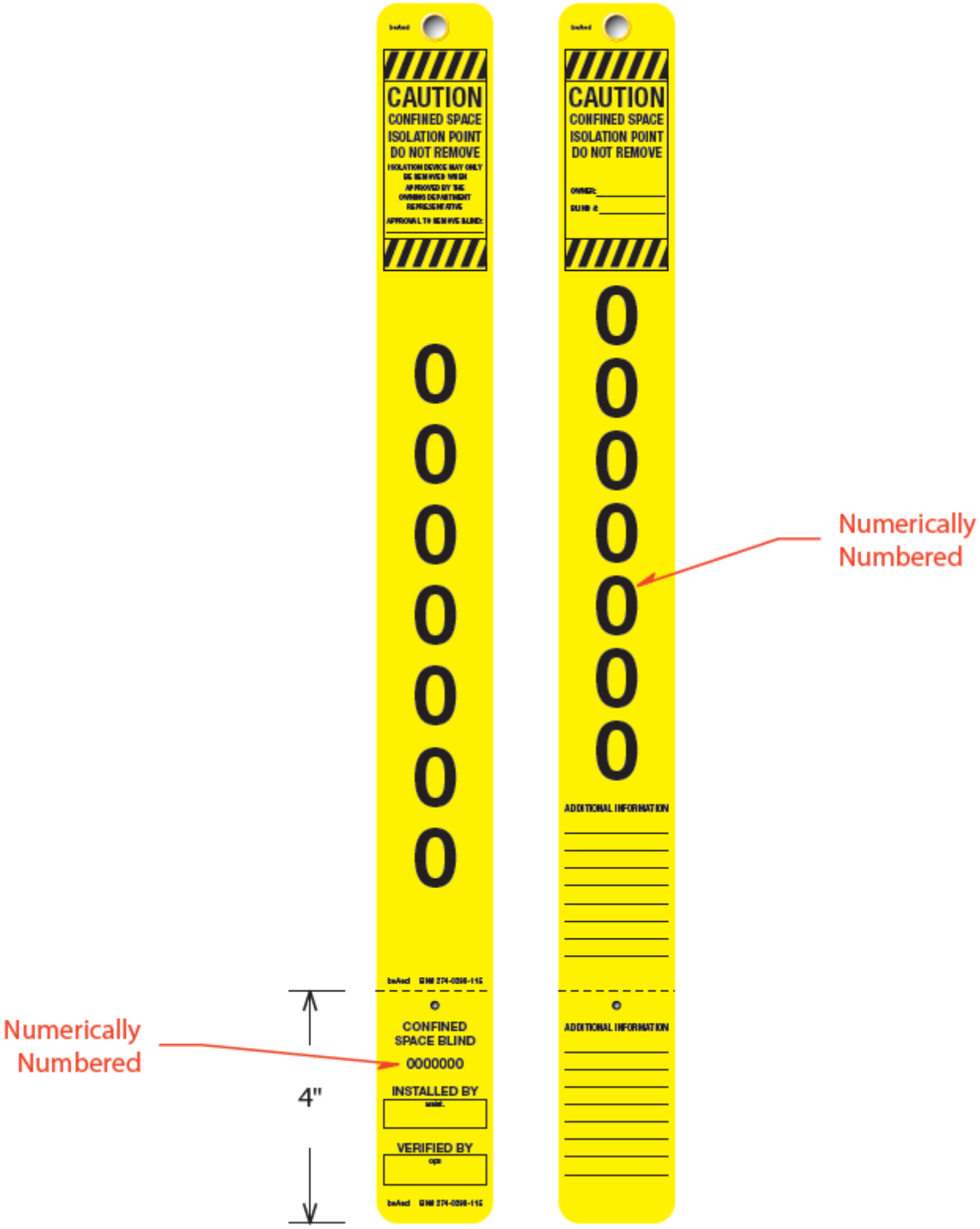
MPC "Do Not Operate" Lockout Tag

MPC Blind Tags

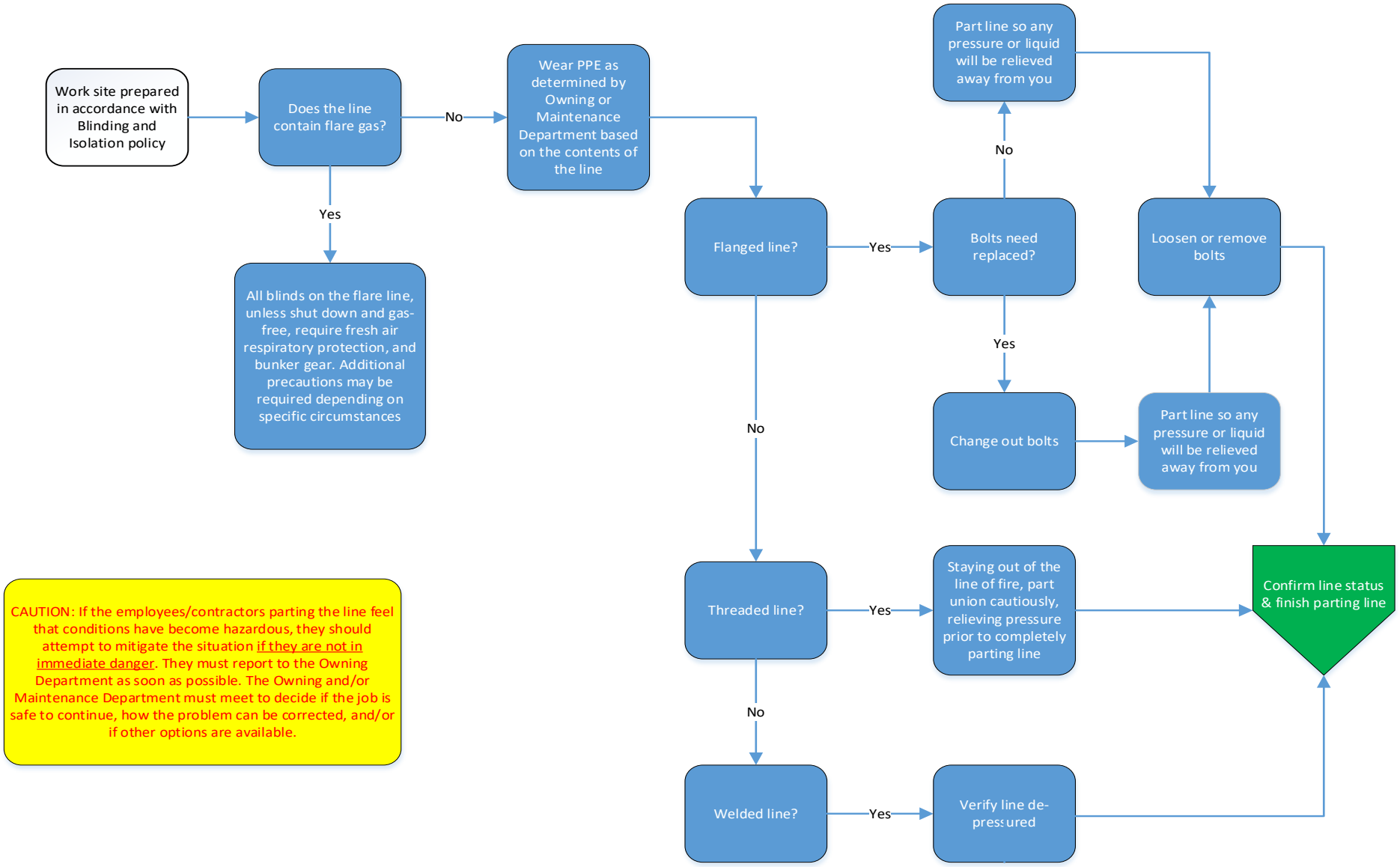
MPC Energy Isolation Device Tag

MPC Bleeder Tag

MPC Confined Space Isolation Point Do Not Remove Tag



Attachment L – Line Breaking Flow Chart



Attachment M – Work Location Tag