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1 INTRODUCTION

1.1 Purpose

1.1.1 The purpose of this standard practice is to establish practices for safe and consistent isolation of refinery equipment and machinery at the Salt Lake City Refinery to facilitate servicing, maintenance or testing.

1.2 Scope

1.1.2 The scope of this standard practice 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

(a) injury to personnel,

(b) adverse environmental impact, or

(c) damage to equipment.

1.1.3 This standard does not apply to Minor Servicing Activities (See Appendix A), Hot Taps, In-Service Welds and activities under Exclusive Control.

1.1.4 This standard does not apply to the established Regen Isolation procedure for HPDS.

1.3 Corporate References

The following sections describe references used to generate this Safe Work Instruction.

1.3.1 Marathon Standards, Policies and Procedures

- Marathon Petroleum Company LP, RSP-1121-010 Blinding and Energy Isolation
- Marathon Petroleum Company LP, RSP-1162 Electrical Safe Work Practices
- Marathon Petroleum Company LLC HES Standard 310 Control of Hazardous Energy Sources (Lockout-Tag out)
- Ops Instruction OPS-OI-007– Using Bleeder Cleaner/Reamer
- Flange Inspection Procedure SP-50-16
- **Government Regulations**
- OSHA 1910 Subpart J Control of Hazardous Energy Sources (Lockout/Tagout)
- OSHA 29 CFR 1910.119(f)(4) - Process Safety Management of Highly Hazardous Chemicals.
- OSHA 29 CFR 1910.146 - Confined Space Entry Standard.

- OSHA 29 CFR 1910.147 - Control of Hazardous Energy (Lockout/Tagout).
- OSHA 29 CFR 1910.269 - Electric Power Generation, Transmission and Distribution Standard.
- OSHA 29 CFR 1910.333(b) - Electrical Safety Related Work Practices.

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- Appendix A - Minor Servicing Activities
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2 DEFINITIONS

The following terms and definitions are used in this document.

Table 1 Terms and Definitions

Term	Definition
Affected Employee	An employee whose job requires him/her to work on equipment which servicing, or maintenance is being performed under energy isolation, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.
Authorized Employee	An employee 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.

Table 1 Terms and Definitions

Term	Definition
Bleed Blind	A blind designed for the isolation of a piece of equipment and contains a bleeder valve for the purpose of hydrotesting, steaming, purging, depressuring, etc. while still maintaining the energy isolation. The two types of bleeder blinds used at MPC are Bleeder Blind Flanges and Pancake Bleeder Blinds. Normally, pancake bleeder blinds are non-rated and considered as temporary devices typically used for equipment preparation and maintenance activities. Pancake bleeder blinds may be used as permanent components in a piping system if they are pressure-rated and designed according to SP-50-39 as a “pressure-rated” vent (bleeder) blind”.
Blinds	A mechanical means to ensure the absolute closure of a pipe, line, duct, or fastening across its base a solid plate, or cap which completely covers a bore; and which extends at least to the outer edge of a flanges mating surface; and which is capable of withstanding the maximum upstream pressure. A blank, slip plate, blind flange, cap, and/or physical disconnect are all considered to be blinds. Blinds are considered an acceptable type of lockout/tagout device.
Blind List (Isolation List)	Is the standardized form used to document the location, size, installation and removal of isolation and test blinds.
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. Examples: Vibration monitoring, control valve tuning, valve packing adjustment.
Common Isolation Point	An isolation point which serves two or more pieces of equipment. Common isolation points shall be listed in the designated section of each piece of equipment’s LO/TO log sheet and will have a separate isolation device attached to the common isolation point for each piece of equipment that is being serviced.
Confined Space Entry	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.
Double Block and Bleed	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.

Table 1 Terms and Definitions

Term	Definition
Energy Isolating Device (EID)	A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: ➢ A manually operated electrical circuit breaker; ➢ Disconnect switch; ➢ A manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and no pole can be operated independently. ➢ A block or line valve; ➢ Blind; ➢ Any device used to block or isolate energy. ➢ The term does not include a check valve, push button, selector switch, and other control circuit-type devices.
Energy Isolation List	The standardized form used to document isolated energy sources (e.g., breakers, valves, blinds), isolation verification points and the means used to verify the control of hazardous energy. (Also referred to as Isolation List)
Engineered Isolation Plug	An engineered tool used to safely provide 100% positive pressure vapor barrier against residual contents in the pipe.
Equipment Isolation Lock	A lock 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 set. Equipment isolation locks shall be standardized by color, shape or size.
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.
Freeze Plug	The practice of freezing a section of the contents of a line (pipe) to isolate equipment.
Group Lock (Craft lock)	Lock applied to the Master Lockbox representing a servicing group.
Hazardous Energy	Any energy, including mechanical, pneumatic, hydraulic, electrical, chemical, radiation, and thermal energies that could cause injury to workers.
Hot Work	Is repair, maintenance, or construction activity, which requires the use of spark-producing equipment or may create an ignition source.
Invasive Work Risk Assessment	A tool to be utilized to determine mitigation actions that should be taken when doing any invasive work. (See Safe Work Permit SP)
Isolation/ De-Isolation	Valve positioning, blinding, plugging, disconnecting, installing or removal that requires process hazard lockout by its owner.
Isolation Blind	A blind designed for the process isolation of a piece of equipment, vessel, piping, etc., during servicing or maintenance activities.

Table 1 Terms and Definitions

Term	Definition
Isolation Verification Point	A point 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 Energy Isolation List.
Lockbox (Master)	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).
Lockout	The placement of a lockout device and appropriate warning tag on an energy isolating device ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.
Minor Servicing Activities	Activities that are not covered by this standard 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. See Appendix A.
Owning Department	The department that normally owns and operates equipment, machinery and/or systems.
Perimeter (Battery Limit) Blind	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 area isolated by perimeter blinds.
Permanent Blind (Running Blinds)	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.
Personal Lock	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.
Ping & Ding	Method used to check for loose bolts on flanges. A ball peen hammer is used to strike each bolt listening for a sound indicating the bolt is loose.
Primary Isolation Point (PIP)	Point of isolation located immediately adjacent to the hazardous energy source.
Principal Affected Employee	The Affected Employee who oversees or leads a group of servicing/maintenance workers. This person performs the walkthrough with Authorized Employee to verify energy isolation. During complex LOTO, the contractor principal Affected Employee may establish a satellite lockbox.
Satellite Lockbox	A lockbox in which the Servicing Group Lead places corresponding master lockbox lock keys. Each individual servicing employee must affix his/her personal lock to the satellite lockbox.
Servicing Representatives	Individuals working on the equipment/process. This may include operations, blending, shipping, maintenance, contractors, and salaried employees.

Table 1 Terms and Definitions

Term	Definition
Status Change / Temporary Release Form	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 Energy Isolation List while the equipment / system is still isolated.
Tagout	The placement of tag on an energy isolating device to indicate that a lockout device cannot be applied (use tagout only if lockout is not possible). The energy isolating device and the equipment being controlled must not be operated until the tag is removed.
Test Blind	Blind installed for the sole purpose of tightness testing of piping and/ or equipment. (e.g., hydrotest blind)

3 EQUIPMENT SHUTDOWN AND ISOLATION PROCESS

3.1 Equipment Shutdown and Isolation Process

3.1.1 Important: See Appendix B: Process/Energy Isolation Matrices for detailed information on isolation requirements.

3.2 Preparation

3.2.1 The shutdown of refinery equipment, machinery, and/or systems, required for servicing/maintenance shall be conducted by the owners of such equipment. Isolation lists for energy isolating devices must be prepared in advance by the Owning Department representative and developed consistent with the Process/Energy Isolation Matrices (Appendix B). The Energy Isolation and Blind Lists serves as a supplemental procedure to this SP for the isolation of specific equipment and systems.

3.2.2 Additions, deletions and changes to the isolation lists must be approved by Owning Department Supervision or designee.

3.2.3 Locations where tubing, unions, pipes, etc. have been disconnected as part of the isolation shall be included on the blind list.

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

3.2.5 A Energy 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.

3.2.6 Equipment should be prepared for maintenance activities per SLC specific operating procedures.

3.2.7 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 a Pink bleeder tag (Appendix L) and listed on the Energy Isolation list in the section of the form designated "Energy Isolation Device Identification."

3.2.7.1 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 Energy 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."

3.2.8 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.

3.2.8.1 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.

3.2.9 The practices in 3.2.7 and 3.2.8 of this stage shall only apply to routine (non-shutdown) related work.

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. Reference PSA 19-07 for additional information.

3.3 Isolation and Lockout/Tag out

3.3.1 Owning Department shall perform the following:

3.3.2 Isolate the hazardous energy according to the Minimum Energy Isolation Requirements (see Appendix B) and the Isolation List.

3.3.3 Following the Owning Department's isolation, arrange for the isolation of maintenance required tasks such as blinding, high voltage breaker deactivation, 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 (Appendix B).

3.3.3.1 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:

3.3.3.1.1 A bleeder is not present to properly air free the system, or

3.3.3.1.2 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 3.3.6

3.3.3.1.3 See Section 4.4 for additional guidelines on the use of bleeder blinds

3.3.4 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 Energy Isolation list. This verification should include:

3.3.4.1 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.

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

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

3.3.5 If de-pressuring or de-energizing cannot be verified (e.g. absence of a bleeder to relieve pressure), then proper line breaking process must be followed with additional precautions implemented to protect workers. This may include:

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

3.3.5.2 Having fire protection onsite and attended, or

3.3.5.3 Utilizing a qualified electrician to test equipment.

3.3.6 If the equipment cannot be adequately de-pressured/de-energized or it cannot be verified as de-pressured, then the Owning Department supervision (Day Foreman or designee) and Maintenance Supervision (Superintendent or designee) must sign the work permit to designate their approval to proceed with the work, methods to de-pressure/de-energize and the precautions being implemented. The requirement only applies to the following services: hydrogen, flare gas, corrosives, and high temperature hydrocarbons (>400F).

3.3.6.1 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.

3.3.7 Affix Owning Department equipment isolation locks or tags (if applicable) to all subject valves, actuators, motor starters, circuit breakers, etc., according to the Energy Isolation List(s).

3.3.8 The Owning Department will then affix an Owning Department lock and energy isolation tag to the appropriate Master Lockbox.

3.3.9 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 11.0.

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

3.4 De-isolation

3.4.1 Servicing Group Representative(s):

3.4.1.1 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.

3.4.1.2 The Servicing group will sign the bottom of the Energy Isolation List in section H when isolation is no longer required.

3.4.1.3 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.

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

3.4.1.5 Remove Group Locks (Company or Craft locks).

3.4.2 Owning Department Personnel:

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

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

3.4.2.2 Prepare equipment and systems for the removal of blinds per Safe Equipment Preparation policy.

3.4.2.3 Prior to the removal of any personal locks, issues the servicing representatives a work permit and direct 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).

3.4.2.4 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:

3.4.2.4.1 **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 supervision to review.

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

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

3.4.2.4.2.2 When using steam, caution should be taken to ensure that equipment MAWP and MAWT is not exceeded and to avoid pulling a vacuum on the system.

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

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

3.4.2.4.2.5 The completed and signed document shall be turned into the Owning Department supervision for review.

3.4.2.4.2.6 Reference the procedures for Pressure Testing of Process Equipment.

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.

3.4.2.4.3 Pressure the system with nitrogen and complete a hold step.

3.4.2.4.3.1 Reference the procedures for Pressure Testing of Process Equipment.

3.4.2.4.3.2 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 the MAWP of the equipment/piping.

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

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

3.4.2.4.3.5 The Owning Department shall have a means to document that the pressure test was completed, all affected bleeders/valves are closed, plugged and capped and all flanges parted have been checked to ensure the gasket is installed and have been checked for loose bolts by completing a ping and ding check. This can be done in the form of a procedure, checklist, work closure form or other equivalent means. The completed and signed document shall be turned into the Owning Department supervision for review prior to placing in service. (See Appendix F/L Return to service Checklist.)

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:

- Equipment in utility service with an operation temperature below 140°F
- Items considered as minor servicing activities or exclusive control. These are not subject to energy isolation.

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

Note: Complete the “MPC Equipment Return to Service Checklist” Appendix F.

4 BLINDING

4.1 Blinding Open Ended Lines or Equipment

4.1.1 Open ended piping or equipment that is only isolated by a single valve must be blinded and tagged with a Green Isolation Blind Tag if the work extends past the current maintenance shift, unless it is continuously worked to completion in the field.

Note: 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.
Double block and bleed may be used in place of a blind in accordance with Section 8.1.

4.1.1.1 This requirement only applies to the following services:

4.1.1.1.1 Hydrocarbons,
4.1.1.1.2 Corrosives, and
4.1.1.1.3 Toxics
4.1.1.1.4 High pressure water and steam

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

4.1.1.3 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.

4.1.2 If a blind is installed, it must be located between the isolated valves and the equipment being worked on. Bleeders must be closed between isolation valves and blinds.

4.1.3 When installing and removing primary isolation point (PIP) blinds, the appropriate vent/drain valve between the 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. The valve should be closed after blinding is complete.

4.2 Hot Work and Blinding

4.2.1 Blinds shall be installed according to the Minimum Energy Isolation Requirements (Appendix A) and at the closest flange to the hot work.

4.2.1.1 If blinding at the closest flange creates additional risk, exceptions must be reviewed and approved by the Operations and Maintenance Foreman.

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

4.2.2 The isolation blind for Hot Work must be tagged with a “Hot Work/Hydro Test” tag (Appendix L 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.

4.2.3 The area between the blind and the hot work shall be cleaned and gas free tested per the requirements in HS-SWI-024 Hot Work Policy.

Note: Gas testing should 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.

4.3 Confined Space Blinding

4.3.1 Blinds shall be installed according to the Minimum Energy Isolation Requirements (Appendix B).

4.3.2 The isolation blind for a confined space must be tagged with a “Confined Space” tag (Appendix L) listing the Owning Department and blind number. This isolation point (blind, plug, physical separation, etc.) cannot be removed/reconnected until the approval for removal box has been signed by an Owning Department representative.

4.3.3 Vessel appendages (e.g. sight glasses, level bridles) 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 Energy Isolation and Blind Lists.

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

4.3.4.1 Operations and Maintenance must agree to the alternate location.

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

4.3.4.3 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.

4.3.4.4 The permit writer shall check the opening of the piping at the blind with a gas detector.

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

4.4 Bleeder Blind Guidelines

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

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

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

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

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

4.5 Permanent Blinds (Running Blinds)

4.5.1 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:

4.5.1.1 The permanent blind shall be identified with a metal tag.

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

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

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

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

4.5.1.4.2 For routine maintenance this can be accomplished using operating procedures/guidelines or other methods a refinery may implement.

4.5.1.5 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.

4.6 Tagging of Blind Location

4.6.1 The Owning Department will visually identify location to be worked by hanging of blind Tags (Appendix L).

4.6.2 Blind Tags will be installed at all locations which involve the installation of blinds or removal or spools for isolation.

4.6.3 Owning department representative designated by the supervisor must verify the blind list locations have been walked out and must sign Appendix D (Blinding List Template).

4.6.4 The Owning department representative designated by the supervisor must be present during initial equipment/line breaks.

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

5 ENERGY ISOLATION VERIFICATION

5.1 Energy Isolation Verification

5.1.1 Energy 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 Energy Isolation List.

5.1.2 If isolation changes occur, 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:

5.1.2.1 Removing a lock to exercise a valve or breaker

5.1.2.2 Opening a lockbox

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

6 TEMPORARY RELEASE/INTERIM TEST/STATUS CHANGE OF LOTO

6.1 Temporary Release of

6.1.1 An Interim Test shall be used when a piece of equipment that is being serviced under lockout/tagout must be temporarily energized for testing, positioning, steaming, rinsing, purging, etc.

Loto/Status Change

6.1.2 Exceptions

6.1.2.1 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.

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

6.1.2.2.1 Prior to testing:

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

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

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

6.1.2.2.2.1 Re-apply and verify proper energy isolation.

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

6.1.3 The Owning Department shall ensure:

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

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

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

6.1.4 The Owning Department Representative shall:

6.1.4.1 Complete a Status Change/Interim Test form (Appendix E) 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 Energy Isolation list

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

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

6.1.4.4 Note the Interim Test number for each EID on the Energy Isolation list.

6.1.4.5 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.

6.1.4.6 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.

6.1.4.7 Test to verify that the equipment is isolated and de-energized according to the instructions in the "Verification of Isolation" section of the Energy Isolation list.

6.1.4.8 Lock Master Lockbox with Owning Department lock and Equipment ID Tag.

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

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

6.1.5.1 Verify that equipment is isolated and de-energized.

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

6.1.6 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 Energy 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.

6.1.6.1 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:

6.1.6.1.1 Prior to testing:

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

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

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

6.1.6.1.2.1 Re-apply and verify proper energy isolation.

6.1.6.1.2.2 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.).

6.1.7 The Owning Department shall:

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

6.1.7.2 Assign a Status Change number and document the Reason for Status Change on the Status Change/Interim Test Log (Appendix E)

6.1.7.3 Note the status change number for each EID on the Energy Isolation list.

6.1.7.4 Field verify that the status change is complete by ensuring that the Owning Department Supervisor or designee signs the Status Change Log indicating approval to proceed with implementation.

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

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

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

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

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

7 PLUGS

7.1 Engineered Isolation Plugs

7.1.1 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 Appendix G must be completed prior to utilizing an engineered isolation plug.

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

7.1.3 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 Appendix G.

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

7.1.4.1 A Hot Work Isolation by Engineered Plug Approval Form in Appendix G shall be completed by Maintenance.

7.1.4.2 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.

7.1.5 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.

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

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

7.1.6.2 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.

7.1.6.3 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 Appendix G.

7.1.7 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.

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

7.1.9 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.

7.1.10 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.

7.1.11 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).

7.2 Mechanical or Inflatable Sewer Plugs

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

7.2.1.1 Plugs are proper size and proper inflation rating for the application

7.2.1.2 Plugs are petrochemical resistant

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

7.2.1.4 Plugs will only be inflated inside of the pipe

7.2.1.5 Have accurate calibrated pressure gauges monitoring the pressure being used

7.2.1.6 Air line connections and hoses are not damaged and/or leaking

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

7.2.1.8 The sewer line flow has been stopped or bypassed

7.2.1.9 The head pressure may never exceed the rated pressure of the plug

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

7.3 Isolation using Freeze Plug

7.3.1 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.

7.3.2 A variance form 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.

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

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

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

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

7.3.3.4 The line pressure and metallurgy allows for the use of a freeze plug,

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

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

8 MISCELLANEOUS REQUIREMENTS

8.1 Alternate use of Locked Double

8.1.1 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

Block and Bleed Valves

Requirements (see Appendix B) 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:

8.1.1.1 Block valves are verified closed and tight.

8.1.1.2 Bleed valves and piping are verified open and clear.

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

8.2 Electrical LOTO Procedures for TAR's

8.2.1 The refinery Electrical Department will work with the Owning Department to coordinate all work and energy isolation within substations/MCC/PDCs.

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

8.2.3 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.

8.2.4 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.

8.2.5 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.

8.2.6 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.

8.3 Exclusive Control

8.3.1 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.

8.4 Minor Servicing Activities

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

8.4.2 Tasks designated as Minor Servicing Activities (routine, repetitive, integral to the process) are listed in Appendix A.

8.4.3 As required by OSHA 1910.147, alternative protective measures have been developed for Minor Servicing Activities and included in Appendix A.

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

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

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

8.5.1.1 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.

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

8.5.1.3 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 until the flare is isolated from equipment by blinds.

8.5.2 The relief valve shall be listed as an EID on the Energy Isolation list and must be tagged.

8.6 Lock Removal Process

8.6.1 If an individual or craft fails to remove a lock and leaves the workplace, the following must be verified.

8.6.1.1 Owner of the lock,

8.6.1.2 Justification description stating why lock must be removed.

8.6.1.3 How it was confirmed that the employee was not on-site or available (e.g., phone call to employee, confirmed by employee's supervisor, confirmed with Security lock owner is not on site is not currently on-site, etc.)

8.6.2 Once the above information has been verified the lock may be cut.

8.6.3 Once the lock is cut an Initial Incident Report (IIR) must be submitted detailing the above information, not to include the lock owners name.

8.7 Energy Isolation of Radioactive Energy Source

8.7.1 Proper applicability and scope are defined in the facility HS-SWI-005 Radiation Safety Management.

and/or Instrumentation

8.8 Shift-Change Procedures

8.8.1 At the end of each shift:

8.8.1.1 Each Maintenance Employee shall remove their personal lock from the master lockbox.

8.8.1.2 The Authorized Employees group/craft lock must remain on the master lockbox for the duration of the job.

NOTE: *Equipment containing hazardous materials shall not be left unblinded beyond the shift that the opening was created.*

8.9 Energy Isolation by Tagout

8.9.1 Tagout procedures shall only be used when an energy source is incapable of being locked out.

NOTE: When tagout is used, additional safety measures shall be utilized such as the removal of an isolating circuit element, blocking of a control switch, opening of an extra disconnecting device, or the removal of a valve handle (underground water lines or T handle valves) to reduce the likelihood of an inadvertent energization.

8.9.2 The Authorized Employee shall:

8.9.3 Isolate and de-energize the equipment and place a blue ESI tag "ENERGY SOURCE ISOLATED BY TAGOUT" and green Energy Isolation Devise tag.

NOTE: Tags and their means of attachment must be able to withstand the environment and be secured so they cannot be inadvertently or accidentally detached during use.

8.9.4 Document each tagout isolation point on the Energy Isolation List.

8.9.5 The Principal Affected Employee or designated Affected Employee shall place their individually identified lock/tag on the lock box after the LOTO has been walked down and de-energization verified.

8.9.6 Each Affected Employee has the right to attach their own blue "ENERGY SOURCE ISOLATED BY TAGOUT" tag to each isolation device if they so choose.

8.3 Procedure for LOTO Spanning More Than One Operational Area or Involving Multiple Unit Operators

8.3.1 For LOTOs spanning multiple operating areas or divisions, the isolating operator shall notify the effected area to isolate equipment.

9 TRAINING

9.1 Training Requirements

9.1.1 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:

9.1.1.1 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.

9.1.1.2 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.

9.1.1.3 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.

9.1.1.4 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).

10 INSPECTIONS AND AUDIT

10.1 Inspection and Audit Requirements

10.1.1 Apply the following requirements for inspections and audits:

10.1.1.1 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.

10.1.1.2 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.

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

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

10.1.1.5 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.

10.1.1.6 The employer shall certify that the periodic audits have been performed utilizing the Blinding and Energy Isolation Audit Form in Appendix J. 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.

11 ALTERNATIVE GROUP LOCKOUT/TAGOUT PROCEDURES

11.1 Alternative Group Lockout/Tagout Procedures

11.1.1 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.

11.1.2 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:

11.1.2.1 Physical size of the equipment

11.1.2.2 Number of employees performing the servicing/maintenance

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

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

11.1.3 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.

11.1.4 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.

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

11.1.4.2 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.

Note: Actions taken in 11.1.4.1 and 11.1.4.2 above must be documented on the work permit.

11.1.4.3 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.

11.1.4.4 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.

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

11.1.4.6 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.

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

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

12 RECORDS RETENTION

12.1 Retention Requirements

Completed LOTO sheets must be retained by the Safety Department per the Records Retention Policy for 84 months.

The Safety Department shall maintain Annual Inspection Reports for three years.

13 PROGRAM REVIEW

13.1 Procedure Review

The Safe Practice will be reviewed every 3 years.

14 CONFORMANCE

14.1 Conformance

Energy Isolation packages installed on or after 12/2/2019 shall conform to this policy. Isolation packages that are installed before the conformance date may remain installed until 3/1/2020.

15 REVIEW AND REVISION HISTORY

15.1 History of Revisions

The Table 2 provides the revision history for this Safety procedure.

Table 2 Revision History

Revision	Date	Change Author	Reason for Change
1.0			Original Issue

16 APPENDIX A 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 **RRD-1150-010** (Utility Connections to Process Lines &Vessels)

Removing plugs and caps from bleeders/valves Installing and removing bleeder cleaner tools Gauge catalyst hopper, salt drier, tank, etc.	• 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.
Removing blind flange to back flush a cooling water exchanger Remove coupon holder in cooling water circuit PM pH probes in cooling water circuits	• 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	--

(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 • PPE requirements include typical Class D PPE nitrile insulated gloves and a face shield
Connect hoses for caustic, acid and chemical deliveries Completing hose loops for product transfer	• 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 • Operating Procedures and/or guidelines shall be in place to adequately define actions and safety provisions to be followed.
Blow down sight glass Steaming out sight glass, control valve, etc. Blow down high and low side taps of flow cell	• 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

Troubleshooting/servicing transmitters with a manifold between root valves & transmitter that allows for isolation Calibration and repair of equipment in analyzer buildings	• 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
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.	--

(Continued)

Activity	Justification	Alternative Measures to LOTO
Blinding small bore fuel gas piping to process heaters Repair/Cleaning of tips or replacement of flex hoses for burners or 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.
Perform troubleshooting or calibration of control valves by blocking in and disconnecting the supply air tubing	• 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 • 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

17 APPENDIX B - MINIMUM ENERGY ISOLATION REQUIREMENTS

Table 3 Minimum Energy Isolation Requirements

Energy Type	Electrical	Radiation	Mechanical	Hydraulic	Pneumatic
Work Activity/Type of Energy	Motor Circuits, Busses, Battery Circuits, Feeders, Control Circuits, Etc.	Laboratory Instrumentation, Level Measure Devices, Etc.	Flywheels, Trolleys, Spring-Tensioned Equipment, Clutches, Elevated Machine Members, Pump Impellers, Etc.	FCCU Slide Valves(s) Control System, Hydraulic Motors, Other Hydraulic Systems, Etc.	Air Driven Actuators, Etc.
Cold Work	LOTO (2)	LOTO or source Removal	LOTO	LOTO	LOTO
Hot Work	LOTO (2)	LOTO or source Removal	LOTO	Blind (1)	Blind (1)
Confined Space Entry	LOTO	LOTO or source Removal	LOTO	Blind (1)	Blind (1)

Stream Type:	Corrosives	Hazardous Waste	High Temp. or Pressure	Hydrocarbon	Toxics	Non-Flammable	Utilities	Other
Work Activity / Process Steam Characterization	HF, Sulfur, Phosphoric, Spent or Fresh Caustics	API, DAF, Waste Water Liquids & Solids	BFW, Steam, Condensate	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	LOTO	LOTO	LOTO	LOTO	LOTO	LOTO	LOTO (2)	LOTO
Hot Work	Blind	Blind	LOTO	Blind	Blind	LOTO	LOTO (2)	Blind
Confined Space Entry	Blind	Blind	Blind (1)	Blind	Blind	Blind (1)	Blind (1)	Blind

NOTE:

(1) Where (1) is located in the table, see Section 8.1 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 to inert equipment and vessels.

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

18 APPENDIX C ENERGY ISOLATION LIST

Marathon Petroleum Company LP	SITE SAFETY PRACTICE	SP-008
Salt Lake Refinery	Energy Isolation List	Page 1 of 4

Unit:	Choose an item.	**Equipment Description:**		**Date:**	
Reason for Isolation:				**Lock Box #:**	
Lock Box Location:				**Prepared by:**	

A. ENERGY SOURCES LOCKED/TAGGED

☐ Process	☐ Electrical	☐ Steam	☐ Air	☐ Radiation	☐ Water
☐ Nitrogen	☐ Hydraulic	☐ Other:			

B. ENERGY ISOLATION DEVICE IDENTIFICATION

	Tag #	Location/Description of Isolation Point	Controlled Position (On, Off, Open, Closed)	Installation		Removal		Status Change / Temporary Release	
				Initials	Date	Initials	Date	Number	Initials
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									

Marathon Petroleum Company LP	SITE SAFETY PRACTICE	SP-008
Salt Lake Refinery	Energy Isolation List	Page 2 of 4

C. VERIFICATION OF ISOLATION (LIST ALL ISOLATION VERIFICATION POINTS THAT ARE USED IN THE PREPARATION OF THE EQUIPMENT)

Location/Description of Isolation Verification Point	Means used to verify Control of Hazardous Energy	Initials	Date		Location/Description of Isolation Verification Point	Means used to verify Control of Hazardous Energy	Initials	Date

Note: If there are not adequate means to verify that the equipment is isolated, requirements in RSP-1121-10, Section 3.1 must be followed.

D. OWNING DEPARTMENT SUPERVISION APPROVAL OF ISOLATION AND VERIFICATION OF ISOLATION PLAN

By signing below, the Owning Department Supervision is approving the plan documented on this isolation list that will be used to isolate the equipment

Date:		**Time:**		**Owning Department Supervision Signature:**	

E. OWNING DEPARTMENT VERIFICATION OF ISOLATION

By signing below, the Owning Department representative is confirming that the equipment has been isolated and de-energized according to the plan documents on this isolation list.

Date:		**Time:**		**Owning Department Representative Signature:**	

F. SERVICING GROUP VERIFICATION OF ISOLATION

Verification signatures may be documents on the work permit if allowed by site.

Date:		**Time:**		**Signature/Company:**	
Date:		**Time:**		**Signature/Company:**	
Date:		**Time:**		**Signature/Company:**	
Date:		**Time:**		**Signature/Company:**	
Date:		**Time:**		**Signature/Company:**	
Date:		**Time:**		**Signature/Company:**	
Safety Comments:					

G. SIGN ON/OFF LOG

SIGN ON				SIGN OFF
Craft / Company	Name	Date	Task Description (Brief Description of task to be performed)	Job Complete
				Date: / By:
				Date: / By:
				Date: / By:
				Date: / By:
				Date: / By:
				Date: / By:
				Date: / By:

H. JOB COMPLETE

Operations Representative: / Date:		MP Contractor Representative: / Date:	
I&E Representative: / Date:		MP Contractor Representative: / Date:	
Metal Trades Representative: / Date:		MP Contractor Representative: / Date:	
Machinists Representative: / Date:		MP Contractor Representative: / Date:	
Building Trades Representative: / Date:		MP Contractor Representative: / Date:	

I. BLOCK FLOW DIAGRAM (OPTIONAL)

APPENDIX D BLIND LIST

Marathon Petroleum Company LP	SAFETY PRACTICE	SP-008
Salt Lake Refinery	Blind List Form	Page 1 of 1

Unit:		Equipment No:		Equipment Description:	
Associated Isolation List	☐ Yes	☐ No	Lockbox No. / Location:	Battery Limit Isolation LOTO	

Owning Department Approval of Blind List					
Date:		Time:		Owning Department Supervision Approval Signature:	

#	Blind Tag No.	Description of Blind Location	Size / Rating		Installation		Removal		Status Change / Temporary Release	
					Servicing Initial / Date	Owner Initial / Date	Servicing Initial / Date	Owner Initial / Date	Number	Initials
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										
11.										
12.										
13.										

Owning Department Verification of Blind Installation					
Date:		Time:		Owning Department Representative Signature:	

19 APPENDIX E STATUS CHANGE/INTERIM TEST

MPC Status Change / Temporary Release Log

Equipment No. / Description — **Sheet # ____ of ____**

Job Description:

Lockbox No. / Location

Temporary Release

Temporary Release Number	Reason for Temporary Release	Equipment/Area Safe For Temporary Release			Isolation Restored		
		Date	Time	Owning Department	Date	Time	Owning Department

Status Change

Status Change Number	Reason for Status Change	Energy Isolation Verification Complete			Status Change Complete		
		Date	Time	Owning Department Approval Supervision	Date	Time	Owning Department

20 APPENDIX F RETURN TO SERVICE CHECKLIST

Return to Service Checklist

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 supervision for review and then attached to the associated Master Isolation List.

Equipment Name: _____

Equipment Number: _____

Check Item	Verification	Date	Employee Signature
1. Review job location, area housekeeping acceptable.	☐ YES ☐ NO		
2. Rotating equipment guards are in place for personnel protection.	☐ YES ☐ N/A		
3. All applicable insulation/pads have been properly reapplied and electrical/steam tracing has been reinstalled and activated for freeze and personnel protection.	☐ YES ☐ N/A		
4. Temporary piping or tubing has been removed from the equipment.	☐ YES ☐ N/A		
5. Verify blinds are removed and/or permanent blinds are reinstalled.	☐ YES ☐ N/A		
6. Verify gaskets are installed.	☐ YES ☐ N/A		
7. Bolts verified tight.	☐ YES ☐ N/A		
8. Complete system P&ID walk down has been completed (print, sign and attach to this checklist).	☐ YES ☐ N/A		
9. Final leak (e.g. O2 Free procedure) testing has been completed and any leaks found have been repaired.	☐ YES ☐ N/A		
10. Verify all bleeders/vents are closed, plugs and caps installed.	☐ YES ☐ N/A		
11. Relief paths including PSV's are open and secured.	☐ YES ☐ N/A		

Comments/Follow Up

21 APPENDIX G HOT WORK ISOLATION BY ENGINEERED PLUG FORM

Marathon Petroleum Company LP

Hot Work Isolation by Engineered Plug Approval Form
(RSP-1121-010-FORM05)

Job Description/Scope of Work:

Material in Line:

Line Location:

CHECKLIST	YES	NO
1. Can lines be blinded? If yes, explain why engineered plug is being requested _____		
2. Is sealing gasket surfaces of the engineered plug compatible for the temperature and service of the line?		
3. Has the proper size of the engineered plug been determined? Size Required:		
4. Is there any pressure on the system that will exert pressure on engineered plug? (If purge is used, a gauge must be used to ensure that the pressure does not exceed the manufacturer's pressure rating)		
5. Have arrangements been made to vent the engineered plug or the line upstream of the engineered plug and has the vent been verified to be unobstructed (e.g., by bubbling through water, using a bleeder reamer, etc.)? Have arrangements been made to monitor the line pressure? Provide details: _____ _____ _____		
6. Have stress relieving requirements been designated & implemented? List requirements: _____ _____		

APPROVALS

MPC Maintenance Planner/Foreman: Date:

MPC Engineer: _____ Date: _____

MPC Day Foreman: Date:

MPC Safety Representative: _____ Date: _____

Engineered Plug Contractor Representative: Date:

Maintenance Manager: _____ Date: _____

Operations Manager: Date:

Completed form shall be attached to the Safe Work Permit

22 APPENDIX I PRINCIPLE AUTHORIZED EMPLOYEE FORM

Principle Authorized Employee Form

TAR ENERGY ISOLATION
Principle Authorized Employee Form

DATE: _____

SHEET: _____ OF _____ WORK PERMIT NO.: _____

SHIFT: DAY ____ NIGHT _____ TIME SURVEY CONDUCTED: _____

I have reviewed this work permit and agree to ensure that all precautions/limitations are complied with.

Isolation Verification Survey Conducted and Approved By: _____ ☐ Not Applicable

Operations Rep. _____MPC Maintenance Rep. _____

Contractor Foreman _____

JOB SIGN ON		
TIME (HRS)	SIGNATURES	COMPANY

JOB SIGN OFF		
TIME (HRS)	SIGNATURES	COMPANY

23 APPENDIX K LOCK COLOR CODE

Salt Lake Refinery Lock/Key Scheme				
Lock Name	**Use/Purpose**	**Color**	**Keys**	**Key Holders**
Marathon Employee Personal lock	Attached by individual authorized employees to lockbox corresponding to job individual is working on.	**Green or matching craft lock color**	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 Silver Master Lock**	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.	**Silver Master Lock**	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"	**HPDN Blue** **HPDS Black** **OMD Gold**	Keyed alike by complex or unit.	Unit Supervision
Maintenance Task Tracking lock	Used by All SLC craft to indicate task tracking.	**Machinists Green** **Metal Trades Purple** **I&E Yellow** **Inspections Silver** **Building Trades Orange**	Keyed alike for all Craft Reps	All of Craft Reps
Contractor Company Identification Lock	Attached by the Contractor Company Supervisor to lockbox corresponding to job the company is working on. Shall be identified with key holder name and company.	**Any Color Except Silver Master Lock**	Keyed alike for all Craft Reps or each lock keyed uniquely	Contractor Supervisor

24 APPENDIX L TAGS