

Marathon Petroleum Company LP			
Blinding and Energy Isolation	Document No.: RSW-SAF-002-DT	Approval Date: 12-20-20	Page 1 of 37
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1.0 PURPOSE

The purpose of this standard practice is to establish guidelines for safe and consistent isolation of refinery equipment and machinery to facilitate servicing, maintenance or testing.

2.0 SCOPE

- 2.1 This document 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.
- 2.2 This standard does not apply to Normal Product Operations, Minor Servicing Activities, Hot Taps, In-Service Welds and activities under Exclusive Control. Process locks or other isolation devices used for safe operation of equipment are not governed by this procedure.

3.0 POLICY

3.1 Equipment Shutdown and Isolation Process

3.1.1 Stage (1) Preparation

3.1.1.1 The shutdown of refinery equipment, machinery, and/or systems, required for servicing/maintenance shall be conducted by the owners of such equipment. Energy Isolation Lists must be prepared in advance by the Owning Department representative and developed consistent with the Process/Energy Isolation Matrices ([Appendix B](#)). The Energy 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. The Energy Isolation and Blind Lists serve as procedures for the isolation of specific equipment and systems.

3.1.1.2 Notes:

- 3.1.1.2.1 Any changes to isolation lists must be approved by Owning Department Supervision or designee.
- 3.1.1.2.2 Energy Isolation and Blind Lists shall be maintained by the respective Owning Department in a dedicated Isolation List binder.
- 3.1.1.2.3 Locations where tubing, unions, pipes, etc. have been disconnected as part of the isolation shall be tagged and included on the energy isolation list. Reference Section 3.4 Blinding Requirements and [Appendix I](#) for tagging requirements.
- 3.1.1.2.4 Disconnected piping shall be positioned so that it does not remain in alignment with or within proximity to the isolated equipment.
- 3.1.1.2.5 As allowed by MIOSHA Part 85 and the OSHA Compliance Directive, an energy isolation list is not required while working on equipment that has a single isolation point that is locked out and tagged. Examples include working on AC units, lighting circuits, etc. This rule does not apply to refinery process equipment such as a single valve, instrumentation or breaker isolation.
- 3.1.1.2.6 Equipment should be prepared for maintenance activities per refinery specific operating procedures and in accordance with guidelines outlined in [RRD-1323-000](#). In most cases, preparing equipment for maintenance by the Owning Department is considered invasive work which requires a RAM score [RSW-SAF-078-DT](#) or use of a specific operating procedure.

- 3.1.1.3 All bleeders, vents, drains, etc. that will remain open during equipment decontamination (e.g. steam out) or during the maintenance work must be tagged with a pink bleeder tag ([Appendix I](#)) and listed on the Energy Isolation List in the section of the form designated "Energy Isolation Device Identification". This does not apply to open bleeders associated with new construction equipment until the equipment has been turned over to Operations.
- 3.1.1.4 Tagging bleeder valves that will remain open during equipment decontamination or the maintenance work will help ensure the equipment or system remains in a controlled energy state. This practice will also help ensure that the valves are closed before the equipment is returned to operation.
- 3.1.1.4.1 Note: The practices in section 3.1.1.3 and 3.1.1.4 of this stage shall only apply to routine (non-shutdown related) work. For turnaround, major maintenance and project work, the elements discussed in this section must be included in the operating procedures, PSSR documentation, and/or functional checkout procedures.
- 3.1.1.5 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 depressured but will not remain open for the duration of the maintenance work or electrical motor switches that do not get locked out because the electrical breaker is the energy isolation device. These isolation verification points shall be listed on the Energy Isolation List and Blind List for Primary Isolation Point (PIP) blind removal, along with the means used to verify control of the hazardous energy and any special instructions, in the section designated "Verification of Isolation".
- 3.1.1.6 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 depressured. This valve only needs to remain open and tagged if continuous bleed is needed to facilitate the blind installation or removal. This verification step must be listed in the "Verification of Isolation" section of the Blind List.

3.1.2 Stage (2) Isolation and Lockout/Tagout

- 3.1.2.1 The Owning Department shall isolate the hazardous energy according to the Process/Energy Isolation Matrices ([Appendix B](#)) and the Isolation List.
- 3.1.2.2 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) and in accordance with the Process/Energy Isolation Matrices ([Appendix B](#)).
- 3.1.2.2.1 Notes:
- 3.1.2.2.1.1 For new construction, the Construction Group will be responsible for key security, Isolation List development and will aid with isolation verification until the equipment has been turned over to Operations. In some cases, an alternative plan for clear ownership can be agreed upon and executed by the Construction Group and Operations.
- 3.1.2.2.1.2 For Unit 23 electrical equipment, the MPC Electrical Department will be responsible for key security, Isolation List development and will be solely responsible for isolation verification.
- 3.1.2.2.1.3 Contractors shall be given the opportunity to personally isolate equipment in accordance with the requirements of an Isolation List however; at no time shall a contractor's lock be the only lock on a piece of process equipment. An Owning Department lock must always accompany a contractor lock.
- 3.1.2.2.1.4 When isolation blinds are necessary the Owning Department will install pre-blind tags ([Appendix I](#)) at the exact location where the

blind will be installed. Reference Section 3.4 of this procedure for requirements relating to installing blinds.

- 3.1.2.2.1.5 When installing isolation blinds ALWAYS think about how the air free and blind removal procedure is going to be executed. The use of a bleeder blind should be considered where feasible, if a bleeder is not present to properly air free the system, or 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 6.5 for additional guidelines on the use of Bleeder Blinds.

- 3.1.2.2.1.6 For electrical isolation requirements, reference Section 3.3.7 of this procedure.

- 3.1.2.2.2 All additional isolation points will need to be documented on the Isolation List and verified by a member of the Owning Department.

- 3.1.2.3 Verify that equipment and/or piping is completely de-energized and depressured according to the instructions in the "Verification of Isolation" section of the Energy Isolation List. This verification should include:

- 3.1.2.3.1 Opening a bleeder or valve near the work location and verification that it is not plugged. For large or complex systems, multiple bleeders and valves should be opened to ensure that the entire system is de-energized.

- 3.1.2.3.2 Pushing any start buttons on pumps, compressors, fans, etc. For energy isolation in the medium/high voltage side of a substation an Owning Department representative must be accompanied by a qualified electrician to perform a JJSV as well as physically verify the correct equipment is isolated.

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

- 3.1.2.4 If de-pressuring or de-energizing cannot be verified (e.g., absence of a bleeder to relieve pressure), then refinery line breaking procedure [RSW-SAF-008-DT](#) must be followed with additional precautions implemented to protect workers. This may include additional/specialized PPE as dictated by the Invasive Work RAM Score, having fire protection onsite and attended, or utilizing a qualified electrician to test equipment. Additionally, follow part (e) of this section.

- 3.1.2.4.1 Note: For underground lines where de-pressuring or de-energizing cannot be verified, two forms of verification are needed for confirming the correct underground line(s) (e.g. hydro excavating/positive verification of external flow test/low voltage tracing/etc.)

- 3.1.2.5 If the equipment cannot be adequately de-pressured or cannot be verified as de-pressured, then it must be documented in the "Verification of Isolation" section of the Isolation List. This also applies to the blind removal process in which it will be documented on the Blind List that the area between the PIP and the blind cannot be de-pressured or cannot be verified as de-pressured.

- 3.1.2.5.1 Notes:

- 3.1.2.5.1.1 In the case of hydrogen, flare gas, corrosives or high temperature hydrocarbons (operating temperature >400°F), the Owning Department Day or Shift Foreman and the Maintenance Foreman (Permit User Supervisor) must sign the safe work permit to designate their approval to proceed with the work, methods to depressure (if possible) and the precautions being implemented. A designee is not allowed to sign the safe work permit as the MPC Owner Supervisor in this situation.

3.1.2.5.1.2 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 to protect workers.

3.1.2.6 Any chain wheel operated valve used as a primary isolation point to facilitate invasive work / line breaking (except for utilities as indicated in Appendix B and cooling water service), the operator must close by tightening with a wrench or similar means and not rely solely on the chain. The operator must also obtain a visual verification of the valve position by looking at the valve stem.

3.1.2.7 Affix Owning Department equipment isolation locks and tags to all subject valves, actuators, motor starters, circuit breakers, etc., according to the Isolation and Blind Lists.

3.1.2.7.1 Note: If it has been deemed impossible (by a unit or shift foreman) to install a lockout device on an energy isolating device, a tagout system may be utilized. The tagout system will include affixing a tag to the energy isolating device as well as inserting a tag into the lockbox. Employees working downstream of the tag will place their authorized employee personal lock onto the lockbox.

3.1.2.8 The Owning Department will then affix a departmental lock and energy isolation tag to the appropriate Master Lockbox. This lock shall be the first on and last off of the lockbox.

3.1.2.9 All Authorized Employees shall then affix their personal lock to either the Master Lock Box or an appropriate Satellite Lockbox. The use of a Satellite Lockbox will require a Servicing Group Lock to be placed onto the Owning Department Lockbox. The key for the Servicing Group Lock will then be placed into the Satellite Lockbox.

3.1.2.9.1 Note: All persons working downstream of an isolation point must have an Authorized Employee Personal Lock on the lockbox. Electricians are considered to be working downstream of an isolation point when their job scope requires them to service equipment that has been isolated. Confined Space Attendants, Fire Watches and Bottle Watches are not required to apply an Authorized Employee Personal Lock unless their job function requires them to enter an isolated area or equipment. Crane operators must sign onto the Safe Work Permit but are only required to apply an Authorized Employee Personal Lock if they will have hands on the equipment that is isolated.

3.1.2.10 The Owning Department Representative shall conduct the Joint Job Site review of all isolation points with affected service group representatives as required by Safe Work Permit [RSW-SAF-006-DT](#).

3.1.3 Stage (3) De-isolation

3.1.3.1 Servicing Group Representative (Maintenance/Engineering/Contractor):

3.1.3.1.1 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.

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

3.1.3.1.3 After all work is completed, authorized employees remove their personal locks and if applicable Servicing Group Locks.

3.1.3.1.3.1 Note: Complete the Lock Removal Report ([Appendix G](#)) if an Authorized Employee Personal lock must be removed from a lockbox by a person other than the Authorized Employee who originally attached the device. This form is not required if the employee is available to remove the lock themselves or has lost their unique key

and must cut the lock off the box. Before removing the Authorized Employee Personal lock the supervisor must verify that the employee is not available to remove the device, make all reasonable efforts to notify the employee that their lock is being removed and must ensure that employee is notified prior to the start of their next shift.

3.1.3.2 Owing Department Personnel:

- 3.1.3.2.1 Initiate the MPC Equipment Return to Service Checklist ([Appendix F](#)). This document serves as a functional checkout for routine maintenance. Equipment cannot be returned to service until the checklist has been successfully completed.
- 3.1.3.2.2 Prepare equipment and systems for the removal of blinds per Equipment Return to Service guidelines ([RRD-1323-000](#)). Document the steps taken to ensure equipment or piping has not re-accumulated energy and is safe to remove PIP blinds in the Isolation Verification section of the Blind List.
- 3.1.3.2.3 Issue the servicing group a safe work permit and direct the removal of blinds/energy isolation devices and reconnection of electrical power, hydraulic/pneumatic lines and re-energization of breakers according to the Isolation and Blind list(s).
- 3.1.3.2.4 Complete a ping & ding to verify that the equipment is fit for service following maintenance activities. Additionally, complete a P&ID walk down or a pressure leak test. See requirements 3.1.3.2.4.2 and 3.1.3.2.4.3 below for details on completing these steps.
 - 3.1.3.2.4.1 Exception: The requirements outlined in 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 (operating temperature >140°F) and are applicable to activities performed by either Maintenance or Operations/Product Control. The following items are not subject to these requirements:
 - 3.1.3.2.4.1.1 Equipment in utility service with an operating temperature below 140°F.
 - 3.1.3.2.4.1.2 Items considered as minor servicing activities or exclusive control. These are not subject to energy isolation.
 - 3.1.3.2.4.1.3 For turnaround, major maintenance and project work, the elements discussed in this section shall be incorporated into the operating procedures, PSSR documentation, and/or functional checkout procedures.
 - 3.1.3.2.4.2 P&ID Walk Down: Utilize the complete system P&ID 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 a ping and ding check. Upon completion, sign the P&ID and submit to Owing Department Supervision for review per 3.1.3.4 below.
 - 3.1.3.2.4.3 Pressure Leak Test: The equipment and/or piping within the maintenance scope shall be leak tested by either:

3.1.3.2.4.3.1 Pressuring the system with a utility (steam, water, condensate) and visually checking for leaks:

- 3.1.3.2.4.3.1.1 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.
- 3.1.3.2.4.3.1.2 When liquid filling equipment, a review should be completed to ensure the equipment is structurally designed to handle the volume of liquid.
- 3.1.3.2.4.3.1.3 Ensure that the utility selected is compatible with the process and metallurgy.
- 3.1.3.2.4.3.1.4 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.

3.1.3.2.4.3.2 Pressuring the system with nitrogen and completing a hold step:

- 3.1.3.2.4.3.2.1 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.
- 3.1.3.2.4.3.2.2 If the hold step cannot be completed, a system walk must be completed to identify the leak source.
- 3.1.3.2.4.3.2.3 The equipment cannot be returned to service until a successful pressure test is completed.
- 3.1.3.2.4.3.2.4 The Owning Department shall use the "MPC Equipment Return to Service Checklist" ([Appendix F](#)) to document that the pressure leak 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 correctly and have been checked for loose bolts by completing a ping and ding check. Upon completion, submit the checklist to Owning Department Supervision for review per part (b)(6) of this section.

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

3.1.3.4 Submits the following documents to Owning Department Supervision for review and records retention. Owning Department Supervision (Shift Foreman or Day Foreman) will be required to review the documents and address any deviations. Upon review, submit these documents to the Process Specialist for retention. Process Specialists will retain these documents for one year but may retain longer if needed.

- 3.1.3.4.1 Completed and signed MPC Equipment Return to Service Checklist
- 3.1.3.4.2 Completed and signed Isolation and Blind List(s)
- 3.1.3.4.3 Completed and signed P&ID (if applicable)

3.2 Lock & Key Requirements

3.2.1 General Lock & Key Requirements

- 3.2.1.1 Locks and keys governed by this procedure may not be used for any purpose other than energy isolation and LOTO for servicing and maintenance activities.
- 3.2.1.2 If process valves need to be secured for operational reasons, work with your foreman to determine the best and most appropriate means to do so (car seal, master lock, etc.).
- 3.2.1.3 When not in use, LOTO devices must be kept in a controlled environment.

3.2.2 Authorized Employee Personal Locks

- 3.2.2.1 MPC personal locks shall be green in color.
- 3.2.2.2 Contractor personal locks shall be colored in accordance with their policy.
- 3.2.2.3 All personal locks shall be uniquely keyed and labeled to identify their owner. The employee ID number is adequate for identification purposes. Tags may be used to provide Authorized employees with additional room to document personal information.
- 3.2.2.4 Keys for personal locks shall remain solely in the possession of the lock owner.
- 3.2.2.5 Locks must be removed from the lockbox at the end of each shift.

3.2.3 Owing Department Isolation Locks

- 3.2.3.1 Owing Department isolation locks will be used to isolate equipment for servicing and maintenance.
- 3.2.3.2 Owing Department isolation locks shall be red in color, uniquely keyed and stamped with a lock number.
- 3.2.3.3 An energy isolation tag ([Appendix I](#)) shall be affixed to each Owing Department isolation lock to clearly indicate the item isolated, reason for isolation, date isolated and the employee who performed the isolation.

3.2.4 Owing Department Lockbox Locks

- 3.2.4.1 Owing Department lockbox locks shall be silver in color and keyed alike per complex.
- 3.2.4.2 Owing Department supervision shall be limited to three (3) copies of the respective keys.
- 3.2.4.3 The keys must remain with the shift foreman or in a secure location where only the Owing Department will have access. The shift foreman office or the shift foreman truck (Complex 5) is considered a secure location.
- 3.2.4.4 An energy isolation tag ([Appendix I](#)) shall be affixed to the Owing department lockbox lock to clearly indicate the item isolated, reason for isolation, date isolated and the employee who performed the isolation.

3.2.5 MPC Electrical Department Isolation Locks

- 3.2.5.1 MPC electrical department isolation locks shall be used in conjunction with an Owing Department isolation lock to isolate electrical equipment operating at a nominal voltage greater than 480V or when isolation beyond opening a lockable electrical switching mechanism is required (e.g. confined space).
- 3.2.5.2 The key for the electrical isolation lock will be maintained by the electrical group.
- 3.2.5.3 MPC electrical department isolation locks shall be brown in color and keyed alike.
- 3.2.5.4 Each qualified electrician shall be provided with a copy with a copy of the key. The key is never allowed to change possession to someone who is not a qualified electrician.

3.2.6 Contractor Electrical Isolation Locks

- 3.2.6.1 Contractor electricians may be used to isolate electrical energy. To do so they will apply their electrical isolation locks to refinery equipment in conjunction with an Owing Department isolation lock. The key for the electrical isolation lock will stay with the contract company that performed the electrical isolation.
- 3.2.6.2 Contractor electrical isolation locks are intended to be part of the equipment isolation and will stay on the breaker until such time that the equipment is ready to start up or that the isolation is taken over by the MPC electrical department. These locks do not satisfy the

requirement of an Authorized Employee Personal Lock. If the installer is required to perform additional work scope downstream of the isolation, a personal lock will be required on the lockbox.

- 3.2.6.3 Contractor electrical isolation locks shall be yellow but may be keyed in accordance with the contract company electrical safety procedures.
- 3.2.6.4 Contractors must ensure that the keys for these locks never change possession to someone who is not a qualified electrician.

3.3 Miscellaneous Requirements

3.3.1 Energy Isolation Verification Inspection

- 3.3.1.1 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.
- 3.3.1.2 Isolation verification will occur as part of the Joint Job Site Visit (JJSV). Verification will be documented on the Isolation List(s) for the work. A representative from each Servicing Group whose work is affected by energy isolation must physically verify the isolation and sign the Isolation List in the appropriate section.
- 3.3.1.3 A description of each isolation verification point must be listed on the Isolation List along with the means used to verify isolation. Some examples are listed below.
 - 3.3.1.3.1 Pressing the start/stop button to verify equipment does not start.
 - 3.3.1.3.2 Rodding out an open bleeder and checking with a gas monitor.
 - 3.3.1.3.3 Opening a high point vent to verify no pressure remains.
 - 3.3.1.3.4 Notes:
 - 3.3.1.3.4.1 For electrical work, adequately rated test equipment must be used to verify absence of voltage on the load side.
 - 3.3.1.3.4.2 For rotating equipment where no local start/stop button exists, the verification process should include a remote start attempt by the DCS Operator. This attempt will be documented in the Verification of Isolation section of the Isolation List. When there is no start/stop button, it is vitally important to verify the electrical isolation of the appropriate breaker.
 - 3.3.1.3.4.3 There may be instances where an unmet permissive is preventing the equipment from starting (e.g. pinned flywheel, lube oil pump for a compressor, etc.). These should be identified as safeguards against the equipment starting but are never acceptable as the only means of isolation.
 - 3.3.1.3.4.4 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.
- 3.3.1.4 Subsequent shifts must, at a minimum review the Isolation List and discuss work scope to determine if the energy isolation is appropriate. Additional measures taken may include pressing the start/stop button, opening a bleeder or using any additional means necessary to be certain that the isolation is effective. Individual authorized employees must be provided the opportunity to verify isolation locations if requested.
- 3.3.1.5 If isolation changes occur, the energy isolation point(s) altered/changed shall be re-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 removing a lock to exercise a valve or breaker or opening a lockbox.

3.3.2 Temporary Release of LOTO

3.3.2.1 A temporary release 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.

3.3.2.1.1 Exceptions:

3.3.2.1.1.1 Temporary release requirements do not apply to the hot alignment of pumps when the warmup lines are used and all other energy sources for the pump remain isolated.

3.3.2.1.1.2 A procedure may be used in lieu of the temporary release form to document actions followed during the testing of equipment. The procedure must contain the following steps:

3.3.2.1.1.2.1 Prior to testing, verify equipment is intact and non-essential items have been removed from the work area, and verify all workers have removed their lock and tag and are clear of the equipment.

3.3.2.1.1.2.2 After testing is complete and prior to allowing work to resume, re-apply and verify proper energy isolation, and verify the equipment is adequately de-energized and de-pressured.

3.3.2.1.1.2.3 See [RMP-M384-MI-DT Hot Pump and Steam Turbine Alignment procedure](#) and [RMP-M384-FORM01-MI-DET Hot Pump and Steam Turbine Alignment checklist](#) for local requirements

3.3.2.2 The Owning Department Representative shall ensure that all affected employees are aware of the temporary release and clear of the area, that all personal and servicing group locks/tags are removed from all the applicable lockboxes, and that any items or equipment that could present a hazard during re-energization are removed from the area.

3.3.2.3 The Owning Department Representative shall:

3.3.2.3.1 Complete the Temporary Release Log and assign a temporary release number and document the reason for the Temporary Release on the Status Change/Temporary Release Log on the back of the Isolation or Blind List.

3.3.2.3.2 Remove Department locks, tags and keys from master lockbox,

3.3.2.3.3 Remove equipment isolation locks/tags from those devices necessary for re-energization,

3.3.2.3.4 Note the Temporary Release number for each EID on the Isolation or Blind List,

3.3.2.3.5 Sign and date the Equipment Safe for Temporary Release section of the Status Change/Temporary Release Log to indicate re-energization is ready to commence,

3.3.2.3.6 After the temporary release is complete, replace equipment isolation locks and tags after the energy isolation device(s) are returned to proper status.

3.3.2.3.7 Test to verify that the equipment is isolated and de-energized per the instructions in the "Verification of Isolation" section of the Energy Isolation List,

3.3.2.3.8 Lock master lockbox with Owning Department lock and tag, and

3.3.2.3.9 Sign and date the Isolation Restored section of the Status Change/Temporary Release Log.

3.3.2.4 After the temporary release has been performed, the Owning Department and the Servicing Representatives shall verify that equipment is isolated and de-energized and reinstall personal locks and tags on the appropriate lockboxes.

3.3.3 Status Change/Relocation of LOTO

- 3.3.3.1 The Status Change/Temporary Release Log shall be used when an Energy Isolation Device must be inspected, repaired, removed, replaced, etc., and results in a change to the Isolation or Blind List. The transferring of LOTO hardware from that Energy Isolation Device to the other Energy Isolation Device(s) must ensure the integrity of the LOTO system is maintained.
- 3.3.3.1.1 Exception: A procedure may be used in lieu of the status change form to document actions followed during the repositioning of LOTO. The procedure must contain the following steps:
- 3.3.3.1.1.1 Prior to testing verify equipment is intact and non-essential items have been removed from the work area, and that all workers have removed their lock and tag from the lock box and are clear of the equipment.
- 3.3.3.1.1.2 After repositioning LOTO is complete and prior to allowing work to resume re-apply LOTO and verify proper energy isolation, and that the equipment is adequately de-energized and de-pressured.
- 3.3.3.1.2 Important: A status change shall also be utilized to document the removal of a piece of equipment that is part of the isolation such as replacing a valve with a spool piece.
- 3.3.3.2 The Owning Department Representative shall:
- 3.3.3.2.1 Identify isolation points required to maintain the integrity of the existing work scope,
- 3.3.3.2.2 Assign a Status Change number and document the Reason for Status Change on the Status Change/Temporary Release Log on the back of the Isolation/Blind List,
- 3.3.3.2.3 Note the status change number for each EID on the Energy Isolation List,
- 3.3.3.2.4 Field verify the status change with the Owning Department Supervisor or Ops designee,
- 3.3.3.2.5 Once verified, Owning Department Supervisor or designee signs the Status Change Log indicating approval to proceed with implementation,
- 3.3.3.2.6 Complete the relocation of LOTO and note the Status Change number for each
- 3.3.3.2.7 EID necessary for the relocation on the Energy Isolation List,
- 3.3.3.2.8 Line preparation and de-energization shall be completed to ensure safe condition of any additional lines and/or equipment included in the new LOTO system,
- 3.3.3.2.9 Sign and date the Status Change Complete section of the Status Change Log,
- 3.3.3.2.10 Remove LOTO equipment from the Energy Isolation Device that is now part of the work scope, and
- 3.3.3.2.11 Review the change with the Servicing Group Representatives associated with the job.
- 3.3.4 Engineered Isolation Plugs
- 3.3.4.1 Equipment isolation by blinds, threaded caps/plugs and/or physically disconnected equipment is recommended instead of using an engineered isolation plug. The Hot Work Isolation by Engineered Plug Approval Form in [Appendix E](#) must be completed prior to utilizing an engineered isolation plug.
- 3.3.4.2 If a flanged connection is unavailable for blinding, an engineered isolation plug may be used in place of a blind for attended hot work.
- 3.3.4.3 An engineered plug may also be utilized when there is significant risk associated with the installation of the necessary blinds. An explanation of the risk / hazards of blinding shall be included on the Hot Work Isolation by Engineered Plug Approval Form in [Appendix E](#).
- 3.3.4.4 To use engineered isolation plugs as the only isolation for Hot Work:

- 3.3.4.4.1 Hot Work Isolation by Engineered Plug Approval Form in [Appendix E](#) shall be completed by Maintenance, and
- 3.3.4.4.2 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.)).
- 3.3.4.4.3 Note: Single sealing, sewer/plumbers plugs shall not be used for hot work.
- 3.3.4.5 If a line cannot be made hydrocarbon free, the end of the line on which the attended hot work is to be performed shall be sealed with an engineered isolation plug.
- 3.3.4.6 The following precautions shall be in place before hot work begins:
 - 3.3.4.6.1 The open end must be made hydrocarbon free and scale removed.
 - 3.3.4.6.2 The engineered isolation plug shall be installed past the heat-affected zone to ensure that the hot work will not burn or melt the sealing surfaces of the plug.
 - 3.3.4.6.3 Provisions shall be made for the continuous venting of any accumulation of gases or vapors to a safe location away from the hot work.
 - 3.3.4.6.3.1 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 be indicated on the Hot Work Isolation by Engineered Plug Approval Form in [Appendix E](#).
 - 3.3.4.6.4 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 to not exceed the plug specifications.
 - 3.3.4.6.5 A flammable gas test shall be made around the plug as part of the permit.
 - 3.3.4.6.6 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.
 - 3.3.4.6.7 The potential exists for engineered isolation plugs to be blown out of lines due to the buildup of pressure. Always work to one side of an inserted plug, never work in front of the plug.
 - 3.3.4.6.8 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 system is sealed or blinded).
- 3.3.5 Isolation Using Freeze Plug
 - 3.3.5.1 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.
 - 3.3.5.2 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.
 - 3.3.5.3 The following factors must be satisfied prior to using a freeze plug:
 - 3.3.5.3.1 There are no valves available to isolate the line or the valves are not operating properly,
 - 3.3.5.3.2 The line contains a freezable product (e.g., water, amine, heavy product),
 - 3.3.5.3.3 The flow/velocity in the line is at an acceptable rate for freezing,
 - 3.3.5.3.4 The line pressure and metallurgy allow for the use of a freeze plug,
 - 3.3.5.3.5 Only cold work is allowed on lines containing hydrocarbons, and

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

3.3.6 Criteria for using a Relief Valve as an Energy isolation Device (EID)

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

3.3.6.1.1 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.

3.3.6.1.2 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 in accordance with [RSW-SAF-083-DT Live Flare Header Invasive Work procedure](#).

3.3.6.1.3 Process operation must be monitored continuously during the installation of blinds to warn workers of any process upsets.

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

3.3.7 Electrical Isolation

3.3.7.1 For servicing and maintenance, electrical equipment operating at a nominal voltage of 50V or greater must be de-energized and isolated. If an electrically safe state cannot be achieved or if conductors are de-energized but cannot be isolated, an Energized Work Permit must be completed in accordance with [Electrical Safe Work Practices RSP-1162-000](#).

3.3.7.2 Owning Department personnel may electrically isolate equipment operating at a nominal voltage up to and including 480V or with an arc-flash incident energy equal to 31 cal/cm² or below and only if isolation can be achieved by opening a lockable electrical switching mechanism (circuit breaker, disconnect, etc.) that will isolate a section of a circuit. A qualified electrician will be required to isolate any equipment operating at a nominal voltage greater than 480V, with an arch-flash incident energy greater than 31 cal/cm² or for isolation beyond opening a lockable electrical switching mechanism (e.g. confined space).

3.3.7.2.1 Note: Owning Department personnel must comply with requirements of [Appendix J](#) of this procedure when operating an electrical switching mechanism.

3.3.7.3 A contractor electrician may electrically isolate equipment operating at a nominal voltage up to and including 600V with the issuance of a Safe Work Permit. Contractor electricians must be directly supervised by an MPC qualified electrician to electrically isolate equipment operating at a nominal voltage greater than 600V.

3.3.7.4 When a qualified electrician is required to isolate equipment, they will perform the isolation and apply an electrical craft lock and tag ([Appendix I](#)) to the equipment. This lock will be in addition to the Owning Department lock and tag.

3.3.7.4.1 The key for the electrical craft lock will stay with the qualified electrician.

3.3.7.4.2 For equipment operating at a nominal voltage above 480V, the key for the Owning Department lock will be affixed with an electrical isolation tag ([Appendix I](#)) and placed into the Owning Department lockbox. The tag will be a visual indicator to help with isolation verification for subsequent shifts. This tag is not required for equipment operating at or below a nominal voltage of 480V.

3.3.7.4.3 Effective 1/20/20: When a wire disconnect is involved, a wire disconnect tag ([Appendix I](#)) shall be affixed to the upstream isolation device of the wire disconnect location by the electrician performing the wire disconnect.

3.3.7.4.4 Effective 1/20/20: When returning equipment to service, the Electrical Pre-Energization Checklist must be completed ([Appendix F](#)). This only applies if

the isolation was due to electrical work taking place. Examples of when this would be required are wire disconnects, replacing a breaker, installing new cabling, etc.

3.3.7.4.4.1 Exception: If Electrical QVD forms and process are used, the Electrical Pre-Energization checklist is not required.

3.3.7.4.5 If a contractor electrician is performing the electrical isolation, they will follow the same steps listed above will apply their lock in addition to the Owing Department lock and tag to the equipment.

3.3.7.5 Confined Space Entry into fin fans and cooling tower shrouds will require energy isolation beyond opening an electrical switching mechanism and applying a lockout device. Area Operations will isolate any electrical breakers and process, if required by Appendix B: Process /Energy Isolation Matrices.

3.3.7.5.1 A qualified electrician shall open the cover of the electrical equipment, visually verify the breaker(s) are off and check for the absence of voltage. The Servicing Group will be allowed a representative to be escorted into the substation to verify this step with the qualified electrician.

3.3.7.5.2 Once the source is verified, the Servicing Group will place a craft lock and tag on the breaker(s) alongside the Operations lock. This lock is to be removed at the completion of the job.

3.3.7.5.3 The electricians shall complete the Verification of Isolation section on the master isolation list for any electrical breaker verified.

3.3.7.6 An Owing Department representative will verify that the electrical isolation is effective by visually verifying that the lockout device is in place and pressing the start/stop button. If the isolation is in the medium/high voltage side of the substation, a qualified electrician will be responsible for escorting the Owing Department representative into the substation for the verification process.

3.3.7.6.1 Note: There may be times where a start/stop button does not exist. In these cases, additional means are necessary to verify and document isolation (Section 3.3.1).

3.3.7.7 Additional information regarding electrical safety standards, energized work permits, means to isolate medium and high voltage equipment as well as industry definitions for electrically isolate, rack-out and wire-disconnect can be referenced in [Electrical Safe Work Practices RSP-1162-000](#).

3.3.8 Electrical Isolation for Turnarounds

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

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

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

3.3.8.3.1 Note: When temporary power is utilized, extreme cautioned must be exercised to ensure that electrical power is not being supplied to isolated equipment. Refer to the [Electrical Safe Work Practices RSP-1162-000](#).

3.3.8.4 The Electrical Department will coordinate with the Owing 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 always remains isolated to protect the persons performing work in the field.

3.3.8.5 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.

3.3.8.6 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 "Temporary Release" procedures and the task may be performed during shift change to minimize work disruptions.

3.3.9 Motor Vehicle Isolation

3.3.9.1 If work being performed on a motor vehicle has the potential to cause injury to personnel due to startup of the engine, the vehicles ignition key shall be removed and retained by the person performing the work. If more than one employee is working on the vehicle, the ignition key must be placed into a lockbox and authorized employee locks attached.

3.3.9.2 If work is being performed on the ignition itself, the vehicles battery shall be disconnected from the electrical system and an energy isolation tag shall be secured warning against reconnecting them.

3.3.9.3 If work requires employees to place themselves in the way of potential gravitational energy (e.g. beneath a hydraulic jack, slopped surface, etc.), the vehicle shall be secured against movement by blocks or wheel chocks.

3.3.10 Railcars

3.3.10.1 Before gaining access to the top of a railcar the employee must ensure that the railcar cannot move by setting the breaks at the rear of the car and placing two chocks on one wheel.

3.3.10.2 If work is being performed on the rail spurs themselves, it may be necessary to secure derailleurs in place.

3.3.11 Fixed Sources of Radiation

3.3.11.1 Prior to manipulating a shutter, the employee must notify the board operator for that specific operating complex. It is usually necessary to place the equipment in manual before operating a shutter. Additionally, some gauges may not be manipulated while the unit is in operation.

3.3.11.2 When LOTO is required ([Appendix B](#)) the Radiation Safety Officer (RSO) or trained personnel will utilize owning department locks to secure shutters in the closed/off position. For Confined Space entry, only an RSO may isolate gauges. A designated RSO lock will be placed on the lockbox.

3.3.12 Fire Water Isolation

3.3.12.1 The Refinery Fire Water system can be isolated with a combination of above/below ground and post indicator valves (PIV). Isolation Lists and key security are maintained by the Safety Mechanics at the Fire Equipment Building. Isolation Verification will be demonstrated to the servicing group by opening a hydrant or monitor in the affected area to verify no pressure or flow.

3.3.12.2 Where above ground valves and PIV's are used for isolation, the standard isolation process shall be used.

3.3.12.3 When below ground valves are used for isolation, there is no way to apply a lock to the valve. In these cases, valves shall be closed using a T-handled wrench which will be controlled by the Safety Mechanics.

3.3.13 Exclusive Control

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

3.3.14 Minor Servicing Activities

- 3.3.14.1 This procedure and MIOSHA Standard (The Control of Hazardous Energy – Lockout / Tagout) does not apply to tasks classified as Minor Servicing Activities.
- 3.3.14.2 Tasks designated as Minor Servicing Activities (routine, repetitive, integral to the process) are listed in [Appendix H](#).
- 3.3.14.3 Alternative protective measures have been developed for Minor Servicing Activities which are included in [Appendix H](#).
- 3.3.14.4 Minor Servicing Activities must be attended at all time. If left unattended for any reason (breaks, lunch, relief, etc.) LOTO must be applied.

3.4 Blinding Requirements

3.4.1 Blind Installation and Removal Procedures

- 3.4.1.1 The Owning Department will identify the location where the blind is to be installed by hanging a yellow pre-blind tag (Appendix I) in the exact location where the blind is to be installed. This is to be completed prior to the JJSV with the servicing group.

- 3.4.1.2 When the servicing group is ready to install a blind, they will be issued a blind tag (Appendix I) that corresponds with the type of blind that is to be installed. Tagging requirements are as follows:

- 3.4.1.2.1 Isolation Blinds – Gold Tag
- 3.4.1.2.2 Permanent Blinds – Red Tag
- 3.4.1.2.3 Battery Limit Blinds – Orange Tag
- 3.4.1.2.4 Hydro Test Blind – Silver Tag

3.4.1.2.5 Notes:

- 3.4.1.2.5.1 Confined space blinds are also required to be tagged with a “Confined Space Isolation Point - Do Not Remove” tag ([Appendix I](#)). Reference Confined Space Blinding (Section 3.4.3) for additional information.
- 3.4.1.2.5.2 When installing a blind, gaskets must be installed on both sides of the blind. This is extremely important when the unit is in operation and there will be a “live” side of the blind as well as work on the flare header which could result in emergency live flare header work if a gasket was left out. Spacer/Vent Blinds only require a gasket on the “live” side.
- 3.4.1.2.5.3 When installing isolation blinds ALWAYS think about how the air free and blind removal procedure is going to be executed. The use of a bleeder blind should be considered where feasible, if a bleeder is not present to properly air free the system, or an isolation valve is known to be leaking and there is not a bleeder present between this isolation valve and the blind location.
- 3.4.1.2.5.4 Blind installation on a live flare header must follow the requirements detailed in [RSW-SAF-083-DT Live Flare Header Invasive Work](#). A live flare header is one that is not isolated by a block valve or one that is isolated by a block valve but cannot be verified as depressured.

- 3.4.1.3 The servicing group will proceed to install the blind in the location where the pre-blind tag is hung. An Owning Department representative must be present for the initial line break in accordance with [RSW-SAF-008-DT](#).
- 3.4.1.4 Once the blind is installed the servicing group will hang the appropriate tag as listed in section 3.4.1.2 of this procedure. Additionally, the servicing group will initial and date the Blind List. An Owning Department representative must physically verify every blind installation and initial the Blind list.
- 3.4.1.5 When a blind is ready to be removed the servicing group must confirm with the Owning Department that it is safe to remove the blind. For confined space blinds, the servicing group cannot remove the blind until the "APPROVAL TO REMOVE BLIND" section of the "Confined Space Isolation Point - Do Not Remove" tag ([Appendix I](#)) has been signed by the Owning Department.
- 3.4.1.6 The Owning Department must verify that the equipment or piping has not re-accumulated energy between the Primary Isolation Point (PIP) and the blind. When removing isolation blinds, the appropriate vent/drain valve between the valve and the blind must be opened prior to removing the blind to verify the system is depressured. This step must be listed in the "Verification of Isolation" section of the Blind List.
 - 3.4.1.6.1 Note: If no vent/drain valve exists and there are no other means available to verify the system is depressured it must be listed in the "Verification of Isolation" section of the Blind List. Additional signatures will be necessary for certain services, see Stage 2 part (e) of this procedure. Future consideration should be given to install bleeder blinds in these situations.
- 3.4.1.7 Once the blind has been removed the servicing group will return the blind tag to the control room and initial and date the appropriate section of the Blind List. The owning department must physically verify the blind has been removed and initial the Blind List.

3.4.2 Hot Work and Blinding

- 3.4.2.1 Blinds shall be installed per the Process/Energy Isolation Matrices ([Appendix B](#)) and at the closest flange to the hot work. If blinding at the closest flange creates additional risk, exceptions must be reviewed and approved by the Operations and Maintenance Foremen.
 - 3.4.2.1.1 Notes:
 - 3.4.2.1.1.1 Blind location requirements do not apply when perimeter or battery limit blinds are utilized, and the unit has been decontaminated. Owning Department may choose to install additional blinds closer to the hot work depending on the equipment and piping configuration and condition.
 - 3.4.2.1.1.2 This blind requirement is referring to attended hot work on the actual piece of equipment or piping. Blinds are not required for non-attended hot work such as the use of an impact wrench, vehicle entry, etc.
- 3.4.2.2 The area between the blind and the hot work shall be cleaned, gas freed and tested per the requirements in [Hot Work RSW-SAF-062-DT](#).
 - 3.4.2.2.1 Note: Testing should be done near 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. to verify no hazards are present. This is especially important on long piping runs or complex systems.

3.4.3 Confined Space Blinding

- 3.4.3.1 Blinds shall be installed according to the Process/Energy Isolation Matrices ([Appendix B](#)).
- 3.4.3.2 The isolation blind for a confined space must be tagged with a "Confined Space Isolation Point - Do Not Remove" tag ([Appendix I](#)) listing the Owning Department and blind

number. This isolation point (blind, plug, physical separation, etc.) cannot be removed / reconnected until the 'APPROVAL TO REMOVE BLIND' box has been signed by an Owning Department representative.

- 3.4.3.3 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.
- 3.4.3.4 Blinds shall be installed at the closest flange to the confined space. Where this is not feasible, the following procedure shall be followed:
 - 3.4.3.4.1 Operations and Maintenance must agree to the alternate location.
 - 3.4.3.4.2 The piping between the vessel and the blind shall undergo the same preparation as the vessel (i.e., wash, steam, etc.).
 - 3.4.3.4.3 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.
 - 3.4.3.4.4 The permit writer shall gas check the opening of the piping at the blind.
 - 3.4.3.4.5 The atmosphere must meet the same minimum requirements as the vessel prior to confined space entry permit being issued.

3.4.4 Blinding Open Ended Lines or Equipment

- 3.4.4.1 Open ended piping or equipment that is only isolated by a single valve must be blinded if the work extends past the current maintenance shift, unless it is continuously worked to completion in the field. This requirement only applies to hydrocarbons, corrosives, toxics.
 - 3.4.4.1.1 Note: Double block and bleed may be used in place of a blind in accordance with Section 3.4.7 if the work does not involve hot work or confined space entry.
- 3.4.4.2 This requirement does not apply to turnaround and project work when perimeter isolation/blinding and decontamination have been completed.
- 3.4.4.3 If a blind is installed, it must be located between the isolated valve and the equipment being worked on.
- 3.4.4.4 When installing and removing primary isolation point (PIP) blinds, if applicable 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 depressured. This valve only needs to remain open and tagged if continuous bleed is needed to facilitate the blind installation/removal.

3.4.5 Bleeder Blind Guidelines

- 3.4.5.1 Where feasible, bleeder blinds should be used in situations where bleeders are not present to properly air free the system, or an isolation valve is known to be leaking and there is not a bleeder present between this isolation valve and the blind location.
- 3.4.5.2 Bleeder blinds should not be used in heavy product service or in other services that are prone to plugging.
- 3.4.5.3 Bleeder blinds shall be designed for applicable process conditions and consistent with ASME standards and [SP-50-39 Pressure-Rated Blinds, Non-Rate Blinds, Vent \(Bleeder\) Blinds, and Bleed Rings](#).

3.4.6 Permanent Blinds

- 3.4.6.1 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 permanent blind management program shall be maintained by the Operations group that includes the following elements:

- 3.4.6.1.1 The permanent blind shall be identified with a tag.
- 3.4.6.1.2 Blinds shall be shown on P&IDs and included on a permanent blind list so they can be verified in place after maintenance. Changes to this list will require an MOC.
- 3.4.6.1.3 A system to verify blinds are re-installed after maintenance. For major maintenance, this can be accomplished as part of the pre-startup checklist or part of an MOC. For routine maintenance, this can be accomplished using operating procedures/guidelines or as part of the MPC Equipment Return to Service checklist.
- 3.4.6.1.4 Permanent blind installation shall be verified as often as necessary to ensure proper management of the program, but no less than once per year.

3.4.7 Alternate Use of Locked Double Block and Bleed Valves

- 3.4.7.1 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 Process/Energy Isolation Matrices (Appendix B) and for isolating opened ended lines not involved in hot work or confined space entry if the following precautionary measures are taken to ensure continued isolation and protect against a hazardous atmosphere from developing:
 - 3.4.7.1.1 block valves are verified closed and tight,
 - 3.4.7.1.2 bleed valves and piping are verified open and clear, and
 - 3.4.7.1.3 block valves are locked closed and the bleed valve is locked open.

4.0 ROLES & RESPONSIBILITIES

4.1 Owning Department

- 4.1.1 Oversees the entire Equipment Shutdown and Isolation Process.
- 4.1.2 Track lockout/tagout devices using the Energy Isolation List with the following information (see [Appendix C](#), Energy Isolation List Form):
 - 4.1.2.1 Type of isolation/energy source,
 - 4.1.2.2 LOTO lock number,
 - 4.1.2.3 Description of isolation point/type of service,
 - 4.1.2.4 Date installed,
 - 4.1.2.5 Installer,
 - 4.1.2.6 Date removed,
 - 4.1.2.7 Remover,
 - 4.1.2.8 Description of isolation verification points, including the means used to verify control of hazardous energy, and
 - 4.1.2.9 Owning Department isolation list and verification approval signatures.

Note: [Appendix C](#), Supplemental Energy Isolation List, is to be used for additional isolation points and/or isolation verification points when unable to list all points on the Energy Isolation List.

- 4.1.3 Track blinds using the Blind List with the following information (see [Appendix D](#), Blind List Form):
 - 4.1.3.1 Blind identifier (e.g., tag number),
 - 4.1.3.2 Blind location/description (Example: 3-inch 150 class heater fuel gas inlet),
 - 4.1.3.3 Installer/remover,
 - 4.1.3.4 Date installed/removed, and
 - 4.1.3.5 Owning Department isolation list and verification approval signatures.

4.2 Turnaround Group

- 4.2.1 For each Turnaround, develop a LOTO & Blinding Philosophy to be applied for that Turnaround. The following should be included in the LOTO & Blinding Philosophy:
 - 4.2.1.1 Lock and key requirements
 - 4.2.1.2 Unit isolation (battery limit blind) requirements
 - 4.2.1.3 Daily unit isolation (battery limit blind) verification
 - 4.2.1.4 LOTO requirements within unit isolation (battery limit blinds)
 - 4.2.1.5 Blind tracking procedures
- 4.2.2 Turnaround specific requirements from this procedure must be adhered to but do not have to be included in the Turnaround LOTO & Blinding Philosophy.
- 4.2.3 Prior to implementation, the Turnaround LOTO & Blinding Philosophy shall be approved by the Safety Department. Variances to this procedure may be required.

5.0 INSPECTIONS AND AUDITS

- 5.1 The Safety Department shall conduct inspections of this energy control procedure at least annually.
- 5.2 Area Safety Representatives shall conduct periodic Audits focusing on energy isolation in their respective operating complex.
- 5.3 Periodic Inspections shall be conducted on an annual basis. Each authorized employee will undergo one inspection per year.
 - 5.3.1 Operations Employees – The inspections will cycle through process equipment on an annual basis (e.g., pumps, compressors, heaters/exchangers, etc.).
 - 5.3.2 Electrically Qualified Persons – The inspections will cycle through methods to electrically isolate equipment (e.g. breaker isolation, rack-out, wire disconnect, etc.).
 - 5.3.3 Maintenance Craftsmen – Maintenance Craftsmen do not perform lockout/tagout of equipment and will not be audited as part of the Periodic Inspection. Blind installation will be captured as part of the Life Critical Safety Audits.
- 5.4 The periodic inspection shall be performed by an authorized employee other than the one utilizing the energy control procedure being inspected. A foreman level employee or higher shall fill the role of the authorized employee performing the inspection.
- 5.5 The periodic inspection shall be conducted to correct any deviations or inadequacies identified. These shall be corrected immediately so that any potential exposure to the employee is mitigated.
- 5.6 The periodic inspection shall include a review, between the inspector and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected. This will include the completion of the Isolation List and isolation verification methods.
- 5.7 The foreman shall complete the Periodic Inspection using the Annual Energy Isolation Periodic Inspection Form. 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 inspection. This document is controlled by Refining Training & Development.

6.0 TRAINING & COMPETENCIES

- 6.1 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:
 - 6.1.1 Each authorized employee shall receive training on this LOTO standard and in 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.
 - 6.1.2 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. Affected employees receive any of the following:

- 6.1.2.1 New Operator Training (BOT)
- 6.1.2.2 New Maintenance Employee Training
- 6.1.2.3 Safety Qualification Course (SQC) 201
- 6.1.2.4 Energy Isolation CBT

6.1.3 Contract companies performing work involving energy isolation must be trained and knowledgeable of the requirements of the MIOSHA Lockout/Tagout standard and this standard.

6.1.4 Training records are maintained by the Refining Training & Development Department.

7.0 DEFINITIONS

- 7.1 **Affected Employee:** 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.
- 7.2 **Authorized Employee:** A person who locks out or tags out machines or equipment for servicing or maintenance to be performed on that machine or equipment. Servicing Group Employees are also considered Authorized Employees however generally do not directly isolate equipment. Servicing Group employees will apply Authorized Employee Personal Locks when their job requires them to service or maintenance equipment that is isolated.
- 7.3 **Bleeder Blind:** a blind designed for the isolation of a piece of equipment and contains a bleeder valve for the purpose of hydro testing, equipment clearing, etc. while still maintaining the energy isolation.
- 7.4 **Bleeder Blind Flange:** 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.
- 7.5 **Blind List:** the standardized form used to document the location, size, installation and removal of isolation and test blinds.
- 7.6 **Blinding:** the absolute closure of a pipe, line or duct achieved by fastening a solid plate, threaded plug or cap across its bore to completely cover it. The cover must
 - 7.6.1 at least cover the outer edge of a flange's mating surface, and
 - 7.6.2 be capable of withstanding the maximum upstream system pressure.
- 7.6.3 Blinds include blanks, slip plates, blind flanges, threaded caps, physical disconnects. The three types of blinds utilized include:
 - 7.6.3.1 Isolation,
 - 7.6.3.2 Hydrotest, and
 - 7.6.3.3 Permanent.
- 7.7 **Cold Work:** 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.
 - 7.7.1 Examples: Vibration monitoring, control valve tuning, valve packing adjustment.
- 7.8 **Confined Space Entry:** the action by which any part of a person passes through an opening into a 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.
- 7.9 **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.
- 7.10 **Energy Isolating Device (EID):** a mechanical device that physically prevents the transmission or release of energy including but not limited to the following:
 - 7.10.1 manually operated electrical circuit breaker,
 - 7.10.2 disconnect switch,

- 7.10.3 manually operated switch that the conductors of a circuit can be disconnected from all ungrounded supply conductors and no pole can be operated independently,
- 7.10.4 a line valve,
- 7.10.5 a block valve,
- 7.10.6 blind, and
- 7.10.7 any similar device used to block or isolate energy.

Note: The following are not energy isolation devices:

- (1) push buttons,
- (2) selector switches, and
- (3) other control circuit type devices.

- 7.11 **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.
- 7.12 **Engineered Isolation Plug:** an engineered tool used to safely provide 100% positive pressure vapor barrier against residual contents in the pipe.
- 7.13 **Exclusive Control:** 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.
- 7.14 **Freeze Plug:** the practice of freezing a section of the contents of a line (pipe) to isolate equipment.
- 7.15 **Group Lock:** a lock applied to the Master Lockbox representing a servicing group.
- 7.16 **Hazardous Energy:** any energy, including mechanical, pneumatic, hydraulic, electrical, chemical, radiation, and thermal energies that could cause injury to workers.
- 7.17 **Hot Work:** repair, maintenance, or construction activity, which requires the use of spark-producing equipment or may create an ignition source.
- 7.18 **Invasive Work Risk Assessment:** 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.
- 7.19 **Isolation / De-isolation:** valve positioning, blinding, plugging, disconnecting, installing or removal that requires process hazard lockout by its owner.
- 7.20 **Isolation Blind:** a blind designed for the process isolation of a piece of equipment, vessel, piping, etc., during servicing or maintenance activities.
- 7.21 **Isolation Verification Point:** 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 Energy Isolation List.
- 7.22 **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.
- 7.23 **Lockout:** the placement of a 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. Lockout devices use positive means such as locks, blank flanges and bolted slip blinds.

- 7.24 **Minor Servicing Activities:** take place during normal production operations and 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.
7.24.1 Reference: A list of approved Minor Servicing Activities can be found in [Appendix H](#).
- 7.25 **Owning Department:** the department that normally owns and operates equipment, machinery and/or systems.
- 7.26 **Pancake Bleeder Blind:** 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.
- 7.27 **Perimeter (Battery Limit) Blind:** 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 area isolated by perimeter blinds.
- 7.28 **Permanent Blind:** 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.
- 7.29 **Authorized Employee Personal Lock:** 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.
- 7.30 **Ping & Ding:** a 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.
- 7.31 **Primary Isolation Point (PIP):** the point of isolation located immediately adjacent to the hazardous energy source.
- 7.32 **Satellite Lockbox:** a secondary lockbox or lockboxes to which the keys to Group Locks are placed and each authorized employee affixes their personal lock. The Owning Department may choose to use a Satellite Lockbox in the field as the Master Lockbox. This application makes sense for tank entry.
- 7.33 **Servicing Group:** the individuals working on the equipment/process. This may include operations, blending, shipping, maintenance, contractors, and salaried employees.
- 7.34 **Status Change/Temporary Release Form:** 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 Energy Isolation List while the equipment / system is still isolated.
- 7.35 **Supplemental Energy Isolation List:** 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 Energy Isolation List. This form is typically used during complex isolations.
- 7.36 **Tagout:** the placement of a 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 is removed.
- 7.37 **Test Blind:** a blind installed for the sole purpose of tightness testing of piping and/or equipment.

8.0 REFERENCES

8.1 Refining:

Number	Description
RRD-1150-010	Utility Connections to Process Lines & Vessels
RRD-1323-000	Safe Equipment Preparation Guidelines
RSP-1162-000	Electrical Safe Work Practice
SP-50-39	Pressure-Rated Blinds, Non-Rate Blinds, Vent (Bleeder) Blinds, and Bleed Rings
RSW-SAF-010-DT	Confined Space Entry
RSW-SAF-006-DT	Safe Work Permit
RSW-SAF-048-DT	Life Critical Safety Rules & Accountability
RSW-SAF-062-DT	Hot Work
RSW-SAF-008-DT	Line Breaking
RSW-SAF-078-DT	Invasive Work Standard Practice
RSW-SAF-083-DT	Live Flare Header Invasive Work
SAF-4007	Control of Hazardous Energy Sources
RMP-M384-MI-DT	Hot Pump and Steam Turbine Alignment procedure
RMP-M384-FORM01-MI-DET	Hot Pump and Steam Turbine Alignment checklist

8.2 Regulatory:

Number	Description
MIOSHA-STD-1158	Part 85 – Control of Hazardous Energy
OSHA 29 CFR 1910.147	Control of Hazardous Energy Sources
OSHA CPL 02-00-147	The Control of Hazardous Energy – Enforcement Policy and Inspection Procedures

9.0 APPENDICES

- 9.1 [Appendix A: Reserved](#)
- 9.2 [Appendix B: Process/Energy Isolation Matrices](#)
- 9.3 [Appendix C: Energy Isolation List & Supplemental Form](#)
- 9.4 [Appendix D: Blind List & Supplemental Form](#)
- 9.5 [Appendix E: Hot Work Isolation by Engineered Plug Approval Form](#)
- 9.6 [Appendix F: MPC Equipment Return to Service Checklist](#)
- 9.7 [Appendix G: Authorized Employee Lock Removal Form](#)
- 9.8 [Appendix H: Approved Minor Serving Activities](#)
- 9.9 [Appendix I: Blind/Open Bleeder/LOTO/Electrical Isolation/Confined Space Blind/Wire Disconnect Tags](#)
- 9.10 [Appendix J: Breaker / Motor Starter LOTO & Reset Procedure](#)
- 9.11 [Appendix K: LOTO & Blinding Training Tools](#)

10.0 REVISION HISTORY

Revision Number	Description of Change	Written By	Approved By	Revision Date
57	Updated reference in Appendix B, added clarification for when the engineered plug approval form is required, and a minor change to allow for other means of verifying valve closure when a wrench is not allowable	A. Morales	E. Neubauer	03/24/20

58	Minor formatting changes only	A. Morales	E. Neubauer	04/22/20
59	Added exception for cooling water service to chain wheel valve closure requirements in section 3.1.2.6	E. Neubauer	A. Morales	8/17/20
60	Review completed, removed life critical auditing language, added live flare invasive column to blind list	T. Brown	A. Morales	8/20/2020
61	Added note for verification of underground lines, changed electrical isolation requirements for fin fans and cooling tower shrouds,	T. Brown	A. Morales	2/1/2021

Appendix A: Reserved

Appendix B: Process/Energy Isolation Matrices

B.1 Minimum Process Isolation Requirements

B.1.1 The table below describes minimum process isolation requirements.

Notes:

B.1.2 Where (1) is located in the table, see Section 3.4.7 for additional information.

B.1.3 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, rack-out).

B.1.4 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:

- 1.1.1. Water to the cell is locked out,
- 1.1.2. Platforms and walkways are structurally sound, and
- 1.1.3. Appropriate PPE is utilized.

B.1.5 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.

B.1.6 Isolation requirements do not apply to gases used to inert equipment and vessels.

B.1.7 Lockout/Tagout is acceptable for confined space entry above the roof on internal and external floating roof tanks.

Stream Type	Examples	Cold Work	Hot Work	Confined Space
Corrosive	Hydrofluoric, Sulfur, Phosphoric, Spent or Fresh Caustics	Lockout	Blind	Blind
Hazardous Waste	API, DAF, Wastewater Liquids & Solids	Lockout	Blind	Blind
Hydrocarbon	Hydrogen, Fuel Gas, LPG, Lube Oil, Naphtha, Crude, Slurry, Flue Gas	Lockout	Blind	Blind
Toxics	Antimony, Ammonia, Hydrogen Sulfide, Amine, Chlorine, Benzene, Nitrogen	Lockout	Blind	Blind
Non-Flammable	Cooling Water, Fresh Glycol, Boiler Feedwater, Steam	Lockout	Lockout	Blind
Utilities	Instrument Air, Plant Air, Utility Water, Firewater	Lockout (2)	Lockout (2)	Blind (1)
Other	Miscellaneous Additives	Lockout	Blind	Blind

Appendix B: Process/Energy Isolation Matrices, Continued

B.2 Minimum Energy Isolation Requirements

B.2.1 The table below describes minimum energy isolation requirements.

Notes:

B.2.2 Where (1) is located in the table, see Section 3.4.7 for additional information.

B.2.3 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, rack-out).

B.2.4 Where (3) is located, lockout or source removal is required only if the employee could be exposed to radiation levels above 2 millirem in any one hour. A detection device will be used to determine potential exposure. The gauge detectors located on the CX 1 Slop Wax Line or in the CCR Catalyst Reduction Zone always require isolation because of their vicinity to each other. Re-energization is allowed for testing purposes only if a radiation detection device is being used.

Energy Type	Examples	Cold Work	Hot Work	Confined Space
Electrical	Motor Circuits, Busses, Battery Circuits, Feeders, Control Circuits	Lockout (2)	Lockout (2)	Lockout (2)
Radiation	Level Measurement Devices, Laboratory Instrumentation	Lockout or Source Removal (3)	Lockout or Source Removal (3)	Lockout or Source Removal
Mechanical	Flywheels, Trolleys, Spring-tensioned Equipment, Clutches, Elevated Machine Members, Pump Impellers	Lockout	Lockout	Lockout
Hydraulic	FCCU Slide Valve(s) Control System, Hydraulic Motors,	Lockout	Blind (1)	Blind (1)
Pneumatic	Air Driven Actuators	Lockout	Blind (1)	Blind (1)

Appendix C: Energy isolation List & Supplemental Form
Appendix D: Blind List & Supplemental Form

C.1 Form

The following is the Isolation List Form.

Reference: For the most up to date, working copy of this form, go to the following: [Energy Isolation List](#)

C.2 Form The following is the Isolation List Supplemental Form

Reference: For the most up to date, working copy of this form, go to the following: [Energy Isolation List Supplemental Form](#)

D.1 Form

The following is the Blind List Form.

Reference: For the most up to date, working copy of this form, go to the following: [Blind List](#)

D.2 Form The following is the Blind List Supplemental Form

Reference: For the most up to date, working copy of this form, go to the following: [Blind List Supplemental Form](#)

Appendix E: Hot Work Isolation by Engineered Approval Form**Appendix F: Equipment Return to Service Checklist****Appendix G: Authorized Employee Lock Removal Form****E.1 Form**

The following is the Hot Work Isolation by Engineered Plug Approval Form RSP-1121-010-FORM05.

Reference: For the most up to date, working copy of this form, go to:

[Hot Work Isolation by Engineered Plug Approval Form](#)

F.1 Procedure

Owning Department personnel must complete the 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 retention.

Reference: For the most up to date, working copy of this form, go to:

[Equipment Return to Service Checklist](#)

Effective 1/20/20: Electricians must complete the Electrical Pre-Energization Checklist prior to returning electrical equipment to service. Upon completion, the checklist will be submitted to the electrical foreman.

Reference: For the most up to date, working copy of this form, go to:

[Electrical Pre-Energization Checklist](#)

G.1 Form

Print and complete the following form anytime an Authorized Employee Personal lock needs to be removed from a lockbox by person(s) other than the person who originally attached the device because the Authorized Employee is not available. This form is not required If the employee is available, but another employee is removing their lock or the employee has lost their unique key and must cut the lock of the box.

Reference: For the most up to date, working copy of this form, go to:

[Authorized Employee Personal Lock Removal Report](#)

Appendix H: Approved Minor Servicing Activities

Activity	Justification	Alternative Measures to LOTO
Replacing pressure gauge and servicing pressure transmitters	<ul style="list-style-type: none"> Done during normal production (intended function of process equipment un-interrupted) <ul style="list-style-type: none"> Routine, Repetitive and Integral – action is repeated on a regular basis during routine technician rounds to ensure equipment and process monitoring is available 	<ul style="list-style-type: none"> Verification that isolation valve is closed Ensure not in line of fire
Light bulb replacement (bulbs not broken)	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	--
Remove coupon holder in cooling water circuit		
PM pH probes in cooling water circuits		
Replacing small cooling water PSVs (3/4"x1")	<ul style="list-style-type: none"> No potential for release of hazardous material Done during normal production (intended function of primary process un-interrupted) Routine, Repetitive and Integral – action is repeated based on a PM frequency to ensure adequate relief protection is in place. 	<ul style="list-style-type: none"> Refer to local policies and procedures for relief valve isolation.
Steam trap replacement and cold work steam tracing repairs (systems that can be isolated by two valves)	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Verify system is isolated and de-pressured PPE requirements include typical Class D PPE nitrile insulated gloves and a face shield
Remove and clean lube oil filters and "Y" strainers.	<ul style="list-style-type: none"> Done during normal production (intended function of process equipment un-interrupted) <p>Routine, Repetitive and Integral – action is repeated on a regular basis during routine operator rounds to ensure integrity of system</p>	Operating guidelines or training documents shall be in place to adequately define actions and safety provisions that must be followed.

(Continued next page)

Appendix H: Approved Minor Servicing Activities (continued)

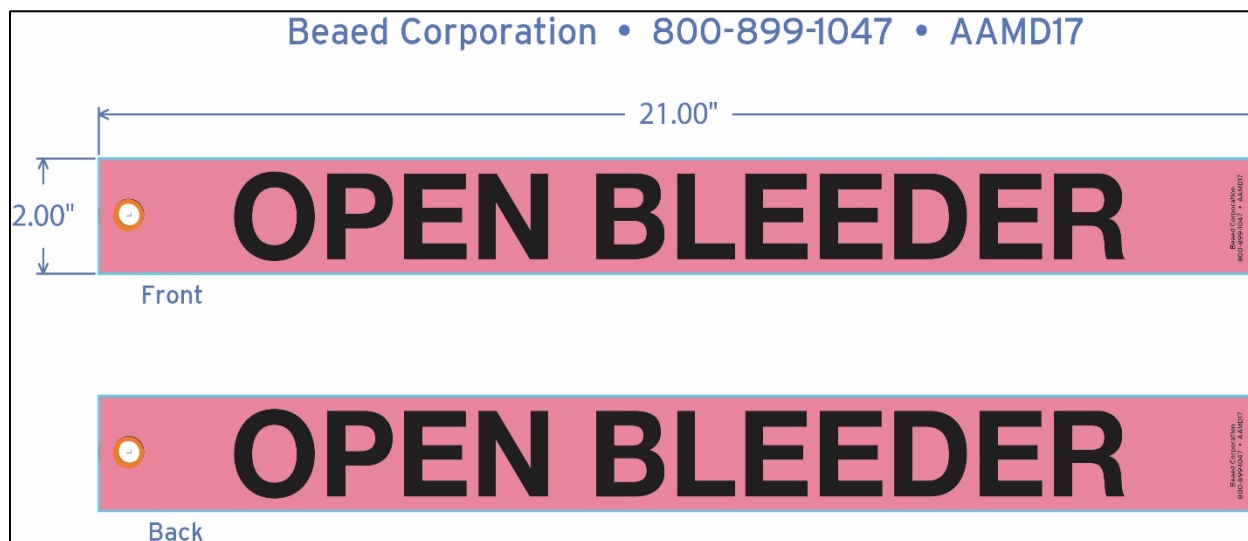
Activity	Justification	Alternative Measures to LOTO
Connect hoses for caustic, acid and chemical deliveries	<ul style="list-style-type: none"> Done during normal production (intended function of process equipment un-interrupted) Routine, Repetitive and Integral – action is repeated on a regular basis and is inherent for process operations 	<ul style="list-style-type: none"> 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.
Completing hose loops for product transfer		
Blow down sight glass	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 Verification that isolation valves are closed
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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Additional PPE will be utilized based on Invasive Work risk Assessment Matrix, other form of equipment
Calibration and repair of equipment in analyzer buildings		
Changing motor and blower air filters	<ul style="list-style-type: none"> 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 hazard review, or other policy Required safety measures shall be documented on the work permit Ensure not in line of fire 	--
Blinding small bore fuel gas piping to process heaters	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Verification of isolation Guideline or training document shall be in place to adequately define actions and safety provisions that must be followed.
Repair/Cleaning of tips or replacement of flex hoses for burners or process heaters		
Replace Pin orifice in reboiler CO ₂ vent	<ul style="list-style-type: none"> 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 for equipment reliability. 	<ul style="list-style-type: none"> Verify isolation valve is isolated. PPE requirements include typical Class D PPE nitrile insulated gloves and a face shield
Coker elevator troubleshooting and PM work	<ul style="list-style-type: none"> Elevator must be functional the entire time to perform troubleshooting and PM work 	<ul style="list-style-type: none"> The master key override stays in the possession of the person performing the troubleshooting and PM work

Appendix I: Blind/Open Bleeder/LOTO/Electrical Isolation/Confined Space Blind/Wire Disconnect Tags

I.1 Blind Install Location Tag

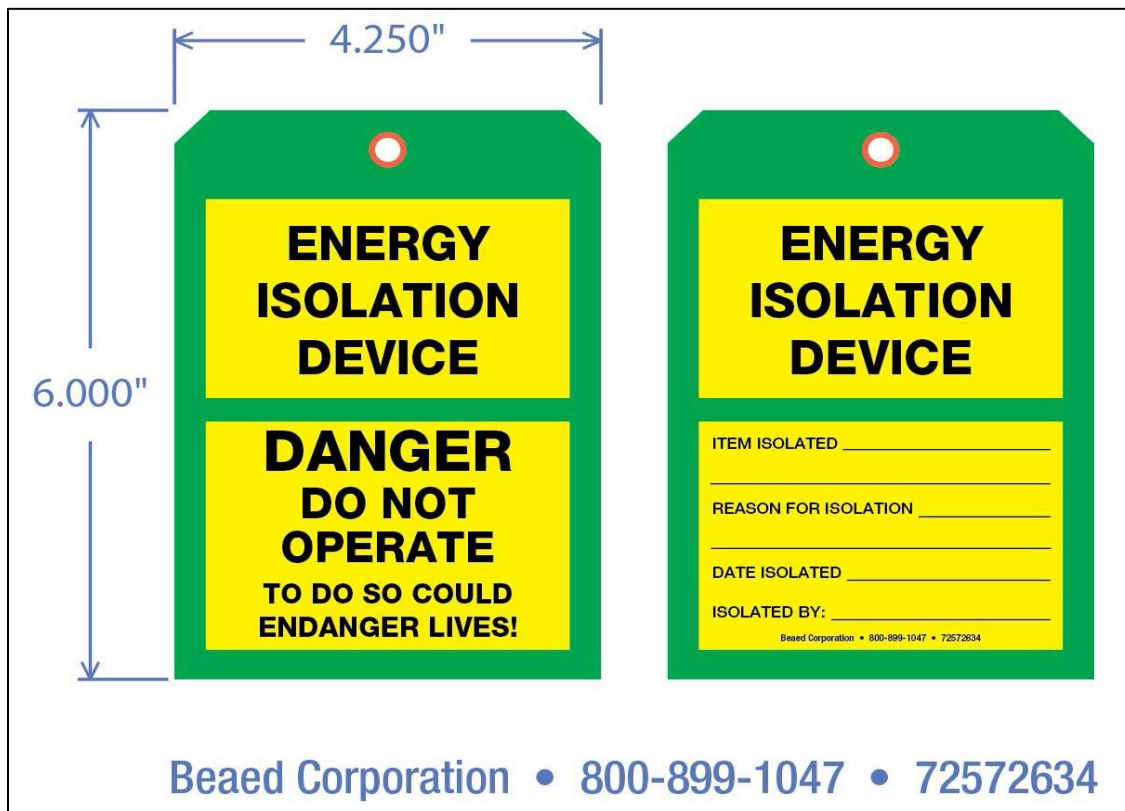


I.2 Pink Bleeder Tag



Appendix I: Blind/Open Bleeder/LOTO/Electrical Isolation/Confined Space Blind/Wire Disconnect Tags
(continued)

I.3 Equipment LOTO Tag



I.4 Electrical Isolation Tag



Appendix I: Blind/Open Bleeder/LOTO/Electrical Isolation/Confined Space Blind/Wire Disconnect Tags
(continued)

I.5 Confined Space Blind Tag



I.6 Wire Disconnect Tag



Appendix J: Breaker/Motor Starter LOTO & Reset Procedure

J.1 Procedure

J.1.1 Owing Department personnel must adhere to the following safe work practice when operating a breaker or motor starter for LOTO or reset purposes. Only personnel who have been trained in the safe use of electrical disconnecting mechanisms may operate a breaker or motor starter.

J.1.2 Breaker / Motor Starter LOTO Procedure

J.1.2.1 Review the nominal voltage and the arc flash incident energy of the electrical equipment. Only equipment operating at 480V or less with arc flash incident energy of 31cal/cm² or less may be operated by Owing Department personnel.

J.1.2.2 Don the appropriate PPE for the task.

	Arc flash incident energy $\leq 12\text{cal/cm}^2$ Less than or equal to 12cal/cm ²	12cal/cm² < Arc flash incident energy $\leq 31\text{cal/cm}^2$ Greater than 12cal/cm ² but less than or equal to 31cal/cm ²
Head & Face Protection	- Arc flash face shield and helmet with balaclava	- 31cal/cm ² Arc flash hood with hard hat
Eye Protection	- Safety glasses	- Safety glasses
Outer Layer	- Fire retardant coveralls (>12 ATPV)	- 31cal/cm ² Arc flash coat - 31cal/cm ² Bib overalls
Hand Protection	- Leather gloves	- 31cal/cm ² Arc flash gloves
Foot Protection	- Safety-toed shoes with defined heel (leather)	- Safety-toed shoes with defined heel (leather)
Hearing Protection	- Hearing protection (must be ear canal inserts)	- Hearing protection (must be ear canal inserts)

J.1.2.3 Push the STOP button for the motor to ensure the equipment is turned off. Verify that the stop light is on prior to isolating. If no light is on, STOP, call electricians, and do not attempt to isolate the breaker.

J.1.2.4 Be aware of the line of fire and stand to the side of the breaker or motor starter. This will minimize exposure should an arc blast occur. While facing the switching mechanism, open the breaker by grasping the handle firmly and placing the switch in the OFF position. There should be resistance when operating the handle. If no resistance is felt, STOP, call electricians, and do not proceed. This may be an indication that the breaker linkage is damaged.

J.1.2.5 Verify that the operating lights come off and the equipment will not start by pressing the START/STOP button. Some equipment may require the DCS operator to attempt a remote start – this step is required for equipment that has this ability.

J.1.2.6 Apply the appropriate Owing Department Lock and Energy Isolation Tag in accordance with this procedure.

J.1.3 Overloads

- J.1.3.1 Review the nominal voltage and the arc flash incident energy of the electrical equipment. Only equipment operating at 480V or less with arc flash incident energy of 31cal/cm² or less may be operated by Owning Department personnel.
- J.1.3.2 Overload tripping is generally caused by mechanical or line up issues and is indicated by fault lights. Owning Department must inspect the equipment prior to resetting an overload.
- J.1.3.3 Press the RESET button to attempt to reset the motor overload. Overloads require a cooling time before a reset will be possible. Cool down generally occurs within 5 minutes.
- J.1.3.4 If motor overloads again, overload fails to clear or equipment does not run after resetting the overload, enter a Work Notification into SAP against the breaker or motor starter.

J.1.4 Breaker Reset Procedure

- J.1.4.1 Never attempt to clear a tripped breaker by turning the breaker off and then back on. Enter a Maintenance Work Notification into SAP.

Appendix K: LOTO & Blinding Training Tools

K.1 [Verification of Positive Energy Isolation for Blind Install/Removal](#)

K.2 [Properly Document Isolation Verification on the Isolation List](#)