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# 1.0 INTRODUCTION

## 1.1 Purpose

1.1.1 To verify, in writing, that proper safeguards and precautions have been taken to minimize the possibility of personnel injury and property damage during all cold work, hot tap/stopple, vehicle entry, hot work, and confined space entry activities;

1.1.2 To inform the Owning Department personnel of every maintenance, repair or construction activity being performed in their area(s) and/or on their equipment, so that proper safeguards can be taken to protect people and facilities from possible hazardous situations;

1.1.3 To inform Owning Department personnel when maintenance, repair or construction activities in their area(s) and/or on their equipment have been properly completed; and

1.1.4 To inform maintenance and contractor personnel of the proper safeguards necessary for their activity.

## 1.2 Scope

1.2.1 A Safe Work Permit is required for all maintenance, repair or construction activity in the process units and/or on perimeter roadways involving:

1.2.1.1 Invasive

1.2.1.2 cold work,

1.2.1.3 vehicle entry,

1.2.1.4 hot tap/stopple,

1.2.1.5 hot work or confined space entry.

1.2.1.6 Energized Electrical work,

1.2.1.7 other work requiring an additional form will require a SWP regardless of location. (Excluding work in lab by lab tech)

1.2.2 A Safe Work Permit is not required for:

1.2.2.1 Operators performing cold work in a unit for which they are currently qualified;

1.2.2.2 Parking lots, fire training grounds, unless work being conducted requires hot work or confined space entry

covered under the Hot Work Authorization (HS-SWI-024) and the Confined Space Entry (HS-SWI-036);

1.2.2.3 Vehicle use on roadways normally open to traffic;

1.2.2.4 Bundle pads unless work being conducted requires hot work or confined space.

1.2.2.5 Personnel performing non-invasive equipment review (e.g., measuring, auditing, monitoring, troubleshooting, reviewing job scope, etc.)

1.2.3 Third party contractors conducting work on their own right of way and/or on their own equipment will utilize their proprietary permitting process unless tying into MPC process/utility equipment. They will also be required to review their work plan with the refinery Owning Department Supervision responsible for the area where the work is to take place. It will be up to the MPC Owning Department as to the required JJSV and work site visit frequency.

## 1.3 Corporate References

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

1.3.1 Marathon Standards, Policies, & Procedures

- HS-SWI-024 Hot Work Authorization
- HS-SWI-036 Confined Space Entry Authorization
- HS-SWI-010 Hot Tapping/In-Service Welding
- HS-SWI-011 Control of Hazardous Energy (Lockout/Tagout)

1.3.2 Industry References

- NFPA 1500 Standard on Fire Department Occupational Safety and Health Program.

1.3.3 Government Regulations

- 29 CFR 1910.119 Process Safety Management
- 29 CFR 1910.146(c) Permit-Required Confined Spaces
- 29 CFR 1910.1200 – Hazard Communication Standard
- 29 CFR 1910.147 – Control of Hazardous Energy

## 1.4 Tools and Templates

The following tools are available in support of this Safe Work Instruction:

- Safe Work Permit
- Responsibility Map

# 2.0 DEFINITIONS

**Table 1**

| Term | Definition |
|---|---|
| Auto-Ignition | Any material or substance that is above the temperature at which it will ignite upon contact with the atmosphere. |
| Blanket Work Permit | A work permit that allows a servicing group to perform work in multiple locations within a unit. Permits that list all the individual pieces of equipment to be worked on are not considered blanket permits. |
| Blinded | The absolute closure of a pipe, line, or duct by fastening across it's bore a solid plate, plug, or cap which completely covers the bore; which extends at least to the outer edge of the flanges mating surfaces; and which is capable of withstanding the maximum upstream system pressure.<br>A blank, slip-blind, blind flange, cap, screwed plug and/or physical disconnect are all considered to be blinds.<br>HS-SWI-011, Control of Hazardous Energy, provides detailed requirements for performing blinding. |
| Closed system | A contained system that facilitates the displacement of contaminants from process piping and/or equipment (e.g., the flare header, closed-drain header, slop header, low-pressure process systems, product rundowns, etc.). |
| Cold Work | An activity that does not have the potential to be the source of ignition. |
| Confined Space | Is large enough and so configured that an employee can bodily enter and perform assigned work; and is not designed for continuous employee occupancy, and has limited or restricted means for entry or exit (e.g., tanks, vessels, towers, sewers, excavations four (4) feet deep, vessel skirts, vaults and pits are spaces that may have limited means of entry).<br>HS-SWI-036, Confined Space Entry Authorization, provides detailed requirements for confined space entry. |
| MPC Contractor Coordinator | The Marathon Petroleum Company (MPC) employee responsible for coordinating contract companies.<br>On projects, the construction management coordinator hired or contracted by MPC may be designated as the MPC Contractor Coordinator. |
| Corrosives | Any equipment or piping systems that contain caustic, acid, potassium hydroxide (KOH), or amine. |
| Decontamination | Draining, purging, steaming, water washing, and neutralizing to remove hydrocarbons and contaminants, (method determined by specific service) to a closed system or safe location.<br>Decontamination takes place after the equipment has been isolated.<br>Decontamination is required to remove any hydrocarbons or contaminants prior to the start of invasive work. |
| Energy Isolation | See HS-SWI-011, Control of Hazardous Energy (Lockout/Tagout). |
| Hazardous Atmosphere | An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (escape unaided from a permit space), injury, or acute illness.<br>See Appendix A for a compilation of normally encountered vapor and gas hazards at the refinery. |

**Table 1**

| Term | Definition |
|---|---|
| Hot Service | Any equipment or piping circuit that contains material above 140°F. |
| Hot Tapping | The practice of installing a valve connection and then drilling or cutting into the pipe or equipment, through the valve connection, while the pipe or equipment is in service or has not been purged (hydrocarbon gas free).<br><br>HS-SWI-010, Hot Tap Stopple Welding Grinding on Equipment, provides detailed permit requirements for performing hot taps. |
| Hot Work | An activity that introduces a known or potential ignition source into an area that could contain a flammable or explosive atmosphere.<br><br>**Examples of Attended Hot Work:** Acetylene burning, welding, and brazing, electric arc welding, electric or gas/electric annealing, use of open flames, use of non-process propane or gas fire heaters, chipping and ripping, cutting and grinding, electric soldering, and CAD welding.<br><br>**Examples of Non-Attended Hot Work:** Concrete breaking, vehicle entry, use of non-explosion proof hand tools, lights, and extension cords, non-explosion proof cordless tools, gasoline or diesel-powered equipment (for example, compressors, generators, pressure washers, etc.), opening of energized explosion proof enclosures, abrasive blasting, and grass cutting in dike area.<br><br>These listings are not all inclusive.<br><br>HS-SWI-024, Hot Work Authorization, provides the detailed requirements for performing hot work. |
| IDLH Atmosphere | Any area that may have an atmosphere that is immediately dangerous to life and health. |
| Immediately Dangerous to Life or Health (IDLH) | Any condition that poses an immediate or delayed threat to life or would cause irreversible adverse health effects or interfere with an individual's ability to escape from a confined space. |
| Inert Confined Space | Entry inside a confined space where nitrogen (N2) or another inert gas has been used to displace/exclude oxygen from the space. All inert atmospheres are incapable of supporting human life even if the inerting agent is non-toxic.<br><br>The Entering and Working in Inert Atmospheres policy, provides the detailed requirements for performing entry into inerted Confined Spaces. |
| In-Service Welding | The practice of welding on pipe or equipment (e.g., tank, vessels, exchangers, etc.) which is in-service or has not been gas-freed through conventional methods. This includes:<br><br>➢ grinding,<br>➢ burning, and<br>➢ welding for any purpose, such as adding brackets, shoes, boxing in leaks, adding weld-o-lets and back-welding fittings.<br><br>HS-SWI-010, Hot Tapping/In-Service Welding, provides detailed permit requirements for performing in-service welding. |
| Invasive Work | Work that expects to require exposure to the internals of a vessel, pump, exchanger, or any other piece of refinery equipment (i.e., piping, sewers, tanks, hoses, etc.). |

**Table 1**

| Term | Definition |
|---|---|
| Joint Job-Site Visit (JJSV) | A meeting, at the specific location where the job will be conducted, between an Owning Department representative and at least one Servicing Representative of all parties (companies/crafts) working off a permit to discuss job scope and all safety aspects of the work to be performed.<br><br>The servicing representative that attends the Joint Job Site Visit must convey the information covered in the discussion to all members of their work party. |
| Live Equipment | Any equipment or piping circuit that is still in service or not completely isolated. |
| Non-Invasive Work | any cold work or hot work being done where there is no potential for contact with product exposure hazards, process hazards, vessels, pumps, electrical breakers, piping, or any other piece of refinery equipment. |
| Owning Department | The department that owns and operates process, process-related and/or utility equipment, machinery, building, and/or systems. |
| Oxygen Deficient Atmosphere | An atmosphere containing less than 19.5% oxygen by volume. |
| PEL | Permissible Exposure Limit |
| Post Joint Job-Site Visit | Review of job site to assure that cleanup is complete and equipment restored in a safe manner. |
| PPE | Personal Protective Equipment |
| Process Break | The opening of a process system to the atmosphere for the purposes of maintenance or new construction. Examples include separating flanges and opening exchangers.<br><br>Operational venting, draining, purging, etc., of equipment is not considered a process break. |
| RAM | Risk Assessment Matrix |
| Safe Location | A destination to purge or blow down hydrocarbons or other process contaminants that will not have any adverse impacts to personnel or equipment. |
| Safe Work Permit (SWP) | The Safe Work Permit is a work-authorizing process and record that is managed, prepared and issued by the Refining department that “owns” the equipment or is responsible for the area before certain work is conducted.<br><br>A Safe Work Permit authorizes a specific scope of work for a specific time frame and is a prerequisite for performing work.<br><br>It is used to assess hazards and to document requirements and conditions such as:<br><br>➢ atmospheric monitoring results,<br>➢ personal protective equipment,<br>➢ confined space details,<br>➢ work requirements (e.g. hot tap, excavation, critical lift),<br>➢ emergency communications, and<br>➢ other potential hazard mitigation means and methods.<br><br>The authorization coordinates and controls the work and is a form of agreement between the Safe Work Permit issuer and all personnel involved with the work. |
| Servicing Representative(s) | The people who are working on the equipment/process. This may include operations, product control, maintenance, contractors and salaried employees. |
| SLCRD | Salt Lake City Refining Division |
| STEL | Short term Exposure Limit |

**Table 1**

| Term | Definition |
|---|---|
| Stoppling | The practice of using a device (stopple) through a hot-tap connection to isolate a section of pipe for repair and/or revision without de-pressuring or purging.<br><br>HS-SWI-010, Hot Tapping/In-Service Welding, provides detailed permit requirements for performing stoppling. |
| Vehicle Entry | Any passage of a motorized (Internal Combustion Engine) vehicle across the battery limits of an operations complex, or into a tank farm diked area, or into any area where classified electrical equipment is required. Vehicle entry is a form of non-attended hot work. |
| Work Party | Includes all personnel whose tasks are covered by the work permit. |
| Work Permit Extensions | The extension of the work permit by the Owning Department at the end of the maintenance shift or at the end of 12 hours.<br><br>As conditions warrant, a work permit may be extended one time, for a period of 12 hours but not exceeding 24 consecutive hours in total. |
| Work Scope | Detailed description of the work to be performed, including the equipment name and number (if applicable) to be worked on and the Servicing Group performing the work. |

# 3.0 ROLES AND RESPONSIBILITIES

## 3.1 Owning Department Supervision

3.1.1 Ensures that Safe Work Permits are being filled out completely and correctly.

3.1.2 Ensures that the invasive work standard practice and the Risk Assessment Matrix (RAM) are being used correctly.

3.1.3 Ensures all persons within their areas of responsibility have received the appropriate Safe Work Permit training.

3.1.4 Ensures that management processes are in place to carry out the appropriate functions of the Safe Work Permit system.

## 3.2 Owning Department Personnel

3.2.1 The Owning Department personnel (Operations, Maintenance, and Product Control) are responsible for the following:

3.2.1.1 Prepares the area and equipment to ensure that it is safe for work.

3.2.1.2 Ensures that the equipment for release to the servicing representative(s) and the environment surrounding the job are in safe condition.

3.2.1.3 Identifies hazards and assesses risks for invasive work not covered under a procedure or guideline using the Risk Assessment Matrix (RAM) prior to equipment preparation, any invasive work performed by operations, and prior to invasive work performed by a Servicing Group.

3.2.1.4 Conducts atmospheric testing required for permit issuance and to assure safety at the job site.

3.2.1.5 Conducts Joint Job-Site Visits as required.

3.2.1.6 Ensures "Rescue Personnel" are available as needed and have been notified.

3.2.1.7 Communicates the permit conditions and ensures that the permit recipients fully understand the requirements of the Safe Work Permit and surrounding simultaneous operations (SIMOPS) and/or process hazards.

3.2.1.8 Issues the Safe Work Permit to perform the work if the conditions specified are met.

3.2.1.9 Communicates and transfers responsibility to the Owning Department's shift relief any active Safe Work Permits in their area.

3.2.1.10 Extends safe work permits when required.

3.2.1.11 Is available for consultation during the work and visits the permitted work site(s) periodically (at least once per shift) to verify compliance with the Safe Work Permit requirements.

3.2.1.12 Cancels the safe work permit if the conditions of the permit are not being met by the work party or area/equipment conditions require a work stoppage.

3.2.1.13 Notifies Owning Department Supervisor with any questions or concerns regarding the job or the Safe Work Permit.

3.2.1.14 Ensures that the job has been checked for completeness and all Servicing Group signoffs are made as required by applicable permits before placing the equipment in service at the completion of work.

3.2.1.15 Debriefs contractor Servicing Representative at the conclusion of confined space entry operations.

3.2.1.16 Matches and staples the paper and carbon copies of completed/cancelled Safe Work Permits and places them in a designated location for review by Supervision.

3.2.1.17 Attaches all supplemental documentation/permits/variances to the permit when the associated activity is complete or expired.

3.2.2 It is the responsibility of the Owning Department, Operations Maintenance, and Product Control departments to safely control all invasive work activities carried out in their respective units or areas. This requires the proper hazard identification, risk assessment, and mitigation requirements to execute the invasive work in a safe manner. In addition, this responsibility includes dictation of precautions and conditions under which any maintenance or contract workers will be performing invasive work. This includes the following:

3.2.2.1 Identify hazards and assess risks for invasive work not covered under a procedure or guideline using the Risk Assessment Matrix (RAM) prior to equipment preparation, any invasive work performed by operations and prior to invasive work performed by a servicing group.

3.2.2.2 Identify and communicate any remaining hazards associated with the invasive work and the actions required to safely execute the work to the servicing group performing invasive work during the JJSV and document the mitigations on the Safe Work Permit.

3.2.2.3 RAM all Operations performed Invasive Work (i.e., equipment preparation/ maintenance activities) and utilize the proper mitigation.

*See Section 6.0 for additional information regarding Invasive Work.*

## 3.3 Servicing Group Representative, Supervisor or Designee

The person directly in charge of the Servicing Group carrying out the specific tasks is responsible for the following:

3.3.1 Participate in the JJSV to be aware of the remaining hazards and the required mitigation.

3.3.2 Identify hazards and assesses risks for invasive work using the Risk Assessment Matrix (RAM).

3.3.3 Signs the Safe Work Permit according to the Required Signature matrix.

3.3.4 Ensures that all work carried out by personnel under their control is covered by a valid work permit, when required.

3.3.5 Understands the limitations and restrictions of the work permit in order that the work may proceed safely.

3.3.6 Relays the information covered in the Joint Job-Site Visit and the provisions/limitations/restrictions of the Safe Work Permit to all members of the work party and to any subsequent or new work party members joining a permit in progress.

3.3.7 Ensures that all precautions specified on the work permit are complied with and work proceeds safely within the terms of the permit.

3.3.8 Ensures that the Owning Department is made aware of any changes in work conditions, work content, or work scope.

3.3.9 Ensures that the work described in the work permit is completed or left in a safe condition if not completed.

3.3.10 If the invasive work conditions change such that it could impact the safety of the worker, stop the work and contact the owning department to re-evaluate the task using the RAM.

3.3.11 Contacts the Inspection Department to conduct any mechanical integrity approvals that need their attention.

3.3.12 Completes the “Return of Equipment/Work Area Job Completeness” portion of the work permit as required.

## 3.4 MPC Maintenance Planner

The MPC Maintenance Planner should conduct the initial RAM score on all invasive work during the planning process.

| | | |
|---|---|---|
| **3.5 MPC/Contractor Competent Person** | The MPC/Contractor Competent Person is responsible for completing and providing the permit writer the appropriate documentation for Energized Electrical Equipment, Scaffold, Critical Lift Plan, and Excavation/Trenching, Portable Radioactive Materials, etc., if required. | |
| **3.6 MPC Designated Contractor Coordinator** | 3.6.1 | Ensures contractors understand the Safe Work Permit process, including the provisions of the Joint Job-Site Visit. |
| | 3.6.2 | Signs the Safe Work Permit per the Required Signature matrix. |
| | 3.6.3 | Conducts periodic audits to verify compliance with the Safe Work Permit process. |
| | 3.6.4 | Serves as a liaison between contractors and MPC personnel. |
| | 3.6.5 | Coordinates the activities of multiple employers when the activities of one may create safety hazards relative to another. |
| **3.7 Work Party** | 3.7.1 | Participates in the Joint Job-Site Visit, as required. |
| | 3.7.2 | Signs the Safe Work Permit per the Required Signature matrix. |
| | 3.7.3 | Contacts the Owning Department to conduct atmospheric retesting if work not started within two (2) hours of initial testing or if the job is vacated more than two (2) hours. |
| | 3.7.4 | Works safely within the terms of the work permit. |
| | 3.7.5 | Notifies their supervisor and the permit writer of any changes on the job site or required changes to the work scope. |
| | 3.7.6 | Reads and understands the work permit. |
| | 3.7.7 | Completes the “Return of Equipment/Work Area Job Completeness” portion of the work permit, as required. |
| **3.8 Safety Department** | 3.8.1 | Co-signs all initial confined space entries. |
| | 3.8.2 | Periodically audits job sites and Safe Work Permits to determine compliance with the work permit. |
| | 3.8.3 | Serve as a reference to answer questions related to this policy. |
| **3.9 Inspection Department** | 3.9.1 | Confirms mechanical integrity and suitability for Hot Tap/In-Service Welding and thickness readings for entry onto tank roofs. |
| | 3.9.2 | Provide Hot Torqueing and Online Tightening guidance as applicable and per Section 15.0 Appendix B - Hot Bolting & Bolt Replacement for Bolted Joints of this SWI. |
| | 3.9.3 | Signs the Safe Work Permit per the Required Signature matrix. |
| **3.10 Training Department** | 3.10.1 | Provides training materials that have been prepared in conjunction with the Safety Department that adequately prepare permit writers and users to be compliant with the work permit process. |
| | 3.10.2 | Schedules Permit Writer training and maintains records of the training provided. |

# 4.0 GENERAL PERMITTING

## 4.1 General

4.1.1 This practice must be strictly adhered to. A variance must be written and approved for any deviation from this practice.

4.1.2 Permit writer jurisdiction is be determined by the Safe Work Permit Responsibility Map attached to this document.

4.1.3 All Safe Work Permits must be issued in accordance with instructions contained in this and all applicable procedures and Safety Work Instructions before the performance of any type of work or activity in the applicable areas.

4.1.4 The Safe Work Permit Program will be audited annually to ensure that the Work Permit Program is either working as intended or should be modified to correct identified deficiencies.

## 4.2 Work Performed by Owner of Equipment

4.2.1 Hot Work, confined space entry, flare work, or electrical hot work (use of non-explosion proof hand tools, lights, and extension cords, non-explosion proof cordless tools) performed by the Owning Department (Operator Performed Maintenance) must be permitted, no matter who performs the work. The Safe Work Permit is to be completely prepared.

4.2.2 Any work performed by the owner of the equipment where energy isolation is required, must be done under lock out/tag out, unless the work being performed is included in the “Minor Servicing Activities Matrix” of Appendix I, RSP-1121-010 Blinding & Energy Isolation.

4.2.3 The Operator(s) responsible for completing the hot work task cannot write or issue their own permit and will sign the Safe Work Permit as the MPC Maintenance Representative.

4.2.4 The Operator authorizing the Safe Work Permit will sign as the MPC Operator.

## 4.3 Preparation for Permitted Work

4.3.1 Prior to beginning work, the servicing representative(s) will contact the Owning Department to discuss the job scope and equipment preparation.

4.3.2 The designated servicing representative(s) and Owning Department will visit the job site together to;

4.3.2.1 Discuss site-specific Safe Work Permit requirements

4.3.2.2 Ensure mutual understanding of the job scope, responsibilities, requirements,

4.3.2.3 Verify proper equipment preparation for the planned work, and

4.3.2.4 Review job surroundings and work conditions including potential simultaneous operations or work tasks that could take place. Ensure discussion is had to barricade areas below elevated work.

4.3.3 The degree of equipment preparation must match the scope of work planned. Items to be discussed/reviewed prior to work include:

4.3.3.1 Equipment to be worked on

4.3.3.2 Preparation of the equipment to be released to the servicing representative

4.3.3.3 Isolation points for LOTO, including verification of de-energization and any special atmospheric monitoring requirements for hot work

4.3.3.4 Special PPE requirements

4.3.3.5 Planned job steps for each operational shift

4.3.3.6 Logistical arrangements required for job execution (scaffold and crane placement)

4.3.3.7 Special permit requirements

## 4.4 Communication of Work Execution

4.4.1 Use the Safe Work Permit as a tool to ensure that communications occur between the Owning Department and Servicing Group.

4.4.2 The Owning Department and Servicing Group must have a mutual understanding of the topics listed below to fulfill their responsibilities as outlined in this work instruction. The steps required for adequate communication are as follows:

4.4.2.1 Initial meeting between Owning Department and Servicing Group - The Servicing Group representative will meet with the owner prior to performing work in the area. The following will occur during this initial meeting:

- Communicate the work scope.
- Discuss equipment preparations and ensure that preparations match the work scope.
- Discuss the actions that will need to be taken to provide for a safe execution of the work.

4.4.2.2 Joint Job-Site Visit – The JJSV will additionally consist of:

- Verification of de-energization (LOTO / blind walkthrough).
- Verification of proper equipment preparation for the planned work.
- Review of site-specific permit requirements.

4.4.2.3 Any changes (i.e., hot work required, confined space entry required, change in blind locations, additional tasks, etc.) in work scope will require the above interaction to be repeated/updated.

4.4.3 Operations (Owning/Servicing Department) will determine a perimeter barricade around the work site to protect personnel from exposure to

hydrocarbons or hazardous materials greater than 140°F during the initial break.

4.4.4 For services that have $H_2S$ levels above the PEL or >140°F, the perimeter barricade will be established based on the impacted area (considering wind direction, gas test results) plus an additional 25 feet.

4.4.5 Only personnel in the proper level of PPE, as designated on the safe work permit will be allowed within the established perimeter barricade during invasive work.

4.4.6 All perimeter barricades will be demarcated with a physical barricade and signs/tags on all sides.

4.4.7 Operations will monitor the initial line break and adjust the perimeter as necessary. The same level of PPE as required within the barricaded area will be worn by the operator(s) while conducting gas testing near the barricades.

## 4.5 Gas Testing Requirements

4.5.1 Perform initial testing and any re-testing in an area that:

4.5.1.1 provides a representative sample of personnel's breathing zone, or

4.5.1.2 reflects the conditions of the work activities.

4.5.2 When atmospheric conditions are subject to change due to work activities, provisions will be established to either require continuous monitoring or provide for retesting after the work activities commence.

4.5.3 Record initial test results and the time taken in Section IV of the permit and initial by the person performing the test. Any additional atmospheric monitoring need only be recorded on the field copy of the permit.

4.5.4 The gas testing requirements for hot work can be found in HS-SWI-024, Hot Work Authorization.

4.5.5 All confined spaces are to be tested for combustible gases/vapors (% LEL), oxygen content, and toxic substances (benzene, H2S, SO2 etc.) as required by the nature of the process and applicable contaminants HS-SWI-036, Confined Space Entry Authorization, provides detailed requirements for confined space entry.

4.5.5.1 Continuous monitoring for combustible gases, oxygen, and toxics (as applicable) is required for all confined spaces.

4.5.5.2 Workers have the right to be present for confined space entry initial testing as required by 29 CFR 1910.146(c).

4.5.6 Continuous monitoring will be performed when vacuuming sewers due to the potential for changing conditions.

4.5.7 When continuous monitoring is required, the permit writer must clearly indicate the sampling point in the space on the permit. The sampling point must be representative of the breathing zone of entrants.

4.5.8 Tests for other hazards such as vapors, gases, mists, fumes, etc., will be performed whenever there is the possibility that conditions have changed.

4.5.9 If required for the work scope, atmospheric testing will be performed within two (2) hours prior to the start of work and at mid-shift. When work is not started within two (2) hours of the time the gas tests were taken or if the job is vacated more than two (2) hours, another test must be made and recorded on the field copy of the permit.

4.5.10 Additional tests must be made after the initial permit has been issued and more frequently if there is any doubt that conditions may foreseeably change. Additional testing results must be recorded on the field copy of the permit.

4.5.11 Gas testing required for hot work and confined space entry will be retested prior to authorizing a permit extension.

## 4.6 Joint Job Site Visit

4.6.1 The Owning Department and servicing representative must perform a Joint Job Site Visit for any invasive work, or when requested for other work.

4.6.2 Joint Job-Site Visits are required for:

4.6.2.1 cold work,

4.6.2.2 confined space entry,

4.6.2.3 hot work (excluding vehicle entry),

4.6.2.4 hot tap/stopple.

4.6.3 The Servicing Representative that attends the JJSV must convey the information covered in the JJSV to all members of their work party.

4.6.4 Unless there is a specific request or there is invasive work involved, jobs that do not require a Joint Job-Site Visit include:

4.6.4.1 Turnaround or jobs that last longer than one day

4.6.4.2 Jobs lasting longer than one day may not require a joint job site visit if nothing has changed with the job or job site. The Owning Department is responsible for informing the servicing representative(s) of any change in conditions or work scope which would affect the job, or any operating emergency.

***NOTE:*** *Verification of de-energization (LOTO) is required for each shift. This requirement can be met with a joint job site visit or handled as a specific task at the beginning of the next shift.*

4.6.4.3 Mowing and weed control

4.6.4.4 Analyzer work within a building or cabinet

4.6.4.5 Insulating and painting

4.6.4.6 LDAR

4.6.4.7 General site clean-up as long as it does not affect the operation of the equipment

## 4.7 Job Safety Analysis

4.7.1 All permitted work performed by Contractor and MPC Craft shall complete a JSA form prior to starting work. Owning department tasks that could have a negative impact to the work site or pose an

exposure concern shall complete a JSA form at the discretion of owning department supervision.

4.7.2 The JSA shall be filled out and discussed during the Joint Job Site Visit for permitted work or during the tool box talk with the work crew in work areas covered by JSA only. The JSA shall be kept with the hard copy of the Safe Work Permit if applicable.

***EXCEPTION: If there is an approved Operations, Maintenance, or Departmental procedure that covers the hazards of the task, it may be used in lieu of a JSA.***

4.7.3 Contractors working at the Salt Lake City Refinery may use their company JSA if they have one. If contractors do not have a company JSA they shall use the SLC JSA.

4.7.4 Non-Task Related Activities That Do Not Require Safe Work Permit or Job Safety Analysis. Certain non-task related activities listed below do not require a Safe Work Permit and/or a JSA. When these activities are performed in permit to work areas, only operations notification and unit sign in is required, and vehicles cannot be used to assist with these activities.

4.7.1.1 Writing permits

4.7.1.2 Scoping out job site

4.7.1.3 Locating isolation points, blinding, verification points

4.7.1.4 Covering sewers

4.7.1.5 Establishing layout areas to be barricaded

4.7.1.6 Staging fire extinguishers if necessary

4.7.1.7 Inspecting scaffolding

4.7.1.8 Visual inspection

4.7.1.9 Eng. surveys, walk around, audits, planning walkthroughs at grade

4.7.1.10 Routine housekeeping by Operations

4.7.1.11 DCS work if not impacting control or alarm devices

4.7.1.12 Work inside office buildings including office equipment repairs, except for craft activities normally requiring permits.

## 4.8 Changes in Work Scope/ Personnel/ Conditions/ Shift

4.8.1 Conditions Change

4.8.1.1 If there are any changes in conditions, activities, or in the event of an operating emergency which would affect the job, the Owning Department will inform the Servicing Representative and stop work if necessary.

4.8.2 Work Scope Change

4.8.2.1 If the scope of the work changes during the covered work permit period, the Servicing Representative must stop work and notify the permit writer to verify the adequacy of equipment and site preparation for the change in work scope.

4.8.2.2 The permit writer approves the change in the scope of work, then both copies of the work permit must be updated to reflect the scope change and any new requirements and initialed by the permit writer and the servicing representative, or a new permit must be written to cover the new scope of work.

4.8.3 Work Party Member Change

4.8.3.1 If a member of the servicing work party changes any time during the permit period, the Servicing Representative / Supervisor must review the work permit with the new personnel. For invasive work, the discussion will occur at the job site.

4.8.4 Work Party/Craft Additions

4.8.4.1 If additional work parties/crafts are needed to support the permit work scope, the permit writer will review the permit with the Servicing Representative/Supervisor and require the Servicing Representative/Supervisor to sign on to both copies of the existing permit in Section VI additional signatures. The permit writer will also sign both copies of the permit to document the communication occurred. The Servicing Representative/Supervisor will review the requirements of the permit with the crew they are representing.

4.8.4.2 A Joint Job-Site Visit is required for cold work, hot work (non-vehicle entry), confined space entry, and hot tap/stopple.

4.8.5 Owning Department Shift Change

4.8.5.1 If there is a shift change of Owning Department personnel involved with the work, each permit writer will inform their relief of any active work ongoing in their unit or area. The soft copy of the work permit must be updated with the signature/time of the relieving permit writer. A determination as to the need for additional gas testing or a revalidation is required.

4.8.6 Servicing Representative/Supervisor Change

4.8.6.1 In the event there is a change in the Service Representative/Supervisor, the work permit must be reviewed by the Permit Writer and the new Service Representative/Supervisor.

4.8.6.2 For invasive work, the discussion will occur at the job site. The oncoming Service Representative/Supervisor must accept the conditions on the work permit and sign both copies of the permit as an acknowledgement and acceptance of the permit conditions. The permit writer will also sign both copies of the permit to document the communication occurred.

## 4.9 Display and Handling of Permits

4.9.1 The servicing department will obtain/return the Safe Work Permit and accompanying supplemental documents from/to the Owning Department at the beginning/end of the service groups' shift if the job will not continue through the shift change.

4.9.2 Once issued, the original copy of each Safe Work Permit must be kept by the Owning Department. The field copy of each Safe Work Permit must be securely fastened to or near the piece of equipment being worked on where practical.

4.9.3 Safe Work Permits written solely for vehicle entry can be posted at the entrance to the permitted area, as long as the vehicle entry is limited to a specific area. Otherwise, it is to remain with the operator of the mobile equipment.

4.9.4 The field copy of the permit and any accompanying supplemental documents must be returned to the Owning Department operator, stapled together with the original copy of the permit, and placed in a designated location for review by supervision.

4.9.5 The Owning Department will collect and ensure permits are retained per the retention policy.

4.9.6 If the field copy of the Safe Work Permit is lost or damaged, the original must be closed out and a new Safe Work Permit must be obtained.

## 4.10 Duration of the Safe Work Permit

4.10.1 Safe Work Permits will be issued for the duration of the job up to 12 hours.

4.10.2 If it becomes necessary to continue work beyond the shift for which the permit was issued, the permit may be extended.

4.10.2.1 Safe Work Permits may be extended another 12 hours not to exceed 24 consecutive hours in total.

4.10.2.2 For extended permits, all safety requirements must be met, and the Permit Writer and Servicing Representative / Supervisor will sign both copies of the existing permit.

## 4.11 Safe Work Permit Extensions

4.11.1 The Safe Work Permit may only be extended (up to maximum 24 hours) if the work will continue to the next succeeding servicing department shift and the work scope has not changed.

4.11.2 Extended Safe Work Permits will meet the same provisions as the original permit (i.e., JJSV, gas testing, review of the provisions of the permit, etc.).

4.11.3 The "Time Extended Until" is to be completed in Section I.

4.11.4 If the permit includes confined space entry, the rescue personnel will be notified of permit extension.

4.11.5 The atmospheric retesting is to be documented in Section IV.

4.11.6 The required signatures in Section VI must be obtained before the work extension is approved.

## 4.12 Blanket Work Permit

4.12.1 A blanket work permit may be issued to servicing representatives to perform non-invasive work in multiple locations when the following conditions are met:

4.12.1.1 The work remains under the responsibility of the operator that issued the original permit or a relieving operator.

4.12.1.2 The work scope is the same at all locations and does not change once the work permit is approved and issued.

4.12.1.3 The level of required personal protective equipment (PPE) and safeguards are the same for each work location.

4.12.1.4 A Joint Job Site Visit (JJSV) is conducted at each work location.

4.12.2 A blanket work permit may be used to permit maintenance work that will be executed using an approved Maintenance Procedure (e.g., SIS system testing).

## 4.13 Return of Equipment / Work Area - Job Completeness

4.13.1 The Servicing Representative must inform the Owning Department when the work is complete or of the job status when the work will not be completed on the current shift.

4.13.2 The Owning Department and Servicing Representatives are to then perform the post Joint Job-Site Visit to discuss the status of the equipment, jobsite cleanup, status of lockout/tagout, special concerns, and returning the equipment to service.

4.13.3 In the event that the work site is not satisfactory (i.e., improper housekeeping, area/equipment not safe to put back into service, etc.), the Owning Department is to contact their Foreman, who will then contact the Servicing Representative's supervisor, and resolve the issues prior to permit signoff. Issues that are not immediate concerns are to be noted in Section VII Comments.

4.13.4 The Owning Department and Servicing Representatives are to check the appropriate boxes in Section VII and signoff on the permit.

## 4.14 Revoking and Reinstating Permits

4.14.1 Interruption by Owning Department

4.14.1.1 When operating personnel find it necessary to open, un-head, or disconnect vessels or lines which are known or suspected of containing flammable or toxic liquids or vapors after a work permit has been issued, it is mandatory that all work permits in the affected area be temporarily revoked.

4.14.1.2 The revoke is to assure that no work is being performed in the affected areas until it is determined that it is safe to return to work.

4.14.1.3 Additional gas tests are required to reinstate the permit.

4.14.2 Interruption by Servicing Representatives

4.14.2.1 When permitted work is interrupted or delayed for more than two hours, it is the responsibility of the Servicing Representative to confirm with the Owning Department that conditions have not changed, and gas retesting is conducted for jobs requiring hot work/confined space.

4.14.3 Emergencies/Unexpected Hazards- In cases where a hazardous situation or prohibited condition has developed during the course of work, the Servicing Group will:

4.14.3.1 Stop work immediately.

4.14.3.2 Summon assistance from the Owning Department.

4.14.3.3 Shut down any machinery or other sources of ignition, as appropriate.

4.14.3.4 Inform the Owning Department of any hazards left in the area.

4.14.3.5 If necessary, leave the area.

4.14.3.6 All permits in the affected area are to be revoked.

4.14.3.7 Work will not resume until the hazardous situation or prohibited condition has been mitigated, gas retesting has been conducted, and a new permit is completed.

4.14.4 Emergency Evacuation

4.14.4.1 All work permits in the affected area will be left in place but are invalid until reinstated by the Owning Department.

4.14.5 Reinstatement After Emergency Alarm Has Sounded- When an emergency has ended and it is safe to resume work, it will be the responsibility of the Owning Department to reinstate the Safe Work Permit after all requirements have been met.

4.14.5.1 In the unit(s) where the emergency occurred, work may resume after gas retesting has been conducted and a new permit is completed.

4.14.5.2 In units that were not affected by the emergency, work may resume after the Servicing Representative and the owning dept has signed the work extension section on both copies of the permit.

4.14.5.3 When work will not resume on a Safe Work Permit the Owning Department will collect the field copies and match them to the soft copies and sign off along with servicing rep, making appropriate notations in the Comments section.

# 5.0 SPECIAL REQUIREMENTS

## 5.1 Lighting a Process Heater

5.1.1 Hot work associated with lighting a process heater (all fired process equipment including direct fired tank heaters) can be controlled by either a Safe Work Permit or an Operating Procedure.

5.1.2 Before an ignition source can be introduced to a process heater, gas testing must be completed to ensure the fire box has been completely purged prior to lighting a burner and the area surrounding the heater is safe to light a torch/flare to be used for lighting the heater. For heaters with electronic ignition inside the firebox, the heater firebox requires gas testing prior to lighting the heater.

## 5.2 Requirements for Cuts Made to Piping and Equipment

5.2.1 Positive Identification of Cut. A system must be in place to positively identify and physically mark any location where a cut will be made (hot taps, demolition work, drilling, tie-ins, or any other activity where mechanical integrity will be compromised). The following requirements must be met.

5.2.1.1 A tag must be placed/attached at the cut location. Tag must be in place at the correct location at the time just before the cut is made (i.e., if insulation is removed the tag must be re-hung and verified to be in the correct place.)

5.2.1.2 Operator must be present for initial cuts, cuts closest to isolation points, or any other cut where hydrocarbons may be trapped due to low points in lines, plugging, etc.

5.2.1.3 If the work is not performed during the shift, the tag must be re-signed and dated by the Owning and Servicing groups.

5.2.1.4 During major turnarounds/shutdowns where equipment has been isolated with perimeter blinds, or for major demolition, identification of the cut location may be handled differently through a separate procedure.

5.2.2 Completing the Tag

5.2.2.1 The person hanging the tag will affix the tag at the cut location and sign and date the tag as the “Tag Installer”

5.2.2.2 An Owning Department Rep will verify the location and sign and date the tag at the time the tag is installed.

- The Owning Department Rep may also be the Tag Installer.

5.2.2.3 The Owning Department will verify the tag is in the proper location and sign and date the original tag. This shall be done during the same shift in which the cut will be made.

5.2.2.4 Prior to work commencing, the Crew Member performing the cut must:

- Verify that the tag is in the correct location, and
- Sign and date the tag.

5.2.2.5 The Lockbox# and the Permit# associated with the job shall be identified on the tag where provided.

# 6.0 INVASIVE WORK

## 6.1 Invasive Work Procedure

6.1.1 When invasive work is to be conducted, either by the Owning Department or a Servicing Group, the task must be assessed by the Owning Department using the RAM unless there is a procedure or guideline list that outlines invasive work hazard mitigation requirements. The RAM will assist with identifying mitigation techniques to help ensure the task is conducted safely.

6.1.2 When a Servicing Group will conduct invasive work, the RAM may need to be conducted two or more times, once for operations to prepare the equipment (if preparation involves invasive work) and again to assess the task after proper isolation/decontamination.

6.1.3 To conduct the RAM, the Owning Department will:

6.1.3.1 Determine whether a task meets the definition of invasive work. (Table 1)

6.1.3.2 Determine the Exposure Concern Value (Section 7.0, Table 2)

- Select the appropriate value for the most significant hazard (1 being the biggest concern) based on what is in the piping or equipment.

6.1.3.3 Determine the Exposure Volume Value (Section 7.0, Table 3)

- Select the appropriate value for the volume of the potential exposure.

***Note:*** *Volume refers to the volume of product that the person performing the invasive work could potentially be exposed to. For example: if a pump is connected to a vessel but has been properly isolated, the person performing the work would potentially be exposed to the volume of the pump only and not the vessel.*

6.1.3.4 Determine the Exposure Impact Value (Section 7.0, Table 4)

- Select the appropriate value for the impact of the potential exposure.
- Potential impacts could include, personnel injury, exposure to chemicals or corrosives, $H_2S$ hits, unit evacuation or shut down, fire, etc.

6.1.3.5 Determine the Level of Mitigation by multiplying the three values together.

6.1.4 It could be expected that the Exposure Volume Value and the Exposure Impact Value could/should decrease after preparation/decontamination.

6.1.5 Once the level of mitigation is determined, the Owning Department will implement the necessary mitigation techniques (for example, PPE) based on the hazard presented.

6.1.6 The Owning Department must also use their equipment knowledge, training, and past experiences/incidents, to determine if the mitigation proposed by the RAM is appropriate. When in doubt, a higher level of

mitigation may always be used. Additional protective measures may also be taken.

6.1.6.1 In the event that the operator performing the RAM does not feel that the mitigation level is appropriate for the task, they must discuss proper mitigation with their supervisor and/or safety professional before deviating from the protective measures given by the RAM.

6.1.6.2 In the event that the mitigation techniques at the determined level are unavailable or unable to be utilized, the mitigation at the next highest level must be used.

***Note**: The use of the RAM does not supersede operation procedures or guidelines or safety procedures. If existing procedures are more restrictive, those requirements must be followed.*

6.1.7 The RAM score and any mitigation requirements associated with it must also be documented on the Safe Work Permit for the Servicing Group.

# 7.0 RAM EXPOSURE CATEGORIES

The following tables provide the RAM Exposure categories.

**Table 2 Exposure Concerns**

| Value | Exposure Concerns | |
|---|---|---|
| 1 | IDLH Material | Immediately dangerous to life and health concentrations of toxic chemicals. Examples are $H_2S$ levels of 100 PPM or above, or inert atmospheres. |
| 1 | Materials Above Auto Ignition | Equipment or piping systems that contain material that will auto-ignite upon contact with the atmosphere. |
| 2 | Corrosives – Acid/Caustic/KOH | Equipment or piping systems that contain material with any caustic, acid or KOH mixture. |
| 2 | Over OEL, PEL, STEL, or LEL | Equipment or piping systems that contain material that is above the Permissible Exposure limit, Short Term Exposure Limit or between 1% and 10% of the LEL. |
| 3 | Hot Service (Above 140°F) | Equipment or piping systems that contain material that is above 140°F. This includes hydrocarbons, catalyst, steam, condensate and Boiler Feed water. |
| 10 | Other Material | Utilities such as air and water that are low temperature and low pressure or any stream that does not meet any of the exposure concerns listed above. |

**Table 3 Exposure Volume**

| Value | Exposure Volume | |
|---|---|---|
| 1 | “Live” Equipment | Any equipment or piping circuit that is still in service or not completely isolated. |
| 1 | Large Volume | Towers, vessels, receivers, and large bore piping circuits. |
| 2 | Medium Volume | Knock-Out drums, pumps, compressors, and piping systems. |
| 3 | Small Volume | Transmitter impulse lines, sight glass assemblies, sample stations and small-bore piping. |
| 4 | Low Potential | All volumes that have been quantifiably decontaminated or the volume contained between a standard isolated bleeder of less than 1” in size and its plug or cap. |
| 6 | No Volume | Verified by operations to be free of any volume. |

**Table 4 Exposure Impact**

| Value | Exposure Impact | |
|---|---|---|
| 1 | Large Impact | Could have off-site impact. |
| 2 | Medium Impact | Could have a refinery wide impact. |
| 3 | Small Impact | Could have an impact contained to the local unit. |
| 4 | Low Impact | Could have a localized impact at the invasive work site. |
| 5 | No Impact | Could have no impact, safe isolation per energy isolation procedure, equipment and material below 140°F, AND checked and verified free of volume and $H_2S$. **Note:** MUST MEET ***ALL*** OF THESE CONDITIONS |

# 8.0 MITIGATION CATEGORIES

**Table 5 Level 1 Mitigations**

| Level 1 Mitigations (1-12) |
|---|
| **Inhalation Hazard**<br>➢ Breathing air<br>**Corrosive Material**<br>➢ Chemical resistant suit (Refer to SLCRD PPE Matrix)<br>➢ Face shield & goggles<br>➢ Chemical gloves & boots<br>**Material Above Auto-Ignition Temperature**<br>➢ Verify isolations and cool down below auto-ignition temperature before doing invasive work.<br>**Fire or Hot Oil Hazard**<br>➢ Bunker gear<br>➢ Heat resistant protective clothing (Refer to SLCRD PPE Matrix)<br>**Miscellaneous Mitigators (Can be used with any of the above mitigators)**<br>➢ Bleeder cleaner tool<br>➢ Face shield, goggles and protective clothing (Refer to the SLCRD PPE Matrix) |

**Table 6 Level 2 Mitigations**

| Level 2 Mitigations (14-46) |
|---|
| **Inhalation Hazard**<br>Eductor to dilute and/or move toxic emissions from the work area.<br>Air purifying respirator (Refer to SLCRD PPE Matrix)<br>Route potential source to safe location using tubing or pipe.<br>**Corrosive Material**<br>Chemical resistant suit, gloves, boots (Refer to the SLCRD PPE Matrix)<br>Face shield & goggles<br>**Hot Service (Above 140°F)**<br>Route potential source to safe location using tubing or pipe.<br>Heat resistant protective clothing (Refer to the SLCRD PPE Matrix)<br>**Fire Hazard/LEL Mitigation (non-confined space)**<br>➢ Continuous LEL Monitoring<br>➢ Non-Sparking tools<br>**Miscellaneous Mitigators** (Can be used with any of the above mitigators)<br>Bleeder cleaner tool<br>➢ Face shield, goggles and protective clothing (Refer to the SLCRD PPE Matrix) |

**Table 7 Level 3 Mitigations**

| Level 3 Mitigations (>46) |
|---|
| ➢ Normal Refinery PPE<br>➢ Normal refinery Standard Work Practices |

# 9.0 RISK ASSESSMENT SCORING

The following table provides the scoring for Risk Assessment.

**Table 8 Risk Assessment Scoring**

| Range | Level |
|---|---|
| 1 - 12 | Level 1 Mitigation |
| 14 – 46 | Level 2 Mitigation |
| >46 | Level 3 Mitigation |

# 10.0 TRAINING

## 10.1 Training on Safe Work Permits

Employees must be trained to fill out the Safe Work Permit form properly. The following information should be provided during training:

- HS-SWI-024 Hot Work Authorization
- HS-SWI-036 Confined Space Entry Authorization
- HS-SWI-010 Hot Tapping/In-Service Welding
- HS-SWI-011 Control of Hazardous Energy (Lockout/Tagout)
- 29 CFR 1910.119 Process Safety Management
- 29 CFR 1910.146(c) Permit-Required Confined Spaces

# 11.0 AUDITING AND PERMIT RETENTION

## 11.1 Auditing

Periodic site safety audits will be conducted as described in the SLCRD Tier I Safety Audit Program.

## 11.2 Permit Retention

Safe work permits must be retained for 7 years. Confined space permits must be retained for 30 years.

# 12.0 PROGRAM REVIEW

## 12.1 Procedure Review

The Safe Work Permitting process will be reviewed every year. The review will include results of the work permit audit process and identify any ongoing trends or opportunities for improvement.

# 13.0 REVIEW AND REVISION HISTORY

**Table 9 Revision History**

| Revision | Date | Change Author | Reason for Change |
|---|---|---|---|
| 0 | 12/2/2019 | Tyson Martin | Original Issue |
| | | | |
| | | | |

# 14.0 APPENDIX A – CONTAMINANT THRESHOLDS AND CONDITIONS

| Contaminant | PEL/TLV (ppm)[1] | STEL (ppm) | IDLH (ppm) | Odor Threshold (ppm) |
|---|---|---|---|---|
| Ammonia ($NH_3$) | 25 | 35 | 300 | 0.43-53 |
| Arsenic (As) | 0.01 mg/m³ | None | 5 mg/m³ | N/A |
| Benzene ($C_6H_6$) | 0.5 | 5 | 500 | 34-119 |
| Carbon Monoxide (CO) | 25 | N/A | 1200 | Odorless |
| Hydrogen Sulfide ($H_2S$) | 10 | 15 | 100 (MPC) | 0.001-0.13 |
| Lower Explosive Limit (LEL) | 0 % LEL<br>0-10 % LEL<br>>10 % LEL | Hot Work<br>Cold Work[2]<br>No Work[2] | N/A | N/A |
| Mercaptans<br>Ethyl | 0.5 | None | 500 | 0.001-0.003 |
| Oxygen ($O_2$) | 19.5 – 23.5 % | N/A | N/A | N/A |
| Perchloroethylene ($Cl_2C=CCl_2$) | 25 | 100 | 150 | 2-71 |
| Silica ($SiO_2$) | 0.025 mg/m³ (Respirable Fraction) | None | N/A | N/A |
| Sulfur Dioxide ($SO_2$) | 0.5 | 1 | 100 | 0.33-5 |
| Sulfuric Acid ($H_2SO_4$) | 0.2 mg/m³ | None | 15 mg/m³ | 0.15 |

**Notes:**

(1) The above limits are based on the OSHA 6 (b) PEL limits, or in their absence on current TLVs.

(2) Cold work may be authorized at levels > 10% LEL (but not to exceed 20% LEL) under the variance procedure established in this document. Reference: See Section 4.1.

# 15.0 APPENDIX B – HOT BOLTING (BOLT REPLACEMENT) AND HALF BOLTING

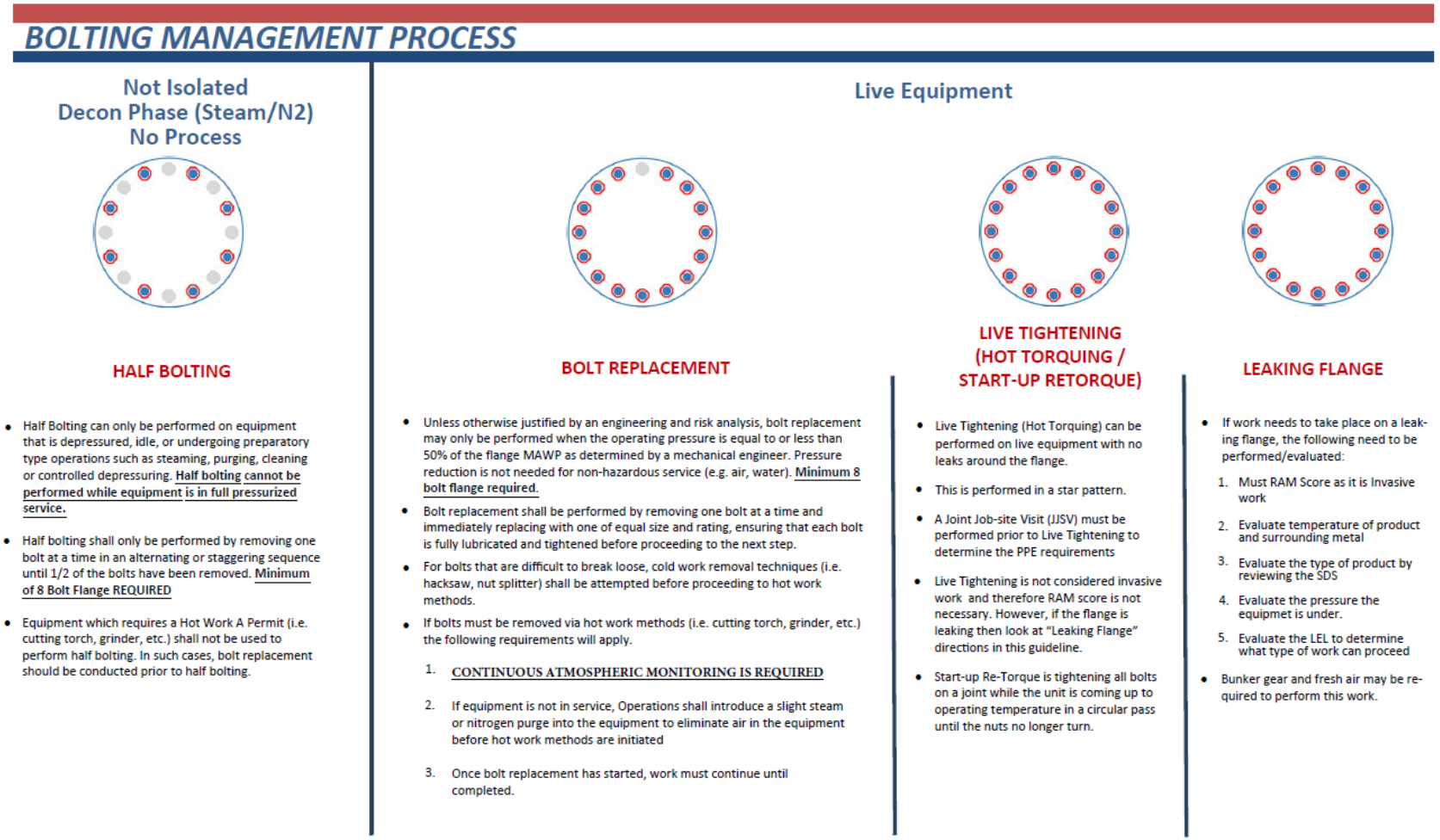
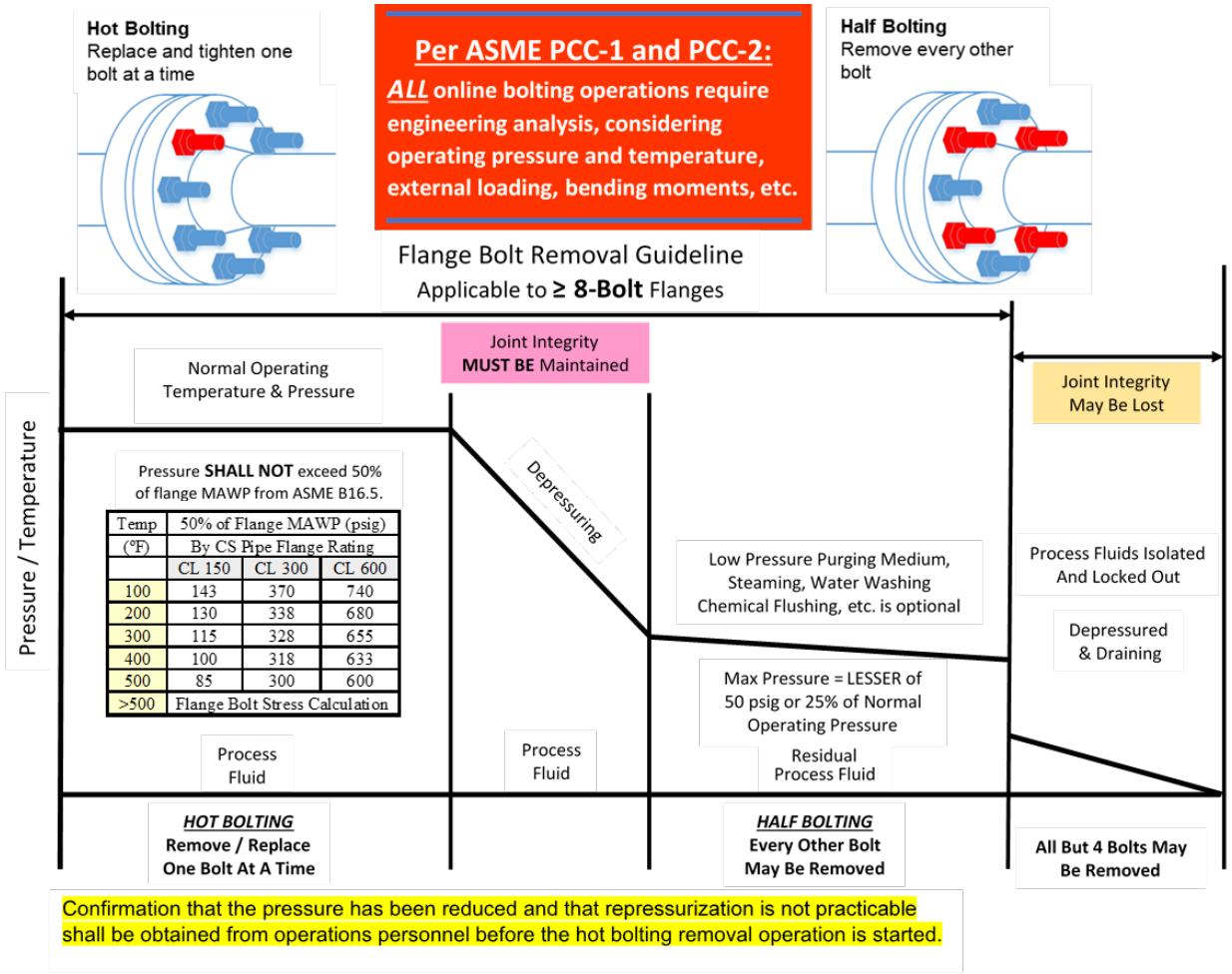



**Figure 1 Hot Bolting (Bolt Replacement) and Half Bolting for Bolted Joints**

**For reference only. Refer to MPC Core Specification SP-50-16 and ASME PCC-2 for additional Guidance.**

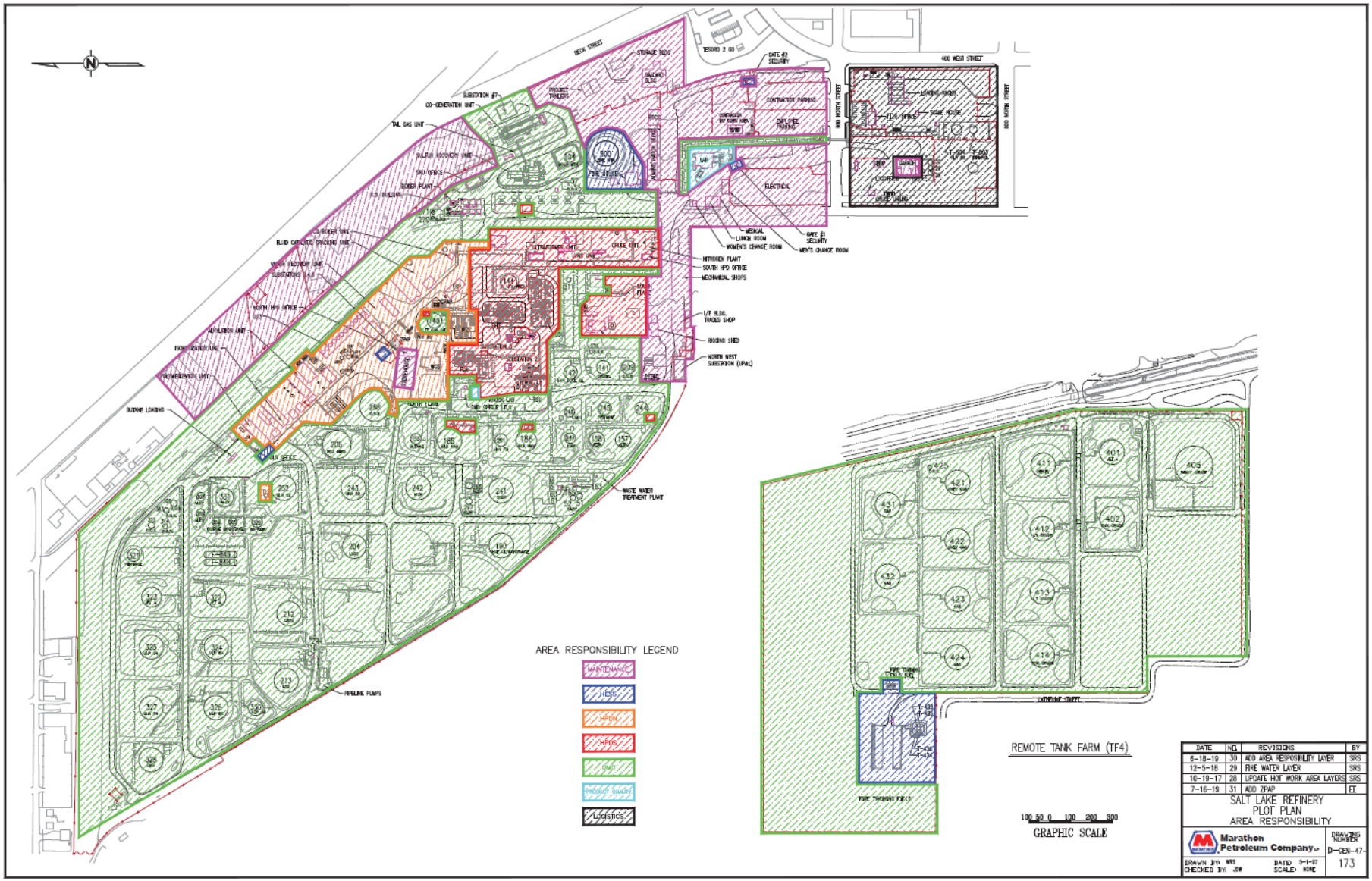



| Temp (°F) | 50% of Flange MAWP (psig) By CS Pipe Flange Rating | | |
|---|---|---|---|
| | CL 150 | CL 300 | CL 600 |
| 100 | 143 | 370 | 740 |
| 200 | 130 | 338 | 680 |
| 300 | 115 | 328 | 655 |
| 400 | 100 | 318 | 633 |
| 500 | 85 | 300 | 600 |
| >500 | Flange Bolt Stress Calculation | | |

**Figure 2 Hot Bolting (Bolt Replacement) and Half Bolting Timeline**

**For reference only. Refer to MPC Core Specification SP-50-16 and ASME PCC-2 for additional Guidance.**

# 16.0 AREA RESPONSIBILITY MAP



# 17.0 APPENDIX C GRATING REMOVAL FORM

## Guardrail/Grating/Decking/Floor Removal Form

Initial Safe Work Permit # _____

***This form must be completed prior to the removal of any part of a guardrail, grating, decking, flooring, fixed ladder or any object that creates a hole/opening in a walking/working surface.***

DISPLAY A PHOTO COPY OF THIS FORM WITH THE SAFE WORK PERMIT AT THE JOBSITE. THE HARD COPY SHOULD BE KEPT WITH THE OWNING DEPTARTMENT. TURN IN THE FORM AT THE COMPLETION OF THE JOB WITH THE PERMIT.

| | | | |
|---|---|---|---|
| Date: | | Starting Time: _____a.m._____p.m. | Date: From_____To _____ |
| Contractor Company Removing or Constructing Deck and/or Railing: | | | |
| Location: | | | |
| Nature of Work: | | | |
| Reason for Removal: | | | |

**Fall Prevention Installation Requirements**

Scaffold barricades must be installed and maintained to prevent falls through walking surfaces and/or vertical fall barrier openings, created by removing decking material, equipment, pipe, railing or walls. Scaffold barricades are required if surface openings in decks will be large enough to step through and/or any length of railing will be removed. In addition, scaffold barricades and signs must be erected to prevent unauthorized access to platforms under construction that are not complete. **All scaffold barricades must:**

- Be installed prior to removing the decking material and as soon as possible following removal of railing;
- Consist of handrails and mid rails;
- Be secured as necessary to prevent slipping or tipping;
- Be covered with red DANGER tape;
- Be posted with DANGER, 100% FALL PROTECTION REQUIRED BEYOND THIS POINT barricade signs on all perimeters until all surface openings are closed and the barricade is removed.

**Scaffold barricades around deck openings must** include a swing gate access point, labeled with a sign that reads DANGER, 100% FALL PROTECTION REQUIRED BEYOND THIS POINT.

Holes in decks (large enough to step through) must be covered when not in use. **Materials used to cover holes in decks must** consist of ¾" plywood or scaffold planks fastened to deck to prevent movement when not hard barricaded.

**Safety Review – Complete the following fields to document the required mitigations.**

**General:** JSA Completed YES Area Below Barricaded YES N/A Reported In Ops Core YES

| **Holes (i.e. gap >2" and <12" in least dimension)** | | | **Openings (i.e. gap ≥12" in least dimension and/or a leading edge)** | | |
|---|---|---|---|---|---|
| Guardrail with Barricade Tags AND/OR Anchored Cover(s) In Place | YES | N/A | Guardrail with Barricade Tags In Place | YES | N/A |
| **For Covers:** Cover Hazard Signs Posted | YES | N/A | **>4ft Fall Hazard:** Fall Hazard Signs Posted | YES | N/A |
| **For Covers:** Attendant OR Danger Tape During Removal | YES | N/A | **>4ft Fall Hazard:** PFAS Required Inside Guardrail | YES | N/A |

Additional Mitigations:

| | Name | Date | Signature |
|---|---|---|---|
| Permit Writer | | | |
| Project Coordinator / Supervisor | | | |
| Owning Department Supervisor | | | |
| Safety Representative | | | |

**Close Out – Complete the grating and platform close out checklist after the job is complete. A post JJSV is required when work is complete.**

Grating and Platform Survey Checklist shall be completed by Owning Department Supervisor and Servicing Group Rep during Post Joint Jobsite Visit for Grating and Platform removals. Handrail removal does not require Grating and Platform Survey Checklist to be completed.

| | | |
|---|---|---|
| Servicing group Representative: | Signature: | Date/Time: |
| Owning Department Supervisor: | Signature: | Date/Time: |

**Grating and Platform Close Out Checklist**

| Unit: | Location: | Date: |
|---|---|---|

**Checklist Inspection Guidance:**
The load bearing edges are generally the long ends of the grating where the bearing ends of the bars sit on the support steel or concrete. Check for signs of excessive corrosion and physical damage to the grating, supports and grating clips.

| | Grating – General Conditions | Yes | No | Corrective Actions |
|---|---|---|---|---|
| 1 | Has the Grating been installed? | | | |
| 2 | Is the grating bent, bowed, not level or flexes (greater than ¼") when walked on? | | | |
| 3 | Is the grating supported on load bearing edges with at least 1" of overlap on the supports? | | | |
| 4 | Is the grating installed with the serrated-surface facing up? | | | |
| 5 | For penetrations in the grating is a toe-board installed? | | | |
| 6 | Is grating and support systems corroded to a point where the integrity of the grating is compromised? | | | |
| 7 | Is the grating size and/or configuration such that the grating will not fall between the supports? | | | |
| | **Grating- Secured with Clips** | **Yes** | **No** | **Corrective actions** |
| 8 | Are at least 2 retaining clips installed on each support (e.g. 6-8 clips per a section of grating) | | | |
| 9 | Are grating clips secured in place? | | | |
| | **Grating- Welded in Place** | **Yes** | **No** | **Corrective actions** |
| 10 | Is the grating welded at a minimum of two places per support? | | | |

Comments:

If any of the above answers are marked in a gray box, the area must remain barricaded until the deficiencies are corrected. Once the close out checklist is completed submit it with the Guardrail/Grating/Decking/Floor removal form and Safe Work Permit.