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1 INTRODUCTION

1.1 Purpose

The purpose of this Safety Practice is to provide requirements to ensure that hot work is performed safely at the site.

A properly authorized Safe Work Permit including completion of the hot work section and authorizing signatures is required for all hot work in regulated areas.

All applicable provisions of HS-SWI-001 *Safe Work Permit* (communication of job scope, equipment prep, joint job-site visit, etc.) shall be met in addition to this SWI to conduct hot work.

1.2 Scope

This Safety Practice applies to all personnel, employee or contractor, and visitors, visiting or working in or on Marathon Petroleum Co. LLC owned, operated, or maintained facilities including, but not limited to, refineries, pipelines and pipeline rights-of-way, terminals, loading racks and tank farms.

This Safe Work Instruction (SWI) for Hot Work Authorization represents a composite of petroleum industry safe practices for this type of task.

This is to be considered minimum acceptable standards and Marathon Petroleum Company Salt Lake City Refining Division policy under normal conditions. More stringent requirements may augment this standard for any situation.

If a special need or problem is encountered, consultation with a Safety Professional should be considered before proceeding, keeping in mind that any alternative procedures must be at least as effective as these instructions in providing a safe work environment.

1.3 Corporate References

The following sections describe references used to generate this Safety Practice.

- **Marathon Standards, Policies & Procedures**
  - MPC Refining Hot Work RSP-1715-000
  - HS-SWI-010 Hot Tap Stopple Welding Grinding on Live Equip.
  - HS-SWI-011 Control of Hazardous Energy (Lockout/Tagout)
  - HS-SWI-001 Safe Work Permit
  - MPC Process Safety Advisory, PSA 16-02
  - MPC Process Safety Advisory, PSA 13-08
  - RRD-1323-000 Safe Equipment Preparation Guidelines
  - RSP-1715-000 Hot Work
  - RSP-1127-000 Confined Space Entry
  - RSP-1128-000 Safe Work Permit

- **Government Regulations**
  - API Publication 2009 Safe Welding and Cutting Practices in Refineries, Gas Plants, and Petrochemical Plants
  - API Publication 2201 Procedures for Welding or Hot Tapping on Equipment in Service
  - API RP 2207 Preparing Tank Bottoms for Hot Work
  - 29 CFR 1910.119 Process Safety Management of Highly Hazardous Chemicals
  - 29 CFR 1910.252 Welding

2 DEFINITIONS

The following terms and definitions are used in this Safety Practice.

Terms and Definitions

Term	Definition
Attended Hot Work	Attended Hot Work is hot work that requires a fire watch. Some examples of attended hot work are: burning, welding, brazing, electric arc welding, heat treating/ stressing (electric or gas), electric soldering, stress relieving, use of open flames, use of non-process propane or gas fired heaters, cutting and grinding, CAD welding, and if combustible materials are within 35 feet of worksite. This type of hot work requires the placement of covers on sewers within 35 feet. These listings are not all-inclusive.
Battery Powered Equipment	Use of unclassified, battery powered equipment (e.g., cordless drills, computers, cell phones) requires a hot work permit. Personal devices (e.g., hearing aids, watches, and other medical devices) with button batteries are exempt from the Hot Work permit requirements. Other medical devices with larger batteries (e.g., certain insulin pumps) would require a Hot Work permit or the person to be equipped with a personal LEL detector.
Class A Combustible Material	Class A Combustible Materials are ordinary combustibles such as wood, cloth, or paper.
Cold Work	Cold Work is maintenance, repair, cleaning, or construction activity, not requiring the use of fire, hot surfaces, spark producing equipment, or electrical equipment that is not classified for use in the area.
Fire Watch	The individual(s), who have received training on the duties of a fire watch.
Hazardous Atmosphere	An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (i.e., escape unaided from a permit space). Injury, or acute illness.

Terms and Definitions

Term	Definition
Hot Tapping (Pressure Tapping)	Hot Tapping (Pressure Tapping) is 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).
Hot Work	Is an activity that introduces a known or potential ignition source into an area that could contain a flammable or explosive atmosphere. Specifically, it includes cutting, burning, welding, grinding, brazing, sandblasting, abrasive wheels, concrete chipping, opening of electrical gear, use of non-explosion proof power tools and electrical equipment, use of non-intrinsically safe instruments and tools that contain batteries and/or rechargeable power supplies, or vehicle entry in regulated areas within the Marathon Petroleum Salt Lake City Refining Division.
In-Service Welding	In-Service Welding is the practice of welding on pipe or equipment (for example, tank, vessels, exchangers, etc.) which is in-service. This includes grinding, burning, and welding for any purpose, such as adding brackets, shoes, boxing in leaks, adding weld-o-lets and back welding fittings.
Internal Combustion Engines (ICEs)	A motor vehicle or other equipment (e.g., light plants, compressors, welding machines, etc.) are considered potential ignition sources.
Joint Job Site Visit	Joint Job Site Visit is a meeting between an Owning Department representative and at least one servicing representative of all parties working off of the permit at the specific location where the job will be conducted. The meeting discussion will address the work scope and all safety aspects of the permit. 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.
Non-Attended Hot Work	Non-Attended Hot Work is hot work that does not require a fire watch. Some examples of non-attended hot work are: concrete breaking; use of unclassified hand tools, lights, and extension cords, non-explosion proof cordless tools, non-intrinsically safe flash cameras, gasoline or diesel-powered equipment (e.g., compressors, generators, pressure washers, etc.), opening of energized explosion proof enclosures, abrasive blasting, and grass cutting in dike area.
Owning Department	Refers to the department that owns and operates process, process-related and/or utility equipment, machinery, building, and/or systems.
Oxygen Deficient Atmosphere	Any atmosphere containing less than 19.5% oxygen by volume.
Permit Writer	The Owning Department employee who prepares and issues the Safe Work Permit.
PSSR	Pre-startup safety review

Terms and Definitions

Term	Definition
Safe Work Permit	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. Notes: (1) It authorizes a specific scope of work for a specific time frame and is a prerequisite for performing work. (2) It is used to assess hazards and to document requirements and conditions such as atmospheric monitoring results, personal protective equipment, confined space details, work requirements (e.g., hot tap, excavation, critical lift), emergency communications, and other potential hazard mitigation means and methods. (3) 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 Group Representative	A maintenance employee or contractor authorized as a representative to sign permits and conduct hazard discussions for anyone performing physical work in the refinery to fulfill their (maintenance or construction) responsibilities for the work instruction.
Vehicle Entry	Any passage of a motorized 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 requires gas testing to determine hazardous conditions but does not require a fire watch.
Work Party	Includes all personnel whose tasks are covered by the work permit.

3 ROLES AND RESPONSIBILITIES

3.1 Owning Department / Permit Writer

The Owning Department/Permit Writer is responsible for the following.

a. Be responsible as a representative of the owning department for safe operation of hot work activities.

b. Ensure that all energy isolation requirements have been satisfied.

- Verify that the lockout/tagout log and blind list associated with the hot work is complete and signed.
- Field verify that the preparations for hot work including steaming, LOTO, and blinding are completed.

c. Identify potential hazards associated with the hot work and specify the testing and precautionary measures required to ensure the safety of the work to be done. Contact the Safety Department for assistance as necessary.

d. Identifies and covers sewers within 35 feet radius of hot work needing to be covered.

e. Provide appropriate instructions for preparation of the hot work.

f. Ensure that the permit is posted at the job site during the hot work.

g. Ensure adequate fire watch personnel are present and that proper fire extinguishing equipment and other personal protective equipment are used as required by the permit.

h. Determine the need for the fire watch to maintain a radio for emergency communications. In general, remote jobs (e.g., tank farm) or jobs that require communication to the fire watch from operations (e.g., hot taps/in-service welds) shall require a radio.

i. Cancel and revoke the permit when the work is completed or if a prohibited work condition occurs.

j. Conduct required atmospheric monitoring for permit issuance.

k. Verify that air-monitoring equipment (i.e., LEL/O_2 meters, gas monitors, etc.) is properly maintained, calibrated, and working properly.

l. Verify that the servicing group representative understands the scope, requirements and limits of the work defined in the permit.

m. Inform the servicing group representative of any area or operational conditions that may impact the hot work (e.g., vapor release, sewer draining operations, etc.).

n. Coordinate with contractors, nearby operations, and any MPC employees working near the hot work operations as needed.

3.2 Servicing Representative Supervisor or Designee

The Servicing Representative Supervisor or Designee is the person directly in charge of the servicing group carrying out the specific tasks. They are responsible for the following.

a. Comply with all conditions specified on the Safe Work Permit.

b. Stop Hot Work activities if conditions of the Safe Work Permit can no longer be met.

c. Ensure tools and equipment to be used are in good-working condition and are safe to use.

d. Verify atmospheric monitoring has been completed.

e. Ensure gasoline or diesel-powered equipment is shut-down in the event of an emergency/evacuation.

f. Ensure the owning department has a complete understanding of the job's execution requirements and job scope, to verify proper equipment isolation and preparation.

g. Convey any potential hazards that they will introduce to the job site as a result of performing work.

h. Field-verify that energy isolation is complete during Joint Job-Site Visit prior to signing the permit.

i. Conduct pre-job discussions and verify that the work party is aware of the scope, requirements, limitations, potential hazards and precautions specified on the permit.

j. Provide a designated, trained fire watch when required.

k. Provide a radio for the fire watch when required per the permit.

l. Notify the owning department if the scope of work or conditions change during the job.

3.3 Work Party

The work party is responsible for the following:

a. Understand the limitations and restrictions of the work permit and comply with the permit requirements.

b. Discontinue hot work and report any abnormal condition that may present itself after the issuance of the original permit.

3.4 Fire Watch

The Fire Watch personnel are responsible and/ or trained for the following.

a. Be aware of the type of material in the general area and possible hazards.

b. Be knowledgeable and trained in extinguishing small fires, the hot work permit procedure and the hazards of hot work.

c. Know how to sound an alarm or contact emergency response personnel in the event of a fire or changing conditions.

d. Know how to use radio communications to obtain emergency services as deemed necessary based on location of job.

e. Ensure a hot work permit has been issued and understand the provisions of the permit.

f. Sign on/off duty onto field copy of the Safe Work Permit.

g. Preplan escape routes for welders and other affected personnel and ensure adequate extinguishing equipment to cover their escape.

h. Maintain a visual surveillance of the vicinity of the hot work for spills, leaks, sparks, glowing embers, and fires which the welder or person performing the work may not be able to see.

i. Remain next to the water hose or extinguisher within reach of the nozzle anytime hot work is being performed.

j. Shuts down the ignition source (i.e., welding machine, torch, electric tool, etc.) anytime anything out of the ordinary occurs (e.g., gassy odors, notice someone draining a line, blown pump seal, etc.)

k. If a fire does occur, the fire watch's main responsibility is to:

- Protect welders, other people in the area, and themselves from fire;
- Extinguish the fire if possible;
- If the fire can't be extinguished, try to contain it and make emergency notification per the Emergency Contacts section on the permit.

l. Ensure fire watch equipment is in good working condition. If not, replace or repair before hot work is permitted.

m. If it is necessary for the fire watch to leave the area for any reason, they must stop hot work **OR** get a qualified replacement before leaving.
   - When persons performing hot work are in a pipe rack or a place where voice communication is difficult, have an alternate communication plan in place before hot work begins if that fails, get their attention in the event of an emergency by:
   - Shut down welding machine
   - Utilize a noisemaker such as a whistle, horn, etc.

n. Be familiar with shutting down welding machines and burning apparatus.

o. Although firefighting equipment inside buildings and operating units may be used in the event of a fire this equipment is never to be removed or used for fire watch equipment. This includes portable fire extinguishers hanging in units.

p. Shall wear a bright and easily identifiable vest to identify them as fire watches (e.g., florescent orange).

q. Immediately extinguish sparks produced by welding, grinding, or use of a cutting torch.

r. Remain at job site a minimum of 30-minutes after completion of welding, cutting, or other hot work operations to detect and extinguish possible smoldering fires.

s. Stop all activities when the refinery alarm is activated or when they observe a deviation from the permitted activity (revoke active permits).

3.5 Training Department

The Training Department is responsible for the following:

a. Provide training materials that have been prepared in conjunction with the Safety Department that adequately prepares Permit Writers and users to be compliant with the Safe Work Permit process.

b. Schedule Permit Writer training.

c. Maintain training certifications for all personnel affected by this program (e.g., MPC permit writers).

4 PRACTICES

4.1 Pre-Job Planning/Hazard Identification

Foreseeable hazards associated with the hot work shall be identified and mitigated in satisfactory condition prior to issuance of the permit.

All sewers and vent pipes and manholes in the immediate area (35 ft) will be atmospheric tested and sealed as necessary. The seal shall be attained utilizing a water-wetted cover (tarpaulin) or other device to prevent emission of flammable vapors from the sewer.

Vent pipes on mechanically sealed sewer boxes must be sealed to prevent leakage when hot work is being performed in the area (i.e., duct tape, sewer plug, etc.). The seal must be of adequate integrity to

withstand the temperature, pressure, and material compatibility of the product within the sewer box.

Any time a sewer or vent pipe is sealed, it must be tested with a gas detection device to assure that a seal has been achieved.

The hot-work area will be defined by identifiable landmarks, or barrier tape or specific language on the permit, to make sure the workers are certain of the area where hot work is permitted.

When cutting with a torch, welding, or grinding, evaluate the impact area of hot slag/sparks and protect sewer openings, doorways, windows and other paths (within 35 feet), which would allow sparks to reach combustible materials.

No welding, cutting, or other hot work shall be performed on used drums, barrels, tanks or other containers until they have been cleaned so thoroughly as to make absolutely certain that there is no flammable materials present or any substances such as greases, tars, acids or other materials which when subjected to heat, might produce flammable or toxic vapors.

a. Any pipelines or connections to the drum or vessel shall be disconnected or blinded.

b. Demister pads and coalescing media in vessels shall be removed prior to hot work if they would pose a hazard due to the hot work activity being performed.

All hollow spaces, cavities or containers shall be vented to permit the escape of air or gases before preheating, cutting or welding. Purging with inert gas is recommended.

Consideration shall be taken to break/disconnect adjacent lines and/or materials (i.e., steel members, pipes, etc.) where heat from the hot work could be transmitted by radiation or conducted to unobserved combustibles.

Containment (i.e., fire blankets, tarps, etc.) shall be used when hot work is to be performed overhead to limit travel of ignition sources.

Signage will be displayed when deemed necessary (i.e., overhead work signs, barrier tape, etc.).

Hot work on lines or vessels that are lined or cladded shall not be performed unless specifically authorized following an engineering evaluation.

Mechanical ventilation shall be required when welding occurs inside of confined spaces. Certain open spaces (e.g., heaters, open tanks, excavations, etc.) may be exempt from this requirement provided there is adequate natural ventilation to remove welding fume.

When hot work is performed in a confined space utilizing cutting torches or inert gases, and the work is stopped and the space vacated for more than 15 minutes, the torches and hoses (oxygen, acetylene, propane, argon, etc.) must be removed or the hoses disconnected from the regulators.

4.1.1 Refer to RRD-1323-000 for other equipment preparation recommendations.

4.2 Welding and Cutting General Requirements

If possible, equipment and piping that will be involved in any Hot Work must be:

a. Isolated and/or disconnected,

b. Cleaned, gas free, and tested, and

c. Vented to prevent over-pressurization.

If the equipment and piping cannot be cleaned and gas freed, cold cutting methods must be used for initial cuts so adequate atmospheric monitoring can be conducted to ensure the equipment/piping is gas free.

Welding on utility lines (e.g., steam, condensate, etc.) under pressure shall require all precautionary measures taken for similar work on oil and gas lines (e.g., in-service welds).

All welding and burning equipment (e.g., leads, grounds, hoses, cables, gauges, regulators, etc.) shall be visually inspected daily, and prior to hot work occurring, to ensure the equipment is in good working condition.

Every effort shall be made to locate weld machines outside of process and dike areas. Weld machines must also be positioned such that exhaust will not negatively impact the atmosphere of employee working areas and confined space entries.

Welding grounds shall be grounded as close to the work as possible. When welding on pumps, turbines, or compressors, to eliminate welding machine grounding through bearings or seals, the ground lead shall be adjacent to the work.

Every effort must be made to route leads and hoses overhead and/or out of walkways to prevent creating tripping hazards.

Hot Work on Used Containers and Out of Service Equipment: Hot Work shall not be performed on used drums, barrels, tanks, or other containers until they have been thoroughly cleaned to make sure there is no flammable materials present or any substances such as greases, tars, acids, or other materials that when subjected to heat , might produce flammable or toxic vapors. Any pipelines or connections to the drum or vessel shall be disconnected or blinded.

Special Precautions While Hot Work is in Progress: When performing Hot Work activities, the Servicing Group and Permit Writer shall take the following into consideration:

(a) Wind direction,

(b) Potential upstream hazards when performing Hot Work adjacent to drainage basins, separators, and open ditches,

(c) Other work activities in the adjacent area, and

(d) Sewers, oily water sumps, equipment, combustibles, personnel, etc. below, when performing Hot Work from an elevated location.

4.3 Blinding and Energy Isolation

Isolation of equipment shall be conducted in accordance with the site's energy isolation requirements.

4.4 Fire Suppression Equipment

Fire suppression equipment is required at all Attended Hot Worksites ready to be used in the event of an incipient fire.

The following is the minimum acceptable fire suppression equipment to be maintained at the site of the Hot Work activity:

a. 20lb. dry chemical fire extinguisher, or

b. Charged water hose, weather permitting, an additional attendant may be required at the discretion of the permit writer.

The Permit Writer can require additional fire protection based on the surrounding conditions and other fire risks. This additional fire protection may include:

a. 150lb. dry chemical fire extinguisher,

b. Multiple charged water hoses,

c. Multiple fire extinguishers

4.5 Ventilation

Adequate natural or mechanical ventilation shall be considered to reduce or eliminate the hazards of weld fumes. Any accumulation of gases must be vented to a safe location, away from the Hot Work.

Local exhaust ventilation is required for any welding or torch work conducted inside enclosed structures. Contact the site Industrial Hygienist to determine adequacy of the ventilation configuration.

4.6 Welding PPE

Welding and cutting activities will require additional Personal Protective Equipment (PPE). The Safe Work Permit must identify the additional PPE requirements. Examples of these additional PPE requirements include:

a. Respiratory protection for toxic metal fumes,

b. Correct shade of eye protection for welding and cutting operations (e.g., welding hoods, cutting goggles, etc.),

c. Welding gloves,

d. Face shield,

e. Welding leathers, and

f. Fall protection equipment.

Note: Welding hoods cannot be used for grinding unless they are approved for grinding operations.

4.7 Bolted Process Equipment and Hot Work

Spark producing Hot Work (e.g., torch cutting, grinder with a cut-off wheel, reciprocating saw) is sometimes required to remove bolts/studs on bolted connections of process equipment. In order to prevent the ignition of flammable or combustible vapors and liquids inside process equipment, the seal on the gasket of the process equipment must be maintained.

To ensure that the seal on the gasket is maintained during hot work removal of studs/nuts, at least four bolts must always be able to be removed via mechanical means (e.g., impact wrench, hand tools) for the final break on process equipment connections.

Four bolt flanges require a new bolt be replaced as each bolt is cut.

Notes:

1) On larger pieces of equipment with multiple bolts/studs more than four bolts may be required to maintain the gasket seal. The new bolts must be spaced adequately to maintain the gasket seal during Hot Work removal of the remaining bolts. Contact Engineering when unsure about the required gasket stress.
2) Refer to MPC Process Safety Advisory, PSA 13-08, on an industry event that resulted in fatalities while hot cutting bolts of a heat exchanger.

4.8 Special Hot Work Requirements for Aboveground Storage Tanks (ASTs)

Because of the unique hazards of conducting Hot Work on ASTs the following additional requirements must be taken into consideration on top of the normal Hot Work items identified on the Safe Work Permit. This section applies to out-of-service ASTs undergoing maintenance and turnaround activities. The safety plan for AST work must, at a minimum, address the following, where applicable:

AST Floor Hazard Assessment:

Hydrocarbons of other previously stored flammable materials may be present under AST floors which need repair. This is more probable if there has been a breach in the floor. Prior to cutting the floor with an open flame, the Servicing Group shall take appropriate precautions to ensure that flammables are not present under the AST floor. Refer to **API RP 2207**.

The AST must be checked for the presence of a double bottom or sketch plates welded to the perimeter of the AST. Where this condition exists, refer to the precautions outlined in **API RP 2207.**

The floor area must be inspected to ensure that patch plates were not used to cover old water draw or process sumps. Where these areas are suspected, holes should be drilled in the floor to verify there is no product under the patch plate.

AST Shell Hazard Assessment:

AST shell surface must be inspected for the presence of product residue, wax, ignitable rust or scale in the areas where hot work may be performed.

Historically, equipment in contact with amines, hydrogen fluoride or “sour” (hydrogen sulfide containing) materials has been susceptible to hydrogen blistering. This occurs more often in areas which have been welded. If the AST contained one of these products or if hydrogen blistering is suspected for any other reason, an evaluation by a qualified person (e.g., metallurgist) must be included in the determination of whether it is safe to perform hot work.

AST Roof Structure Hazard Assessment:

Verify that product residue is not present on the upper surfaces of the roof rafter.

Some ASTs were constructed using piping as structural support columns. Where this is the case, verify that mouse holes were cut at the base of the columns so they can be free draining.

AST Floating Roof Hazard Assessment:

Deck:

a. The underside of the floating roof must be inspected for the presence of product residue, wax, ignitable rust or scale in the areas where hot work could be performed.

b. The floating roof must be inspected to verify there are no pockets of hydrocarbon that could be trapped between the deck’s plates due to the underside of the floating roof being seal welded.

Seals:

a. If the AST is equipped with either a primary or secondary resilient urethane foam log, it must be removed or protected from hot sparks prior to hot work being performed in the area. These seals can leak and trap hydrocarbon.

b. Mechanical shoe-type seals need to be inspected for liquids and must be cleaned prior to hot work being performed in the area. The area between the top side of the primary fabric and the bottom side of the secondary seal fabric or underside of wiper must be clean. Outer rim plates, shoe seals, springs and other seal hardware must be clean and vapor free prior to any hot work activity.

Pontoon & Double Decks:

All deck and pontoon covers must be opened and each compartment free of hydrocarbon, ignitable rust, scale or wax, prior to any Attended Hot Work on or near the float roof.

Floating Roof Deck Penetrations:

a. All leg sleeves, vacuum breaker sleeves, gauge wells, column and ladder wells must be inspected for cleanliness and verified that they are hydrocarbon free.

b. Floating roof and vacuum breaker legs can hold product. Prior to hot work, each leg must be cleaned and free draining.

c. Gauge poles must be inspected to verify that they are free draining and clear of wax, product residue and scale.

AST Nozzle and Piping Hazard Assessment:

a. Verify that jet and internal distributors are clean and both vapor and liquid free.

b. Foam lines must be checked for hydrocarbons. The frangible diaphragms often break allowing for product vapor to leak from the ASTs.

c. Skimmer and drain piping must be drained, cleaned and gas free prior to performing hot work.

Hazard Assessment for Areas Adjacent to ASTs:

a. Tank dike must be free of combustible materials that could be affected by the Hot Work.

b. Process valve bonnets and flanges located in the tank dike must be checked for leakage.

c. All drain and vent valves located in the tank dike must be inspected to ensure there is a plug installed.

d. The ground around the AST must be inspected to check for the possibility of an underground line leak.

4.9 Hot Work Authorization

Prior to any hot work, the Hot Work section of the Safe Work Permit must be completed.

Welding, cutting, and grinding on vehicles not in shops or approved fabrication areas requires a Safe Work Permit with hot work authorization.

For hot work tasks performed by the owning department:

a. The operator performing the hot work task shall sign as the “MPC Maintenance Representative”

b. A separate qualified hot-work permit writer shall sign as the “MPC Operator”.

Hot-tap paperwork must be completed in addition to the Safe Work Permit with hot work authorization prior to hot tapping, stoppling, or in-service welding being performed. For minimum requirements, see HS-SWI-039 *Hot Tap Stopple Welding Grinding on Live Equipment*.

4.10 Atmospheric Testing/Monitoring

Initial testing and any re-testing shall be performed in an area that:

a. Provides a representative sample of personnel’s breathing zone

b. Reflects the conditions of the work activities. Be completed after all blinding, disconnecting, purging, steaming and other

preparatory work has been completed, and in a short a time as possible before hot work is started.

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

The work area will be tested for flammable vapors using a properly calibrated combustible gas testing device. The area or equipment must test 0% of the lower explosive limit (LEL) and the results must be recorded on the permit.

NOTE: Hot work can be performed up to 10% LEL with the completion of an Elevated Hot Work Approval Form. If the concentration exceeds 0% LEL, the source of the flammable vapors and the control strategy must be described on the variance. The use of steam, nitrogen, CO_2 or other means of keeping the immediate work area out of the flammable range must be approved by the owning department.

Reference: See RSP-1715-000-FORM1 (see Appendix A) for an example form to be used prior to Hot Work in atmospheres up to 10% LEL, in order to capture the required information.

Flammable gas testing shall be performed within 2 hours prior to the start of hot work. When hot work is not started within 2 hours of the time the gas tests were taken, another test must be made and recorded on the field copy of the permit.

Additional tests must be made and documented on the permit at least midway through the permitted duration of the job after the permit has been issued and more frequently if there is any doubt that conditions may foreseeably change. Mid-shift gas testing is not required on jobs permitted for a duration of four hours or less. Mid-shift gas testing by the permit writer is still required even when continuous monitoring is conducted

The work area or equipment must be retested for flammable vapors after a change in conditions or upon request.

Continuous monitoring may be required at the discretion of the permit writer. Continuous monitoring is required for all attended hot work performed within 35ft. of live process equipment.

As a minimum, the atmospheric monitoring equipment must use a calibrated/bump tested combustible gas indicator to determine oxygen and flammable vapor concentrations before hot work is started.

Note: Ensure there is adequate atmospheric oxygen inside the monitoring area, per the manufacturer's recommendation, for correct operation of the combustible gas indicator.

In units where an emergency occurred, additional gas tests are required and the servicing group and owning dept must sign the work extension signature section of the permit.

4.11 Shields, Guards and Curtains for Containing Heat and Sparks

Stray sparks from Hot Work activities create a major fire risk in a refinery. Every effort must be made to contain sparks as best as practicable to prevent fires from Hot Work.

The following minimum requirements must be implemented:

a. Remove or cover any combustible material within 35 feet of the Hot Work.

b. Seal all sewers and manholes within 35 feet of the Hot Work site to prevent emission of flammable vapors from the sewer and conduct appropriate atmospheric monitoring to verify.

c. Construct spark containments of fire blankets and/or fire-resistant tarps to prevent sparks and slag from impacting live process equipment or other areas where flammable vapors or liquids could accumulate.

d. Prevent or mitigate emissions of flammable vapors from tank vents, pit vents, oily water sumps, and seal/packing vents on pumps/compressors within 35 feet of Hot Work and conduct the appropriate atmospheric monitoring to verify.

e. Bystanders must be protected from potential welding arcs either by the use of shields or other equally effective methods.

Note: Welding and cutting shall not be performed if fire hazards cannot be moved and guards cannot be used to protect immovable fire hazards.

4.12 Vehicle Access Restrictions

During critical modes of operation (i.e., startup, shutdown), vehicle access around the immediate perimeter of such units may be limited to mitigate the potential risk of vehicular ignition sources in the event of an unanticipated hydrocarbon release.

d. The Owning Department be responsible for employing/deploying the physical barricades and/ or signage of such perimeters.

e. If a vehicle must travel within the confines of the perimeter. The Owning Department must be notified prior to entry into the area.

5 TRAINING

5.1 Fire Watch Training

5.1.1 Fire watches must be trained to perform their assigned duties as required in this SWI. The use of portable pumps to pump hydrocarbons must be managed to control potential ignition sources, releases, and fires.

6 SPECIAL CONSIDERATIONS

6.1 General

6.1.1 Intrinsically-safe cell phones, phones in intrinsically-safe cases, and/or cell phones in the MPC approved and etched cases are allowed to be used in the refinery to conduct company business.

6.1.2 When non-explosion proof/non-intrinsically safe portable equipment (e.g., a camera or thickness meter) will be used at multiple locations within an operator's area of responsibility, a single hot-work permit shall be written, and the user may, at the permit writer's discretion, continuously monitor flammable gas with a combustible gas meter (MX6, area monitor, 5 gas meter, etc.). The use of portable pumps to pump hydrocarbons must be managed to control potential ignition sources, releases, and fires.

6.2 Temporary Portable Pumps

The use of portable pumps to pump hydrocarbons must be managed to control potential ignition sources, releases, and fires.

The Management-of-Change procedure must be completed prior to the start-up of any non-intrinsically safe portable pump used to pump hydrocarbons inside tank dikes or unit battery limits.

If a site MOC is used, it must contain, at a minimum, the following:

a. MOC duration,

b. Product and pump specifications,

c. Hazard review,

d. Approvals,

e. Implementation actions, and

f. Pre-startup safety review (PSSR).

Temporary non-intrinsically safe pumps used to pump hydrocarbons that are located inside tank dikes or unit battery limits must be manned at all times while in operation and equipped with a remote shutdown device (e.g., lanyard, electronic shutoff, disconnect switch, fuel shutoff valve, etc.).

Reference: Refer to MPC Process Safety Advisory, PSA 16-02

7 PROGRAM REVIEW

7.1 Procedure Review

The Safety Practice will be reviewed every 3 years.

8 REVIEW AND REVISION HISTORY

8.1 History of Revisions

Revision History

Revision	Date	Change Author	Reason for Change
1.0			Original Issue

9 APPENDIX A- ELEVATED LEL HOT WORK APPROVAL FORM

The following is the Elevated LEL Hot Work Approval Form (RSP-1715-000-FORM1).

Elevated LEL Hot Work Approval Form

(RSP-1715-000-FORM1)

Company Performing Work: _____

Date: _____ Time: _____ Area/Unit: _____ Permit No.: _____

Hot Work to be Completed: _____

_____

Describe the Source of the Flammable Vapors: _____

_____

_____

_____

_____

Justification to Complete the Hot Work at Increased LEL: _____

_____

_____

_____

_____

Additional Control Procedures Required to Complete the Hot Work Safely: _____

_____

_____

_____

_____

Conditions When the Hot Work Must be Stopped: _____

_____

_____

_____

_____

_____ _____

Maintenance Manager Safety Supervisor

10 FREE BURN AREA MAP