



## 1 Purpose:

To establish a fire prevention permit procedure for working safely with welding, burning, spark producing or open flame-producing equipment referred to in the following document as “Hot Work”.

## 2 Scope:

2.1 To provide communications between operations and maintenance/contract personnel involved, regarding the safety of the jobsite conditions, including the potential hazards and safety information while performing Hot Work.

2.2 **A Hot Work Permit must be used to control all Hot Work performed on Westlake property, except for the following:**

2.2.1 Permanent designated shop locations

2.2.2 Temporary fabricating areas may be treated as permanent designated shop locations by means of evaluation and mutual agreement between the Operations Supervisor, Field Engineering and the Safety Department.

## 3 Definitions

**Affected Employee-** Employees impacted by the performance of permitted work which may include hot work

**Authorized employee-** Employees trained and authorized to perform permitted work in the plant

**Class 1 Hazardous Locations-** Flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

- **Division I-** Ignitable concentrations of flammable gases or vapors may exist under normal operating conditions, exist frequently due to repair, maintenance operations, leakage or be released as a result of breakdown or faulty operation of equipment and simultaneous failure of electrical equipment.
- **Division II-** Locations where flammable gases and liquids are handled, processed or used but will normally be protected by mechanical ventilation or a closed system in which they can only escape in the event of an accidental breakdown, rupture or abnormal operation, locations adjacent to Division I areas where flammables may occasionally exist unless prevented by clean air ventilation and effective safeguards.



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**Class 2 Hazardous Locations-** Combustible dust is or may be present

- **Division I-** Locations where combustible dust is or may be suspended in the air under normal conditions in quantities sufficient enough to cause explosions or ignitable mixtures, where mechanical failure or abnormal operation of machinery may produce such explosions or ignitable mixtures or where combustible dust of an electrically conductive nature may be present.
- **Division II-** Locations where combustible dust will not normally be suspended in the air in quantities sufficient to produce explosions or ignitable mixtures, dust accumulation will normally be insufficient to interfere with the normal operation of electrical equipment, combustible dust may be suspended in the air as a result of infrequent malfunctioning or handling of process equipment

**Combustible Dust-** particulate solid that will burn violently when suspended in air over a range of concentrations, regardless of particle size or shape. Note: any “material that will burn in air” in a solid form can be explosive when in a finely divided form as a powder or dust.

**Combustible Material-** Capable of reacting with oxygen and burning if ignited. Examples include oil, paper, various chemicals products, wood, plastic, textile fibers such as carpet and cardboard.

**Designated Hot Work Area-** A permanent or temporary non-hazardous location designed or approved for hot work operations without a hot work permit. Examples: Maintenance shops or fab areas.

**Equipment Owner-** The person assigned to an area / department that normally controls and operates the equipment.

**Fire Watch** – An individual assigned, trained and qualified to monitor and observe hot work activities. Aid in preparing work area for hot work, take necessary action(s) to prevent and control sparks caused by hot work and fighting incipient fires caused by hot work activities. The fire watch would also contact operations in the event of a fire.

**Flammable Atmosphere-** A mixture of dangerous substances with air, under atmospheric conditions, in the form of gases, vapors, mist or dust which are ignitable and after ignition has occurred, combustion spreads to the entire unburned mixture.



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**Hot Tap-** The technique of attaching a welded branch fitting to piping or equipment as it remains in service, and then creating an opening in that piping or equipment by drilling or cutting a portion of the piping or equipment within the attached fitting. Hot Tapping by definition involves Hot Work on equipment “in service”

**Hot Work-** Any operation that can produce a spark, arc or flame hot enough to cause the ignition of ordinary combustible materials, combustible dusts, flammable gasses or vapors. Examples of hot work include welding & cutting, burning, resistance welding, soldering, brazing, torch applied roofing, grinding, abrasive wheel cutting, servicing of electrical equipment capable of producing sparks or other operations that are capable of initiating fires or explosions.

**Combustion Engines-** requirements for staged combustion engine equipment in process units permitted to operate in one area and having the potential to become an ignition source.

**Vehicle Entry Only-** requirements for vehicles entering process units with the potential to become an ignition source.

**Power Tools Only-** Ignition source requirements for the use of electrical or pneumatic tools not approved for Class I, Division II areas

**Incipient Fire** – The initial or beginning stage of a fire, which can be controlled or extinguished by portable fire extinguishers, Class II standpipe or small hose systems without the need for protective clothing or breathing apparatus.

**Lower Explosive Limit (LEL)** - The lower limit of flammability of a gas or vapor at ordinary ambient temperatures expressed in a percent of the gas or vapor in air by volume. For the purposes of this procedure, the %LEL limit for hot work permit authorization is 0.0% LEL. A variance must be obtained prior to conducting work with readings above 0.0% LEL.

**PED (Portable Electronic Device)** - Any battery operated device with a battery larger than a button that has the potential to create a spark when the battery is removed or is in use.

**General Work Permit** is a multifaceted safety planning tool to ensure that necessary safety precautions have been addressed prior to beginning work on site.

**The Hot Work** permit is used to authorize Hot Work.



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**Spark Producing Operations-** Any activity that produces or has the potential to produce sparks, such as, but not limited to welding, brazing, soldering, torch or arc gouging, cutting, grinding, sandblasting, and the use of power tools. Department supervision should consider the possibility of sparks resulting from scraping, hammering, pneumatic tools and other operations, and the advisability of obtaining a hot work permit to cover such work.

**Welding blanket/curtain-** A heat-resistant fabric designed to be placed in the vicinity of a hot work operation with light moderate exposures such as that resulting from chipping, grinding, heat treating, sand blasting, and light welding. Designed to protect machinery and prevent ignition of combustible materials such as wood that are located adjacent to the underside of the blanket.

**Welding Pad-**A heat-resistant fabric designed to be placed directly under a hot work operation such as welding and cutting. It is intended for use in horizontal applications with severe exposures such as that resulting from molten substances or heavy horizontal welding designed to prevent the ignition of combustible materials that are located adjacent to the underside of the pad.

#### **4 Responsibilities:**

- 4.1 The Hot Work Permit will be issued by the Operator or the equipment owner in situations when the equipment to be worked on falls outside of an operating unit. ***Permit is issued for equipment that is used in welding, burning, grinding or produces an open flame. Requires testing with a combustible gas meter.***
- 4.2 The permit issuer will use the hot work permit as a guide to prepare the area for Hot Work.
- 4.3 ***All combustible materials should be removed from the area within 35 feet of the hot work operation. This may involve appropriate measures (sweeping, hosing down, etc.) To assure combustibles will not be ignited.*** If easily ignitable combustibles cannot be removed, the area and / or combustibles must be wetted and/or covered with a fire blanket. Welding or cutting in flammable process units requires watering sparks and slag. **Note: In the event that the area is wetted down, personnel operating the arc welding or cutting, shall be protected from possible shock.**



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- 4.4 The Maintenance Foreman or Contractor Supervisor will be responsible to ensure that precautions have been taken as outlined on the permit and will provide verbal job safety instructions to the employees.
- 4.5 When hot work is to be performed by Contract employees the Contractor's Supervisor will be the requester, sign the permit, and serve as supervisor for the work.
- 4.6 The employees working under the permit are responsible to follow the precautions listed on the permit and ask questions to clarify any misunderstandings.
- 4.7 The paper copy of the permit will be kept in a prominent location in the control room while the permit is *active*. In the event of a unit upset, the permit will serve as a reference for work being performed in the unit. The field cardboard copy of the permit will be issued to the craftsmen performing the work and will be placed in *the possession of the person performing the work, fire watch or the welding machine or equipment being used*.
- 4.8 The **employees** working under the permit are responsible for notifying *their supervisor, who will notify the* issuer (Operations, Field Engineer) at the completion of the job, if the job needs to be revalidated, or at the expiration of the permit. *They will return the permit to their supervisor at the end of the job or expiration of the permit.*
- 4.9 The field copy of the permit *will* be returned to the issuer/equipment owner *by the supervisor* when it is *no longer needed, permit "Time" has expired or upon completion of the job.*
- 4.10 The issuing equipment owner/control room will keep the permits **for seven days**, per Works Managers Retention letter. EDMS #4301- 06-309.
- 4.11 Operations Representatives
- 4.11.1. Control the issuance of permits for work located in their assigned areas.
- 4.11.2 Complete permit requirements assigned to Operations or persons functioning as required.



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4.11.3 Do not issue permits when unsafe conditions exist, or adequate mutual understanding has not taken place.

#### 4.12 Maintenance/Contractor Representatives

4.12.1 Complete permit requirements assigned to Maintenance or persons functioning as required. (I.e. covering sewer openings and trenches)

4.12.2 Account for safety requirements during the planning process by providing verbal job safety instructions before beginning work.

4.12.3 Do not accept permits when unsafe conditions exist, or adequate mutual understanding has not taken place.

#### 4.13 Safety Department

4.13.1 Review written program and requirements for updating as needed.

#### 4.14 Training Department

4.14.1 Ensure documented qualifications for Operations Representatives are maintained for employees who issue Hot Work permits

4.14.2 Ensure employees are properly trained in the Hot Work procedure as needed meet requirement.

### 5 **Issuance of Hot work permit:**

5.1 **Hot work can only be permitted when the area is free of combustible and or flammable materials and atmospheric monitoring is within acceptable ranges. If this cannot be accomplished the hot work must be relocated outside the electrically classified or process area to a designated work area.**

- i. Eliminate ignition sources by selecting alternative work methods, equipment or moving the location of the hot work to a non-hazardous location
- ii. Implement safeguards and controls (examples - fire blankets, enclosures and wetting or cleaning surfaces)



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- 5.2 For any Hot Work permit, if there are any doubts if conditions are safe by anyone authorized to sign the hot work permit, they should withhold the issuance of the permit and consult with the safety department. It is the responsibility of anyone who becomes aware of changes in the conditions which might cause fire, exposure to gases or any other unsafe conditions to halt work immediately and notify the **Operations Representative that issued the permit and their supervisor.**
- 5.3 After the Hot Work permit is issued, changes in the scope of work will require a new permit to be issued for the job. Any minor additions such as changes to hazards or PPE shall be initiated by the Operations Representative that issued the permit **and** the Maintenance Representative on the permit. Initial on the permit at the location change was made. **No Verbal changes are allowed.** The Maintenance Representative must review the changes with all workers covered by the permit.

## 6. Requirements for hot work.

- 6.1 A fire watch who shall not be assigned any other duties.
- 6.2 Continuous atmospheric monitoring shall be required for the duration of the hot work activity.
- 6.3 All hot work will be conducted following OSHA's 29CFR 1910.252 "Welding, Cutting and brazing."

**Other requirements in Derivatives, South Terminal, Powerhouses and shipping (Chlorine and Caustic Production areas will follow sections 7-9 unless their Class I Div. II areas are clearly marked).**

## 7. **Ignition Source** (Combustion Engines)

- 7.1 Combustion engine equipment must meet all the requirements of "Hot Work (Vehicle Entry Only)"
- 7.2 Examples include: Portable gasoline, diesel or electric pumps, powered compressors, light plants, etc.
- 7.3 Combustion equipment must only be operated in the area for which it has been permitted
- 7.4 **Passive gas monitor required**



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**8. Ignition Source (Vehicle Entry Only)**

- 8.1 The ignition source portion of the General Work Permit will be filled out for all vehicles and other internal combustion engine-driven equipment taken into an operating unit. (Example: trucks, forklifts, golf carts portable gasoline, diesel or electric pumps, powered compressors, light plants, etc.)
- 8.2 A combustible gas check of the area in which the vehicle entry will be used must be conducted and the readings documented on the general work permit.
- 8.3 Fixed point monitors or other means shall be used to verify conditions on an established frequency where the potential for flammable vapors has been determined based on a hazard analysis. A fire watch shall not be required.

**9. Ignition Source (Power Tools Only)**

- 9.1 Work requiring the use of electrical or pneumatic power tools that are not approved for Class I Division II areas (Drills, circular saw, sandblasting equipment, needle gun, jackhammer, cold cut band saw, etc.) must have the ignition source portion of the General Work Permit filled out.
- 9.2 A combustible gas check of the area in which **power tools** will be used must be conducted and the readings documented on the general work permit.
- 9.3 Ignition Source for Power Tools Only will not require the use of a fire watch unless sparks are produced which cannot be controlled. An approved fire extinguisher must be obtained and located at the job site. Emergency fire extinguishers located throughout unit cannot be used to meet this requirement.

- 10. Ignition Source** Portable Electronic Devices (PED) will follow the same requirements of “Power Tools Only” work with the exception of the requirement to obtain an approved fire extinguisher. If the device is powered off and remains off while in the unit a hot work permit will not be required.





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11. **The acceptable atmospheric air monitoring ranges for Hot Work Permitting must be in the following ranges:**
  - 11.1. **Oxygen – Must be in the range between 19.5% and 23.5%**
  - 11.2 **LEL – 0%**
12. If the LEL is greater than 0.0% hot work permitting must be approved by the Department Manager and Safety Department. In no case will a permit be issued when meter readings of 10%LEL or greater are obtained. Note: A false reading can exist due to the presence of an inert gas like nitrogen or argon. A sufficient amount of oxygen must be present to give an accurate LEL reading. In most meters this is 16% oxygen, see manufacturer's instructions.
13. Toxicity – 0% if potential for toxins exists during hot work.
14. The permit issuer will verify, evaluate, and utilize a combustible gas detector to test the work to be conducted with the ***person doing the work or his supervisor.***
15. The issuer will survey the work location to verify that conditions meet acceptable permit requirements. (See permit) ***No Hot Work will be performed in buildings and operating units where the sprinkler system is impaired unless a backup system has been installed by Shift Safety and /or our sprinkler maintenance contractor.***
16. For Hot Work, the issuer will examine the work area for combustible materials visually (oil, grease, diesel, etc) and with an approved LEL/O2 instrument.

**Note:**

- The meter must be tested in a safe atmosphere for proper operation and calibration prior to each use.
- Check calibration date on the instrument prior to use.
- The issuer must be trained in the use of the LEL/O2 instrument used to test the atmosphere.
- The issuer will complete the permit and review it with the requester. Paper copy will be kept by the Owner/Control Room and the Cardboard copy will go to the job.



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- At the completion of the work, the owner/issuer will be notified. The hot work permit should not be closed until 30 minutes following the hot work activities. **Notification will be accomplished by returning cardboard copy to the Owner/issuer. The Hot Work Permit shall be kept on file (i.e. control room) until completion of the work.**
- A Hot Work Permit should be issued only when all preparations are made and the hot work is ready to commence. The issuer specifies the start time and expiration time of the Permit.
- Following any break in continuity of the job, **meaning no hot work is being performed, of 30 minutes or greater** such as, time spent in shops on fabrication, lunch, etc. The area must be retested to confirm atmospheric monitoring is within acceptable ranges. The results will be documented on the permit in the Results/Time section of the field copy.
- All permits will be voided and new permits issued after a unit upset.
- Hot Work Permits are generally written to coincide with the current operational shift. The permit duration is 12 hours. **It may be extended up to 2 hrs to accommodate completion of a job provided that the same personnel are involved. Permit may be issued on one shift and carry over to the second shift provided the same personnel are involved.**

#### 17. Special Cases:

- If “hot work” is to be done on a piece of process equipment entirely in a designated shop location and the equipment is free from flammable materials, the Equipment owner will issue the initial permit to assure safe working conditions. Additional permits are not required.

#### 18. General:

- When performing Hot Work near sewer openings or trenches **anywhere in the complex**, they must be evaluated for flammable atmospheres and covered and sealed.
- When performing Hot Work near combustible walls, partitions, ceiling or roof of combustible materials, fire resistive shields or guards shall be provided to prevent ignition.



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- When performing Hot Work on metal (noncombustible) wall, partition, pipes, ceiling or roof, precautions shall be taken to prevent ignition of combustibles on the other side, due to conduction or radiation. This can be done by removing the combustibles or providing fire resistive shielding **and** placing a fire watch on the side of the combustibles.
- When performing Hot Work on, near or above a cable tray containing plastic instrument tubing and/or exposed electrical wiring, requires the exposed area to be adequately covered with fire blankets to prevent damage to lines.
- When performing Hot Work overhead, the area below shall be barricaded or a watch posted to alert personnel.
- Isolating and clearing must be performed when Hot Work is being performed on process lines or vessels that may contain (or have contained) a flammable or explosive material **(including well water)**. Installation of blinds is the preferred method of control. Removal of spool pieces or similar procedures which will provide equivalent protection is acceptable. All valves controlling flows to and from the work shall be closed and locked with bleed valves open and locked.
- When welding or cutting on used containers (drums, barrels, tanks, etc.), shall be cleaned thoroughly as to make absolutely certain that there are no flammable materials present. Any pipes or connections shall be disconnected or blanked. All containers shall be vented to permit the escape of air or gases before preheating, cutting or welding. Purging with an inert gas is recommended.
- Oxygen gas must be protected from oil, grease and fuel. Cylinders, hoses, regulators and torches must be clean and oil-free.
- Appropriate PPE must be worn for any Hot Work activity performed.
- In the event of Hot Work in areas with combustible dust atmospheres or storage of large quantities of exposed, readily ignitable materials such as bulk sulfur, baled paper or cotton, consult with safety department for guidance.



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## 19. DESIGNATED SHOP AREAS:

Welding and Burning Permits are not required in designated shop areas, except for process-contaminated equipment as provided in the section "Special Cases" of this procedure.

These designated shop areas are listed below. Changes in this listing can be made when an Area Supervisor or Maintenance Foreman of the affected area makes requests to the Manager of Safety for specific additions or deletions:

### CHLOR/ALKALI "A"

- Powerhouse "A" Maintenance
- Riverside Powerhouse Maintenance Shop
- 'A' Chlorine Maintenance Shop
- 'A' Chlorine Electrolyzer Repair Shop
- North Liquefaction Maintenance Shop
- South Liquefaction Maintenance Shop
- 'A' Caustic Maintenance Shop
- Pels Maintenance Shop
- Mercury Cell Pipe Fabrication Shop
- Riggers Loft
- Carpenter Shop (Including Scaffold Storage Areas)
- Garage (Includes Equipment Parking Areas South, East, and West of the Garage and Service Building)
- Yard Maintenance Shop (South of Garage - Old Chlorate Maintenance)
- Machine Shop (Includes Cathode Repair Shop and Swing Crew Fab).
- Electric Shop
- Instrument Shop
- Salvage Yard
- Tank Car Repair Shop
- Construction Fabrication Shop (Northwest of Riverside Power)
- Membrane Anode shop (West end)
- Shipping Cylinder Building Maintenance Shop
- Shrink-wrap machine at PELS

### DERIVATIVES

- Per/Tri Shop
- WTU Shop
- EDC Shop
- Tri-Ethane II Shop
- PHH Shop
- Construction Fabrication Shop (Northwest of Derivatives Carpenter)



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Shop)

**CHLOR/ALKALI “C”**

Shop C  
Electrolyzer Repair Shop  
“C” Chlorine Maintenance Shop  
“C” Power Maintenance Shop “C”  
Caustic Maintenance Shop  
Construction Fabrication Area (along West fence line)

**Brine Fields**

*Contractors Maintenance Shop at Sulphur Field  
Starks Control Maintenance Shop*

Plant Sandblast yards are not exempt and will require a hot work permit for welding and burning in these areas.

**20. Hot Work in Confined Spaces:**

- 20.1 When arc welding is suspended for any substantial period of time, such as lunch or overnight, all electrodes shall be removed from the holders and the holders carefully located so that accidental contact cannot occur and the machine shall be switched to the off position.
- 20.2 All welding and cutting operations inside a confined space shall be adequately vented to prevent accumulation of toxic materials or possible oxygen deficiencies.
- 20.3 No gas cylinders are allowed inside any confined space. This does not apply to supply breathing air cylinders.
- 20.4 For elimination of possible fire in enclosed/confined spaces as a result of gas escaping through leaking or improperly closed torch valves, the gas supply to the torch shall be positively shut off at some point outside the confined space whenever the torch is not being used or whenever the torch is left unattended for substantial period of time, such as during lunch period. Overnight and at the change of shifts, the torch and hose shall be removed from the confined space. Open end fuel gas and oxygen hoses shall be immediately removed from the enclosed spaces when they are disconnected from the torch or other gas consuming device.

**21. Fire Watch:**

- 21.1 Will be required when welding, burning, cutting, grinding, arc



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gouging and/or open flame torches are used.

- 21.2 Shall be trained to understand the inherent hazards of the work site and of the Hot Work activities.



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- 21.3 Will inspect the work area with the Maintenance/Contractor Supervisor for sources of combustible materials and ensure that safe conditions are maintained during the Hot Work operation.
- 21.4 Will participate in all Pre-job meetings with the permit Issuer, work crew and work crew supervisor.
- 21.5 The individual assigned as the fire watch cannot leave the area when hot work activities have started without the supervisor first assigning another trained person to relieve them.
- 21.6 Have the authority to stop the work if unsafe conditions develop.
- 21.7 Stay in constant communication with workers in the area.
- 21.8 Be familiar with the unit and procedures for sounding an alarm in the event of a fire.
- 21.9 Shall have fire-extinguishing equipment readily available and be trained in its use.
- 21.10 Shall remain at worksite for at least **30 minutes** after completion of any Hot Work activities to detect and extinguish smoldering fires.
- 21.11 Owners of areas that are not occupied 24/7 or monitored by guard tours, shift safety or other means, the need for a documented walkthrough of the area three hours after the Hot Work is completed should be based on the type and/or scope of the work.
- 21.12 **If sparks are not completely contained on the working level of a multi-level process unit, Area Safety or Shift Safety must evaluate the need for additional fire watch personnel on the lower levels.**