



# ***Don H. Mahaffey Drilling Co.***

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***HOT WORK***

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YOUR OSHA COMPLIANCE SOLUTION

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Questions? Call 1-800-734-3574



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## **1 OBJECTIVE**

The purpose of this program is to provide guidance for persons, including outside contractors, who manage, supervise and perform hot work operations. This program establishes written procedures and a permit system to prevent fires resulting from hot work operations involving open flames or operations that may produce heat or sparks.

## **2 PROGRAM ADMINISTRATOR**

Don H. Mahaffey Drilling Co. has designated Ashley Mahaffey Tullius as the administrator for this program. Ashley Mahaffey Tullius will be responsible for:

- a. Identifying work areas, processes or tasks that involve hot work;
- b. Selecting and implementing the appropriate hot work systems;
- c. Maintaining records pertaining to the program;
- d. Evaluating the program; and
- e. Updating the written program as needed.

## **3 HOT WORK, AN EXPLANATION OF**

Hot work covers any equipment or processes that can create a source of ignition such as intense heat, sparks or open flames. The following are examples of hot work.

### **3.1 Welding**

#### **3.1.1 Gas**

Metals joining process in which the ends of pieces to be joined are heated at their interface by producing coalescence with one or more gas flames (such as oxygen and acetylene), with or without the use of a filler material. Gas welding is slower and easier to control than arc welding.

#### **3.1.2 Arc**

A welding power supply is used to create an electric arc between an electrode and the base material to melt the metals at the welding point.

### **3.2 Metal Cutting**

#### **3.2.1 Oxyacetylene**

The initial combustion of the acetylene gas heats steel to a molten state. By adding a pressurized stream of oxygen, the cutter ignites the steel to burn through the kerf of your cut. This method of cutting is only used for steel and carbon steel. All other metals require a different method of cutting.

#### **3.2.2 Arc**

A process employing a consumable carbon or graphite electrode where metal is cut and melted by the heat of a carbon arc. The molten metal is then removed by a blast of air.

### **3.3 Brazing and Soldering**

Brazing and soldering are two methods of joining two metals by heating and melting a filler (alloy) that bonds to the two pieces of metal together. The filler has a melting temperature below that of the metal pieces to be joined. Brazing and soldering offer the capability of joining together of 2 different types of metal, unlike welding.

The difference between brazing and soldering centers around the melting point of the fillers used. The fillers used in soldering melt at below 840°F while the filler used in brazing melt at temperatures above 840°F.

## **4 MANAGEMENT AND SUPERVISOR RESPONSIBILITIES**

### **4.1 Management**

Management will recognize its responsibility for the safe usage of cutting and welding equipment on its property and:

- a. Based on fire potentials of plant facilities, establish areas for cutting and welding and establish procedures for cutting and welding in other areas;
- b. Designate a competent individual responsible for authorizing cutting and welding operations in areas not specifically designed for such purposes;
- c. Insist that cutters or welders and their supervisors are suitably trained in the safe operation of their equipment and the safe use of the process; and
- d. Advise all contractors about flammable materials or hazardous conditions of which they may not be aware.

### **4.2 Supervisor**

The supervisor will:

- a. Be responsible for the safe handling of the cutting or welding equipment and the safe use of the cutting or welding process;
- b. Determine the combustible materials and hazardous areas present or likely to be present in the work location;
- c. Protect combustibles from ignition by the following:
  1. Have the work moved to a location free from dangerous combustibles;
  2. If the work cannot be moved, have the combustibles moved to a safe distance from the work or have the combustibles properly shielded against ignition; and
  3. See that cutting and welding are so scheduled that plant operations that might expose combustibles to ignition are not started during cutting or welding;
- d. Secure authorization for the cutting or welding operations from the designated management representative;
- e. Determine that the cutter or welder secures his approval that conditions are safe before going ahead;
- f. Determine that fire protection and extinguishing equipment are properly located at the site; and
- g. Will ensure that fire watches are available at the site, when required.



## 5 PRE-WORK REQUIREMENTS

- 5.1 Before hot work is begun, it will be determined whether or not a source of ignition can be safely used. In locations where flammable vapors may be present, precautions will be taken to prevent ignition by eliminating or controlling sources of ignition. A source of ignition will not be introduced into an area until all of the following required actions have been completed.
- Tests for the presence of flammable gases and vapors will be made when the concentration of flammable gases or vapors may reasonably be expected to exceed 20% of the lower explosive limit (LEL). The tests will confirm that the concentration of flammable gases and vapors does not exceed 20% of the LEL;
  - Oil accumulations or other combustible materials will be removed or protected from ignition when present in exposed areas; and
  - The gauge valves will be closed and the gauges drained, or the gauge glasses will be guarded when gauge glasses contain flammable liquids, vapors or gases and are exposed to the spatter of molten metal.
- 5.2 A source of ignition will not be used where the concentration of flammable gases or vapors exceeds 20% of the LEL.

## 6 GAS WELDING AND CUTTING

### 6.1 Compressed Gas Cylinders

All compressed gas cylinders will:

- Have valve protection caps in place except when in use, hooked up or secured for movement. Oil will not be used to lubricate caps;
- Be hoisted only while secured, as on a cradle or pallet, and will not be hoisted by mallet, choker sling or cylinder caps;
- Have keys, handles or nonadjustable wrenches on valve stems on cylinders not having fixed hand wheels while these cylinders are in service. In multiple cylinder installations, only one key or hand is required for each manifold;
- When in portable service, be moved by suitable hand trucks to which they are securely fastened, or safely carried where job conditions require;
- Be moved only by tilting or rolling on their bottom edges;
- Be secured when moved by vehicle;
- Be secured in an upright position while in use;
- Have valves closed when cylinders are empty, being moved or stored;
- Be secured upright except when hoisted or carried;
- Not be freed when frozen by prying the valves or caps with bars or by hitting the valve with a tool;
- Not be thawed by boiling water;
- Not be exposed to spark, hot slag or flame;
- Be protected against undue absorption of heat;
- Not be permitted to become part of electrical circuits or have electrodes struck against them to strike arcs;
- Not be used as rollers or supports;
- Not have contents used for purposes not authorized by the supplier;
- Not be used if damaged or defective;
- Not have gases mixed within, except by gas suppliers;

- s. Be kept away from oil or grease. Cylinders, cylinder caps and valves, couplings, regulators, hoses and apparatus will be kept free from oil or greasy substances and will not be handled with oily hands or gloves. Oxygen will not be directed at oily surfaces, greasy clothes or within a fuel oil or other storage tank or vessel;
- t. Be stored and used with the valve end up;
- u. Be stored so that oxygen cylinders are separated from fuel gas cylinders and combustible materials by either a minimum distance of 20 feet or a barrier having a fire-resistance rating of 30 minutes; and
- v. Not have objects that might either damage the safety device or obstruct the valve placed on top of the cylinder when in use.

## 6.2 Use of Fuel Gas

Fuel gas will be used only as follows:

- a. No device or attachment facilitating or permitting mixture of air or oxygen with combustible gases prior to consumption, except at the burner or in a standard torch or blowpipe, will be allowed unless approved for the purpose;
- b. Backflow protection will be provided by an approved device that will prevent oxygen from flowing into the fuel-gas system or fuel from flowing into the oxygen system;
- c. Acetylene will not be generated or utilized at a pressure in excess of 15 pounds per square inch gauge pressure;
- d. The use of liquid acetylene is prohibited;
- e. Before regulators are connected to cylinder valves, the valves will be opened slightly (cracked) and closed immediately to clear away dust or dirt. Valves will not be cracked if gas could reach possible sources of ignition;
- f. Cylinder valves will be opened slowly to prevent regulator damage and will not be opened more than 1 1/2 turns. Any special wrench required for emergency closing will be positioned on the valve stem during cylinder use. For manifolded or coupled cylinders, at least one wrench will be immediately available. Nothing will be placed on top of a cylinder or associated parts when the cylinder is in use;
- g. Pressure-reducing regulators will be attached to cylinder valves when cylinders are supplying torches or devices equipped with shut-off valves;
- h. Cylinder valves will be closed and gas released from the regulator or manifold before regulators are removed;
- i. Oxygen will never be used from a cylinder or cylinder manifold unless a pressure-reducing device intended for use with oxygen, and is so marked, is provided;
- j. Acetylene will never be brought into contact with unalloyed copper except in a blowpipe or torch;
- k. Leaking fuel gas cylinder valves will be closed and the gland nut tightened. If the leak continues, the cylinder will be tagged, removed from service and moved to a location where the leak will not be hazardous. If a regulator attached to a valve stops a leak, the cylinder need not be removed from the workplace but will be tagged and may not be used again before it is repaired;
- l. If a plug or safety device leaks, the cylinder will be tagged, removed from service and moved to a location where the leak will not be hazardous;
- m. A dry chemical or carbon dioxide fire extinguisher rated at least 10 B:C will be kept near operations where bottled fuel gases are being used; and
- n. LP-Gas vessels will be kept in a position so that the safety relief valve is in direct contact with the vapor space in the vessel at all times.



### 6.3 Fuel Gas and Oxygen Hoses

Fuel gas and oxygen hoses will follow these guidelines:

- a. Hose piping systems, apparatus and fittings will not be used;
- b. Fuel gas and oxygen hoses will be easily distinguishable from each other by color or sense of touch. Oxygen and fuel hoses will not be interchangeable. Hoses having more than one gas passage will not be used;
- c. When oxygen and fuel gas hoses are taped together, not more than 4 of each 12 inches will be taped;
- d. Hoses will be inspected before each use. Hoses subjected to flashback or showing evidence of severe wear or damage will be tested to twice the normal working pressure, but not less than 200 p.s.i. before reuse. Defective hoses will not be used;
- e. Hose couplings will be of the type that cannot be unlocked or disconnected by means of a straight pull without rotary motion;
- f. Hose connections will be clamped or securely fastened to withstand twice the normal working pressure, but not less than 300 p.s.i. without leaking; and,
- g. Gas hose storage boxes will be ventilated;
- h. A single hose having more than 1 gas passage will not be used as a connection between torch and gas outlet if a wall failure would permit the flow of either gas into the other passage.
- i. Hoses used for liquefied petroleum gas, such as butane or propane, will be of, or lined with, materials that are resistant to the action of LP-gas. The will be designed for a bursting pressure of at least 1,250 p.s.i. and will be marked every 5 feet with the letters "LPG". Hoses over 1/2-inch diameter will also be marked with the manufacturer's name;
- j. The connection between fuel source and burner will be with extra heavy steel pipe (Schedule 80), flexible metallic tubing or hose suitable for the service, and where exposed will be protected against physical damage;
- k. When not in use, manifold and header hose connections will be capped. As used in this section, "manifold" means a device used to connect the outlets of one or more gas cylinders to a central piping system and "header" means a pipe or duct through which liquid or gas is conveyed and supplied to or received from multiple branches

### 6.4 Torches

- a. Torch tip openings will only be cleaned with devices designed for that purpose;
- b. Torches will be inspected before each use for leaking shut-off valves, hose couplings and tip connections. Torches with such defects will not be used;
- c. Torches will not be lighted from matches, cigarette lighters, other flames or hot work.

### 6.5 Pressure Regulatory

Pressure regulators, including associated gauges, will be maintained in safe working order.

## **6.6 Operational Precaution – Oil and Grease**

Oil or grease will not be permitted to come into contact with oxygen cylinders, valves, regulators or other fittings. Oxygen cylinders and apparatus will not be handled with oily hands or gloves or greasy materials. A jet of oxygen will not be permitted to strike an oily surface, greasy clothes or enter a fuel oil or other storage tank.

## **7 ARC WELDING AND CUTTING**

### **7.1 Manual Electrode Holders**

- a. Only manual electrode holders intended for arc welding and cutting and capable of handling the maximum current required for such welding or cutting will be used; and
- b. Current-carrying parts passing through those portions of the holder gripped by the user and through the outer surfaces of the jaws of the holder will be insulated against the maximum voltage to ground.

### **7.2 Welding Cables and Connectors**

- a. Arc welding and cutting cables will be insulated, flexible and capable of handling the maximum current required by the operations, taking into account the duty cycles;
- b. Only cable free from repair or splice for 10 feet from the electrode holder will be used unless insulated connectors or splices with insulating quality equal to that of the cable are provided;
- c. When a cable other than the lead mentioned in Section 7.2(b) wears and exposes bare conductors, the portion exposed will not be used until it is protected by insulation equivalent in performance capacity to the original;
- d. Insulated connectors of equivalent capacity will be used for connecting or splicing cable. Cable lugs, where used as connectors will provide electrical contact. Exposed metal parts will be insulated.

### **7.3 Ground Returns and Machine Grounding**

- a. Ground return cables will have current-carrying capacity equal to, or exceeding, the total maximum output capacities of the welding or cutting units served;
- b. Structures or pipelines, other than those containing gases or flammable liquids or conduits containing electrical circuits, may be used in the ground return circuit if their current-carrying capacity equals or exceeds the total maximum output capacities of the welding or cutting units served;
- c. Structures or pipelines forming a temporary ground return circuit will have electrical contact at all joints. Arcs, sparks or heat at any point in the circuit will cause rejection as a ground circuit;
- d. Structures or pipelines acting continuously as ground return circuits will have joints bonded and maintained to ensure that no electrolysis or fire hazard exists;
- e. Arc welding and cutting machine frames will be grounded, either through a third wire in the cable containing the circuit conductor or through a separate wire at the source of the current. Grounding circuits will have resistance low enough to

- permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current; and
- f. Ground connections will be mechanically and electrically adequate to carry the current.

#### **7.4 Additional Requirements**

- a. When electrode holders are left unattended, electrodes will be removed and holders placed to prevent employee injury;
- b. Hot electrode holders will not be dipped in water;
- c. When arc welders or cutters leave or stop work, or when machines are moved, the power supply switch will be kept in the off position;
- d. Arc welding or cutting equipment having a functional defect will not be used;
- e. Arc welding and cutting operations will be separated from other operations by shields, screens or curtains to protect employees in the vicinity from the direct rays and sparks of the arcs;
- f. Employees in areas not protected from the arc by screening will be protected by appropriate filter lenses in accordance with Section 12. When welders are exposed to their own arc or to each other's arc, they will wear filter lenses complying with the requirement of Section 12;
- g. The control apparatus of arc welding machines will be enclosed, except for operating wheels, levers and handles;
- h. Input power terminals, top change devices and live metal parts connected to input circuits will be enclosed and accessible only by means of insulated tools;
- i. When arc welding is performed in wet or high-humidity conditions, employees will use additional protection, such as rubber pads or boots, against electric shock.

#### **7.5 Inert-Gas Metal-Arc Welding**

Employees will not engage in, and will not be exposed to, the inert-gas metal welding process unless the following precautions are taken:

- a. Chlorinated solvents will not be used within 200 feet of the exposed arc. Surfaces prepared with chlorinated solvents will be thoroughly dry before welding is performed on them;
- b. Employees exposed to radiation will have their skin covered completely to prevent ultraviolet burns and damage. Helmets and hand shields will not have leaks, openings or highly reflective surfaces; and
- c. Inert-gas metal-arc welding on stainless steel will not be performed unless exposed employees are protected either by local exhaust ventilation or by wearing supplied air respirators.

### **8 WELDING, CUTTING OR HEATING OF TOXIC MATERIALS**

#### **8.1 General Precautions**

- 8.1.1 Before welding, cutting or heating is commenced on any surface covered by a preservative coating of unknown flammability, a test will be made by a qualified person to determine its flammability.

- 8.1.2 Precautions will be taken to prevent ignition of highly flammable hardened preservative coatings. When coatings are determined to be highly flammable, they will be stripped from the area to be heated to prevent ignition.
- 8.1.3 Surfaces covered with preservative coatings will be stripped for at least 4 inches from the area of heat application or employees will be protected by supplied air respirators in accordance with the requirements of OSHA Standard 1910.134 (Personal Protective Equipment, Respiratory Protection).

## **8.2 Fluorine Compounds**

- 8.2.1 General  
In confined spaces, welding or cutting involving fluxes, coverings or other materials which contain fluorine compounds will be done in accordance with Section 11.2. A fluorine compound is one that contains fluorine, as an element in chemical combination, not as a free gas.
- 8.2.2 Maximum Allowable Concentration  
The need for local exhaust ventilation or airline respirators for welding or cutting in other than confined spaces will depend upon the individual circumstances. Where air samples taken at the welding location indicate that the fluorides liberated are below the maximum allowable concentration, such protection is not necessary.

## **8.3 Zinc**

- 8.3.1 Confined Spaces  
In confined spaces, welding or cutting involving zinc-bearing base or filler metals coated with zinc-bearing materials will be done in accordance with Section 11.2.
- 8.3.2 Indoors  
Indoors, welding or cutting involving zinc-bearing base or filler metals coated with zinc-bearing materials will be done in accordance with Section 13.3.

## **8.4 Lead**

- 8.4.1 Confined Spaces  
In confined spaces, welding involving lead-based metals will be done in accordance with Section 12.
- 8.4.2 Indoors  
Indoors, welding involving lead-based metals will be done in accordance with Section 13.3.
- 8.4.3 Local Ventilation  
In confined spaces or indoors, welding or cutting operations involving metals containing lead, other than as an impurity, or metals coated with lead-bearing materials, including paint, will be done using local exhaust ventilation or airline respirators. Such operations, when done outdoors, will be done using

respirators approved for this purpose by NIOSH under 42 CFR part 84. In all cases, workers in the immediate vicinity of the cutting operation will be protected by local exhaust ventilation or airline respirators.

## **8.5 Beryllium**

Welding or cutting indoors, outdoors or in confined spaces involving beryllium-containing base or filler metals will be done using local exhaust ventilation and airline respirators unless atmospheric tests under the most adverse conditions have established that the workers' exposure is within the acceptable concentrations defined by OSHA Standard 1910.1000. In all cases, workers in the immediate vicinity of the welding or cutting operations will be protected as necessary by local exhaust ventilation or airline respirators.

## **8.6 Cadmium**

### **8.6.1 General**

In confined spaces or indoors, welding or cutting operations involving cadmium-bearing or cadmium-coated base metals will be done using local exhaust ventilation or airline respirators unless atmospheric tests under the most adverse conditions show that employee exposure is within the acceptable concentrations specified by OSHA Standard 29 CFR 1910.1000. Such operations, when done outdoors, will be done using respirators, such as fume respirators, approved for this purpose by NIOSH under 42 CFR part 84.

### **8.6.2 Confined Space**

Welding (brazing) involving cadmium-bearing filler metals will be done using ventilation as prescribed in Section 12 or 13.3 if the work is to be done in a confined space.

## **8.7 Mercury**

In confined spaces or indoors, welding or cutting operations involving metals coated with mercury-bearing materials, including paint, will be done using local exhaust ventilation or airline respirators unless atmospheric tests under the most adverse conditions show that employee exposure is within the acceptable concentrations specified by OSHA Standard 29 CFR 1910.1000. Such operations, when done outdoors, will be done using respirators approved for this purpose by NIOSH under 42 CFR part 84.

## **8.8 Cutting of Stainless Steel**

Oxygen cutting, using either a chemical flux or iron powder or gas-shielded arc cutting of stainless steel, will be done using mechanical ventilation adequate to remove the fumes generated.

## **9 HOT WORK PERMITS**

- 9.1 Except for those operations identified in Section 10.1, a written and numbered Hot Work Permit (Appendix 1) will be completed, signed and issued by Don H. Mahaffey Drilling Co. or the authorized agent before a source of ignition is used. All required actions identified in Section 5 will be completed before a hot work permit is issued.
- 9.2 Before an employee introduces a source of ignition, a copy of the hot work permit will be provided to the employee or a copy of the permit will be posted in the area of the planned hot work. The copy of the permit will be kept on the job where the source of ignition is being used until the work is completed or the permit expires or is revoked.
- 9.3 The hot work permit will contain the following information:
  - a. The effective time and date;
  - b. The place of use;
  - c. The hours during which the source of ignition may be used, not to exceed 24 hours;
  - d. The specific location or piece of equipment where the source of ignition will be used;
  - e. The nature of the use of the source of ignition; and
  - f. Any special precautions or limitations to be observed before, during or after the use of the source of ignition, including the need for fire watch.
- 9.4 The permit will be revoked under the following conditions:
  - a. When circumstances would make the continued use of the source of ignition hazardous;
  - b. Any time the conditions of its issuance change; or
  - c. Inactivity of permitted hot work in excess of 2 hours unless tests determine the LEL is less than 20%.

## **10 HOT WORK OPERATIONS AREAS**

### **10.1 Designated Hot Work Operations Areas**

Designated hot work operations areas are permanent locations designed, or approved by an authorized individual, for hot work operations to be performed regularly. No hot work permit is required for these areas.

### **10.2 Non-Designated Hot Work Operations Areas**

Any area that is not a designated hot work operation area, but where hot work is to be performed, requires special precautions to be taken, including a hot work permit.

#### **10.2.1 Prohibited Areas**

Cutting or welding will not be permitted in the following situations:

- a. In areas not authorized by management;
- b. In sprinklered buildings while such protection is impaired;



- c. In the presence of explosive atmospheres (mixtures of flammable gases, vapors, liquids or dusts with air), or explosive atmospheres that may develop inside uncleaned or improperly prepared tanks or equipment which have previously contained such materials or that may develop in areas with an accumulation of combustible dusts;
- d. In areas near the storage of large quantities of exposed, readily ignitable materials such as bulk sulfur, baled paper or cotton.

#### 10.2.2 Fire Prevention and Precaution

- a. If the object to be welded or cut cannot readily be moved, all movable fire hazards in the vicinity will be taken to a safe place;
- b. If the object to be welded or cut cannot be moved, and if all the fire hazards cannot be removed, then guards will be used to confine the heat, sparks and slag, and to protect the immovable fire hazards;
- c. If the requirements stated in Sections 10.2.3(a) and 10.2.3(b) cannot be followed, then welding and cutting will not be performed;
- d. Suitable fire extinguishing equipment will be maintained in a state of readiness for instant use. Such equipment may consist of pails of water, buckets of sand, hose or portable extinguishers depending upon the nature and quantity of the combustible material exposed; and
- e. Cutting or welding will be permitted only in areas that are, or have been made, fire safe. When work cannot be moved practically, as in most construction work, the area will be made safe by removing combustibles or protecting combustibles from ignition sources.

#### 10.2.3 Fire Watch

- a. When the hot work operation is such that normal fire prevention precautions are not sufficient, additional personnel will be assigned to guard against fire during hot work and for a sufficient time after completion of the work to ensure that no fire hazard remains. Fire watchers will be required whenever welding or cutting is performed in locations where other than a minor fire might develop, or any of the following conditions exist:
  - 1. Appreciable combustible material, in building construction or contents, closer than 35 feet to the point of operation;
  - 2. Appreciable combustibles are more than 35 feet away but are easily ignited by sparks;
  - 3. Wall or floor openings within a 35-foot radius expose combustible material in adjacent areas including concealed spaces in walls or floors;
  - 4. Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings or roofs and are likely to be ignited by conduction or radiation
- b. Fire watchers will:
  - 1. Have fire extinguishing equipment readily available and be trained in its use;
  - 2. Be familiar with facilities for sounding an alarm in the event of a fire;
  - 3. Watch for fires in all exposed areas;
  - 4. Try to extinguish fires only when obviously within the capacity of the equipment available, or otherwise sound the alarm.

- c. A fire watch will be maintained for at least a half hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires.

#### 10.2.4 Relocation of Combustibles

Where practicable, all combustibles will be relocated at least 35 feet from the work site. Where relocation is impracticable, combustibles will be protected with flameproofed covers or otherwise shielded with metal or asbestos guards or curtains.

#### 10.2.5 Additional Precautions

##### a. Floors

1. Where combustible materials such as paper clippings, wood shavings or textile fibers are on the floor, the floor will be swept clean for a radius of 35 feet.
2. Combustible floors will be kept wet, covered with damp sand or protected by fire-resistant shields. Where floors have been wet down, personnel operating arc welding or cutting equipment will be protected from possible shock.
3. Wherever there are floor openings or cracks in the flooring that cannot be closed, precautions will be taken so that no readily combustible materials on the floor below will be exposed to sparks which might drop through the floor. The same precautions will be observed with regard to cracks or holes in walls, open doorways and open or broken windows.

##### b. Combustible Walls

Where cutting or welding is done near walls, partitions, ceiling or roof of combustible construction, fire-resistant shields or guards will be provided to prevent ignition.

##### c. Noncombustible Walls

If welding is to be done on a metal wall, partition, ceiling or roof, precautions will be taken to prevent ignition of combustibles on the other side due to conduction or radiation, preferably by relocating combustibles. Where combustibles are not relocated, a fire watch on the opposite side from the work will be provided.

##### d. Ducts

Ducts and conveyor systems that might carry sparks to distant combustibles will be suitably protected or shut down.

##### e. Combustible Cover

Welding will not be attempted on a metal partition, wall, ceiling or roof having a combustible covering, not on walls or partitions of combustible sandwich-type panel construction.

##### f. Pipes

Cutting or welding on pipes or other metal in contact with combustible walls, partitions, ceilings or roofs will not be undertaken if the work is close enough to cause ignition by conduction.

## **11 WORK IN CONFINED SPACES**

As used herein, confined space is intended to mean a relatively small or restricted space such as a tank, boiler, pressure vessel or small compartment of a ship. Please refer to the Confined Space program for requirements regarding confined space operations.

### **11.1 Air Testing**

Hot work will not be performed in a confined space until a competent person has tested the atmosphere and determined that it is not hazardous

### **11.2 Ventilation**

Ventilation is a prerequisite to work in confined spaces. For ventilation requirements, refer to Section 13.

### **11.3 Securing Cylinders and Machinery**

When welding or cutting is being performed in a confined space, the gas cylinders and welding machines will be left on the outside of the confined space. Before operations are started, heavy portable equipment mounted on wheels will be securely blocked to prevent accidental movement.

### **11.4 Lifelines**

Where a welder must enter a confined space through a manhole or other small openings, means will be provided for quickly removing him/her in case of emergency. When safety belts and lifelines are used for this purpose, they will be so attached to the welder's body that his/her body cannot be jammed in a small exit opening. An attendance with a preplanned rescue procedure will be stationed outside to observe the welder at all times and be capable of putting rescue operations into effect.

### **11.5 Electrode Removal**

When arc welding is to be suspended for any substantial period of time, such as during lunch or overnight, all electrodes will be removed from the holders and the holders carefully located so that accidental contact cannot occur and the machine be disconnected from the power source.

### **11.6 Gas Cylinder Shutoff**

In order to eliminate the possibility of gas escaping through leaks or improperly closed valves, when gas welding or cutting, the torch valves will be closed and the gas supply to the torch positively shut off at some point outside the confined area whenever the torch is not to be used for a substantial period of time, such as during lunch or overnight. Where practicable, the torch and hose will also be removed from the confined space.

## **11.7 Warning Sign**

After welding operations are completed, the welder will mark the hot metal or provide some other means of warning other workers.

## **11.8 Ventilation in Confined Spaces**

### **11.8.1 Air Replacement**

All welding and cutting operations carried on in confined spaces will be adequately ventilated, via mechanical or local exhaust ventilation systems, to prevent the accumulation of toxic materials or possible oxygen deficiency. This applies not only to the welder, but also to helpers and other personnel in the immediate vicinity. All air replacing that withdrawn will be clean and respirable.

### **11.8.2 Airline Respirators**

In circumstances for which it is impossible to provide such ventilation, airline respirators or hose masks approved for this purpose by the National Institute for Occupational Safety and Health (NIOSH) under 42 CFR part 84 will be used.

### **11.8.3 Self-contained Units**

In areas immediately hazardous to life, a full-facepiece, pressure-demand, self-contained breathing apparatus, or a combination full-facepiece, pressure-demand supplied air respirator with an auxiliary, self-contained air supply approved by NIOSH under 42 CFR part 84 will be used.

### **11.8.4 Outside Helper**

Where welding operations are carried on in confined spaces and where welders and helpers are provided with hose masks, hose masks with blowers or self-contained breathing equipment approved by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health, a worker will be stationed on the outside of such confined spaces to ensure the safety of those working within.

### **11.8.5 Oxygen will never be used for ventilation.**

## **12 PROTECTION OF PERSONNEL**

### **12.1 General**

#### **12.1.1 Railing**

A welder or helper working on platforms, scaffolds or runways will be protected against falling. This may be accomplished by the use of railings, safety belts, life lines or some other equally effective safeguards.

#### **12.1.2 Welding Cable**

Welders will place welding cable and other equipment so that it is clear of passageways, ladders and stairways.

- 12.1.3 Any employee exposed to the same atmosphere as the welder or burner will be protected by the same type of respiratory and other protective equipment as that worn by the welder or burner.

## 12.2 Eye Protection

### 12.2.1 Selection of Eye Protection:

- a. Design, construction, testing and use of devices for eye and face protection will be in accordance with American National Standard, Practice for Occupational and Educational Eye and Face Protection, Z87.1-1989, except that integral lens and frame design will be allowed if the lens frame combination provides unit strength, as well as impact, penetration, heat and flammability resistance, optical qualities and eye zone coverage equal to or greater than is required by ANSI Z87.1-1989;
- b. Helmets or hand shields will be used during all arc welding or arc cutting operations, excluding submerged arc welding. Helpers or attendants will be provided with proper eye protection;
- c. Goggles or other suitable eye protection will be used during all gas welding or oxygen cutting operations. Spectacles without side shields, with suitable filter lenses, are permitted for use during gas welding operations on light work, for torch brazing or for inspection;
- d. All operators and attendants of resistance welding or resistance brazing equipment will use transparent face shields or goggles, depending on the particular job, to protect their faces or eyes, as required;
- e. Side shield protection will be used whenever the hazard of flying objects is angular as well as frontal;
- f. Eye protection in the form of suitable goggles will be provided where needed for brazing operations not covered in Sections 12.2.1 through 12.2.3;
- g. Where eye protection is required and the employee requires vision correction, such eye protection will be provided as follows:
  1. Safety spectacles with suitable corrected lenses, or
  2. Safety goggles designed to fit over spectacles, or
  3. Protective goggles with corrective lenses mounted behind the protective lenses.
- h. Wearing of contact lenses is prohibited in working environments having harmful exposure to materials or light flashes, except when special precautionary procedures, which are medically approved, have been established for the protection of the exposed employee.

### 12.2.2 Specifications for Protectors

- a. Helmets and hand shields will be made of a material which is an insulator for heat and electricity. Helmets, shields and goggles will be not readily flammable and will be capable of withstanding sterilization.
- b. Helmets and hand shields will be arranged to protect the face, neck and ears from direct radiant energy from the arc.
- c. Helmets will be provided with filter plates and cover plates designed for easy removal.
- d. All parts will be constructed of a material which will not readily corrode or discolor the skin.

- e. Goggles will be ventilated to prevent fogging of the lenses as much as possible.
- f. All glass for lenses will be tempered, substantially free from striae, air bubbles, waves and other flaws. Except when a lens is ground to provide proper optical correction for defective vision, the front and rear surfaces of lenses and windows will be smooth and parallel.
- g. Lenses will bear some permanent distinctive marking by which the source and shade may be readily identified.
- h. The following is a guide for the selection of the proper shade numbers. These recommendations may be varied to suit the individual's needs.

Welding Operation	Shade No.
Shielded metal-arc welding – 1/16-, 3/32-, 1/8-, 5/32-inch electrodes	10
Gas-shielded arc welding (nonferrous) – 1/16-, 3/32-, 1/8-, 5/32-inch electrodes	11
Gas-shielded arc welding (ferrous) – 1/16-, 3/32-, 1/8-, 5/32-inch electrodes	12
Shielded metal-arc welding: 3/16-, 7/32-, 1/4-inch electrodes	12
5/16-, 3/8-inch electrodes	14
Atomic hydrogen welding	10-14
Carbon arc welding	14
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1 inch to 6 inches	4 or 5
Heavy cutting, 6 inches and over	5 or 6
Gas welding (light) up to 1/8 inch	4 or 5
Gas welding (medium 1/8 inch to 1/2 inch	5 or 6
Gas welding (heavy) 1/2 inch and over	6 or 8

*Note: In gas welding or oxygen cutting where the torch produces a high yellow light, it is desirable to use a filter or lens that absorbs the yellow or sodium line in the visible light of the operation.*

- i. Filter lenses will meet the test for transmission of radiant energy prescribed by any of the consensus standards listed in OSHA 29 CFR 1910.133(b)(1).

#### 12.2.3 Protection from arc welding rays

Where the work permits, the welder will be enclosed in an individual booth painted with a finish of low reflectivity such as zinc oxide and lamp black, or will be enclosed with noncombustible screens similarly painted. Booths and screens will permit circulation of air at floor level. Workers or other person adjacent to the welding areas will be protected from the rays by noncombustible or flameproof screens or shields or will be required to wear appropriate goggles.



### 12.3 Protective Clothing

Employees exposed to the hazards created by welding, cutting or brazing operations will be protected by personal protective equipment in accordance with the requirements of OSHA Standard 1910.132. Appropriate protective clothing required for any welding operation will vary with the size, nature and location of the work to be performed.

### 12.4 Hand Protection

12.4.1 Appropriate hand protection will be selected and provided when employee's hands are exposed to hazards such as those from skin absorption of harmful substances, cuts or lacerations, abrasions, punctures, chemical burns, thermal burns, radioactive materials and harmful temperature extremes. The use of provided hand protection is required.

*EXCEPTION: Hand protection for cuts, lacerations and abrasions will not be required when the personal protective equipment hazard assessment determines that the risk of such injury to the employee's hands is infrequent and superficial.*

12.4.2 Hand protection, such as gloves, will not be worn when there is a danger of the hand protection becoming entangled in moving machinery or materials.

### 12.5 Foot Protection

12.5.1 Appropriate foot protection will be required for employees who are exposed to foot injuries from electrical hazards, hot, corrosive, poisonous substances, falling objects, crushing or penetrating actions which may cause injuries or who are required to work in abnormally wet locations.

12.5.2 Footwear which is defective or inappropriate to the extent that its ordinary use creates the possibility of foot injuries will not be worn.

12.5.3 Protective footwear for employees will meet the requirements and specification in American Society for Testing and Materials (ASTM) F 2412-05, Standard Test Methods for Foot Protection and ASTM F 2413-05, Standard Specification for Performance Requirements for Foot Protection.

### 12.6 Protection Against Radiant Energy

12.6.1 Employees will be protected from radiant energy eye hazards by spectacles, cup goggles, helmets, hand shields or face shields with filter lenses complying with the requirements of this section.

12.6.2 Filter lenses will have an appropriate shade number, as indicated in the table below, for the work performed. Variations of 1 or 2 shade numbers are permissible to suit individual preferences.

12.6.3 If filter lenses are used in goggles worn under the helmet, the shade numbers of both lenses equals the value shown in the table below for the operation.

Filter Lenses for Protection Against Radiant Energy	
Operation	Shade No.
Soldering	2
Torch Brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1-6 inches	4 or 5
Heavy cutting, over 6 inches	5 or 6
Light gas welding, up to 1/8 inch	4 or 5
Medium gas welding, 1/8 – 1/2 inch	5 or 6
Heavy gas welding, over 1/2 inch	6 or 8
Shielded metal-arc welding, 1/16 – 5/32 inch electrodes	10
Inert-gas metal-arc welding (Non-ferrous) 1/16 – 5/32 inch electrodes	11
Shielded metal-arc welding 3/16 – 1/4 inch electrodes	12
Shielded metal-arc welding 5/16 – 3/8 inch electrodes	14

### 13 HEALTH PROTECTION AND VENTILATION

The requirements in this Section have been established on the basis of the following 3 factors in arc and gas welding which govern the amount of contamination to which welders and other workers in the same atmosphere may be exposed:

- Dimensions of space in which welding is to be done (with special regard to height of ceiling);
- Number of welders; and
- Possible evolution of hazardous fumes, gases or dust according to the metals involved.

#### 13.1 General

##### 13.1.1 Screens

When welding must be performed in a space entirely screened on all sides, the screens will be so arranged that no serious restriction of ventilation exists. It is desirably to have the screens so mounted that they are about 2 feet above the floor unless the work is performed at so low a level that the screen must be extended nearer to the floor to protect nearby workers from the glare of welding.

##### 13.1.2 Maximum Allowable Concentration

Local exhaust or general ventilating systems will be provided and arranged to keep the amount of toxic fumes, gases or dusts below the maximum allowable concentration as specified in OSHA Standard 1910.1000.

##### 13.1.3 Hazard Communication

The potentially hazardous materials employed in fluxes, coatings, coverings and filler metals, all of which are potentially used in welding and cutting, or are released to the atmosphere during welding and cutting, will be included in

the Hazard Communication Program. All employees will have access to labels on containers of such materials and safety data sheets and will be trained in accordance with the provisions of the Hazard Communication Program. Potentially hazardous materials will include, but not be limited to, the materials itemized in Section 8.

**13.1.4 Additional Requirements for Hazard Communication in Welding, Cutting and Brazing:**

- a. The suppliers will determine and will label in accordance with the Hazard Communication Program any hazards associated with the use of their materials in welding, cutting and brazing;
- b. In addition to any requirements imposed by the Hazard Communication Program, all filler metals and fusible granular materials will carry the following notice, as a minimum, on tags, boxes or other containers: "Do not use in areas without adequate ventilation. See ANSI Z49.1-1967 Safety in Welding, Cutting and Allied Processes published by the American Welding Society";
- c. Where brazing (welding) filler metals contain cadmium in significant amounts, the labels will indicate the hazards associated with cadmium including cancer, lung and kidney effects and acute toxicity effects; and
- d. Where brazing and gas welding fluxes contain fluorine compounds, the labels will indicate the hazards associated with fluorine compounds, including eye and respiratory tract effects.

**13.2 Ventilation for Welding, Brazing and Cutting**

**13.2.1 Mechanical Ventilation for Indoor Operations**

Local exhaust systems providing a minimum air velocity of 100 lineal feet per minute in the welding zone will be used except as otherwise specified by this subsection.

- a. Where local exhaust ventilation is not feasible, mechanical dilution ventilation sufficient to prevent exposure to concentrations of airborne contaminants from exceeding those specified in T8 CCR 5155 (Airborne Contaminants) will be provided.
- b. Respiratory protective equipment in accordance with T8 CCR 5144 (Respiratory Protection) will be used when the methods described in Sections 13.2.1 and 13.2.1(a) are not feasible.

**13.2.2 Toxic Substances Used in any Enclosed Space**

- a. Local exhaust ventilation will be used when potentially hazardous materials are employed as base metals, fluxes, coatings, platings or filler metals. These include, but are not limited to, the following materials:
  1. Beryllium,
  2. Cadmium,
  3. Chromium,
  4. Fluorides,
  5. Lead,
  6. Mercury,
  7. Zinc, and
  8. Inert-gas metal-arc welding or oxygen cutting of stainless steel.

- b. When the nature of the work is such that local exhaust ventilation is not an effective means for preventing potentially hazardous exposure levels as specified by T8 CCR 5155 (Airborne Contaminants), supplied-air respirators will be worn.

#### 13.2.3 Toxic Substances Used in the Open Air

Where toxic substances such as those listed in Section 13.2.2(a) are used, respiratory protective equipment in accordance with T8 CCR 5144 (Respiratory Protection) will be provided except as otherwise specified by this subsection.

- a. In operations involving beryllium-containing base or filler metals, only supplied-air respirators will be used.
- b. Except for operations involving beryllium, cadmium, lead or mercury, respiratory protective equipment is not required when natural or mechanical ventilation is sufficient to remove welding fumes from the breathing zone of the workers.

#### 13.2.4 Chlorinated Hydrocarbons

Degreasing or other operations involving chlorinated hydrocarbons will be located or controlled such that vapors from these operations will not enter the atmosphere surrounding any welding or cutting operations to prevent the degradation of such chlorinated hydrocarbon vapors to more highly toxic gases by the action of heat or ultraviolet radiation.

#### 13.2.5 Precautionary Labels

Hazardous materials used in welding and cutting will bear precautionary labels as required by T8 CCR 5150 (Ventilation and Personal Protective Equipment Requirements for Welding, Brazing and Cutting).

### 13.3 Local Exhaust Hoods and Booths

Mechanical local exhaust ventilation may be by means of any of the following methods.

#### 13.3.1 Hoods

Freely movable hoods intended to be placed by the welder as near as practicable to the work being welded and provided with a rate of air-flow sufficient to maintain a velocity in the direction of the hood of 100 linear feet per minute in the zone of welding when the hood is at its most remote distance from the point of welding. The rates of ventilation required to accomplish the control velocity using a 3-inch wide flanged suction opening are shown in the following table:

Welding Zone	Minimum air flow (1) cubic feet/minutes	Duct diameter, inches (2)
4 to 6 inches from arc or torch	150	3
6 to 8 inches from arc or torch	275	3 1/2
8 to 10 inches from arc or torch	425	4 1/2
10 to 12 inches from arc or torch	600	5 1/2

*Footnotes:*

*(1) When brazing with cadmium-bearing materials or when cutting on such materials increased rates of ventilation may be required.*

*(2) Nearest half-inch duct diameter based on 4,000 feet per minute velocity in pipe.*

**13.3.2 Fixed Enclosure**

A fixed enclosure with a top and not less than 2 sides which surround the welding or cutting operations and with a rate of airflow sufficient to maintain a velocity away from the welder of not less than 100 linear feet per minute.

**13.3.3 Exhausts from working spaces will be discharged into the open air, clear of intake air sources.**

**13.3.4 Replacement air will be clean and respirable.**

**13.3.5 Compressed oxygen will not be used for ventilation, testing or similar purposes different from its intended function in welding and burning.**

**13.4 Cleaning Compounds**

**13.4.1 Manufacturer's Instructions**

In the use of cleaning materials, because of their possible toxicity or flammability, appropriate precautions found in manufacturer's instructions will be followed.

**13.4.2 Degreasing**

Degreasing and other cleaning operations involving chlorinated hydrocarbons will be so located that no vapors from these operations will reach or be drawn into the atmosphere surrounding any welding operation. In addition, trichloroethylene and perchlorethylene will be kept out of atmospheres penetrated by the ultraviolet radiation of gas-shielded welding operations.

**13.5 First Aid Equipment**

First aid equipment will be available at all times. All injuries will be reported as soon as possible for medical attention. First aid will be rendered until professional medical services can be provided.

**14 FIRE PREVENTION AND PROTECTION**

**14.1 Fire Extinguishers**

Suitable fire extinguishers will be maintained in a state of readiness for instant use. The National Fire Protection Association has classified 4 basic types of fire extinguishers with respect to the type of fire they are capable of extinguishing:

**1. Type A**

Type A fire extinguishers are used for combustible solids such as paper, wood and cloth. The symbol for a Type A fire extinguisher is a green triangle with the letter "A" in the center.

2. Type B  
These extinguishers are used for combustible liquids such as oil, grease and paint thinner. The symbol for a Type B extinguisher is a red square with the letter “B” in the center.
3. Type C  
These extinguishers are for use on electrical fires involving items such as fuse boxes, electric motors and welding machines. The symbol for a Type C extinguisher is a blue circle with the letter “C” in the center.
4. Type D  
Type D extinguishers are used on fires involving combustible metals such as zinc, titanium and magnesium. The symbol for a Type D extinguisher is a yellow star with the letter “D” in the center.

## **14.2 Additional Fire Extinguishing Equipment**

In addition to the appropriate fire extinguisher being readily available, additional fire extinguishing equipment may be maintained in a state of readiness for instant use. Such equipment may consist of pails of water, buckets of sand or water hoses.

## **14.3 Fire Prevention Precautions**

Cutting or welding will be permitted only in areas that are, or have been made, fire safe. When work cannot be moved practically, as in most construction work, the area will be made safe by removing combustibles or protecting combustibles from ignition sources.

## **14.4 Welding or Cutting Containers**

### **14.4.1 Used Containers**

- a. Drums or containers which contain, or have contained, flammable or combustible liquids will be kept closed. Empty containers will be removed from the hot work area;
- b. No welding, cutting or other hot work will be performed on used drums, barrels, tanks or other containers until they have been cleaned so thoroughly as to make absolutely certain that there are 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 designated person will test the atmosphere and determine that it is not hazardous before hot work is performed on or in such structures;
- c. Any pipe lines or connections to the drum or vessel will be disconnected or blanked; and
- d. Before heat is applied to a drum, container or hollow structure, an opening to release built-up pressure during heat application will be provided.

### **14.4.2 Venting and Purging**

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



## **14.5 Exemptions**

- 14.5.1 All hot work operations will abide by the contents of this program with the exception of the following:
- a. The operation of fixed fire equipment;
  - b. Hot work required for operating purposes in laboratories and pilot plants. This exemption does not apply to sources of ignition used in the maintenance of equipment;
  - c. Hot work within designated, marked or posted smoking areas within plants; and
  - d. Hot work in locations outside of plants where it would be safe to smoke.
- 14.5.2 The following operations need only comply with the hot work safety procedures in Sections 5 and 13.1:
- a. Operations where compliance with the order will result in the employer or authorized agent issuing a hot work permit to him/herself;
  - b. Operations where the use of a source of ignition in connection with work on an oil or gas transmission pipeline remote from plants does not affect the normal movement of the contents of the pipeline; and
  - c. Hot work within areas meeting all of the following conditions:
    1. With respect to operating process equipment, the area is:
      - i. Free of flammable liquids, vapors and gases except as may be required for necessary activities when safely used, handles and stored; and
      - ii. Effectively protected against the possibility of flammable oils, liquids, vapors or gases being liberated within the area from pipe lines, sewers, drains or ditches.
    2. The area is posted in a manner to define the boundaries; and
    3. The area has a warning system to alert employees to eliminate ignition sources in the event of an emergency.

## **15 INDUSTRIAL APPLICATIONS**

### **15.1 Transmission Pipeline**

#### **15.1.1 General**

The requirements of Sections 12 and 13 and OSHA Standard 1910.254 will be observed.

#### **15.1.2 Field Shop Operations**

Where field shop operations are involved for fabrication of fittings, river crossings, road crossing and pumping and compressor stations the requirements of Sections 12, 13 and 14 and OSHA Standards 1910.253 and 1910.254 will be observed.

#### **15.1.3 Electric Shock**

When arc welding is performed in wet conditions, or under conditions of high humidity, special protection against electric shock will be supplied.

#### 15.1.4 Pressure Testing

In pressure testing of pipelines, the workers and the public will be protected against injury by the blowing out of closures or other pressure restraining devices. Also, protection will be provided against expulsion of loose dirt that may have become trapped in the pipe.

#### 15.1.5 Construction Standards

The welded construction of transmission pipelines will be conducted in accordance with the Standard for Welding Pipe Lines and Related Facilities, API Std. 1104-1968, which is incorporated by reference as in OSHA Standard 1910.6.

#### 15.1.6 Flammable Substance Lines

The connection, by welding, of branches to pipelines carrying flammable substances will be performed in accordance with Welding or Hot Tapping on Equipment Containing Flammables, API Std. PSD No 2201-1963, which is incorporated by reference as specified in OSHA Standard 1910.6.

#### 15.1.7 X-ray Inspection

The use of X-rays and radioactive isotopes for the inspection of welded pipeline joints will be carried out in conformance with the American National Standard Safety Standard for Non-Medical X-ray and Sealed Gamma-Ray Sources, ANSI Z54.1-1963, which is incorporated by reference as specified in OSHA Standard 1910.6.

### 15.2 Mechanical Piping Systems

#### 15.2.1 General

The requirements of Sections 12, 13 and 14 and OSHA Standards 1910.253 and 1910.254 will be observed.

#### 15.2.2 X-ray Inspection

The use of X-rays and radioactive isotopes for the inspection of welded piping joints will be in conformance with the American National Standard Safety Standard for Non-Medical X-ray and Sealed Gamma-Ray Sources, ANSI Z54.1-1963.

## 16 EMPLOYEE TRAINING

### 16.1 Training Frequency

All employees assigned to hot work positions will be trained:

- a. When they are first assigned to their position;
- b. Annually thereafter;
- c. When a change is made to the Hot Work program; and
- d. Whenever there is a reason to believe that an employee has not followed the required hot work procedures.

## **16.2 Training Topics**

Hot Work training will include:

- a. General welding safety,
- b. Gas welding safety,
- c. Arc welding safety,
- d. Potential fire hazards,
- e. The use of firefighting equipment,
- f. Metal cutting,
- g. Brazing and soldering; and
- h. All precautions and safety standards in this program.

## **17 PROGRAM EVALUATION**

Periodic evaluations of the workplace will be conducted to ensure that the provisions of this program are being implemented and that the program is effective.

### **17.1 Job Site Inspections**

Periodic inspections of job sites will be conducted to ensure the following:

- a. Employees are following all Hot Work safe practices;
- b. Employees are wearing all personal protective equipment as required by this program; and
- c. Proper ventilation systems are being used.

### **17.2 Employee Complaints**

Investigation of employee complaints regarding unsafe hot work practices will be conducted as they are brought to the attention of Ashley Mahaffey Tullius (or designee).

## **18 DOCUMENTATION AND RECORDKEEPING**

### **18.1 Program and Safety Standard**

A written copy of this program and the OSHA Hot Work Standard will be kept at each job site and made available to all employees who wish to review it.

### **18.2 Training Records**

Copies of training records will be maintained and will be updated as new employees are trained and as existing employees receive additional training.

### **18.3 Hot Work Activity Records**

Copies of all hot work activity records, including hot work permits and air testing results, will be maintained for a minimum of one year.

## APPENDIX 1 – HOT WORK PERMIT

Hot Work Permit No. \_\_\_\_\_

Date: _____ Issue Time: _____ Expiration Time: _____		
Location of permit space: _____		Work Tasks: _____
Authorized Worker: _____		Equipment involved: _____
Fire/Safety Watch: _____ Attendant(s): _____		
<b>Potential Hazards:</b> <input type="radio"/> Toxic <input type="radio"/> Corrosive <input type="radio"/> Mechanical <input type="radio"/> Flammable/Explosive <input type="radio"/> Fire/Heat <input type="radio"/> Radioactive <input type="radio"/> Spills <input type="radio"/> Energy Release <input type="radio"/> Oxygen <input type="radio"/> Store Energy <input type="radio"/> Other _____	<b>Procedures/Precautions:</b> <input type="radio"/> Tools Inspected for Frayed/Broken Wires <input type="radio"/> Communications <input type="radio"/> Entry Permit <input type="radio"/> Ventilation <input type="radio"/> Training <input type="radio"/> CPR/First Aid <input type="radio"/> Rescue Plan <input type="radio"/> Sprinkler System in Service <input type="radio"/> Charged Fire Hose <input type="radio"/> Surfaces Wetted Down <input type="radio"/> Shower/Eyewash Located <input type="radio"/> Other _____	<b>Safety Equipment:</b> <input type="radio"/> Hard Hat <input type="radio"/> Eye Protection <input type="radio"/> Hearing Protection <input type="radio"/> Foot/Hand Protection <input type="radio"/> Protective Clothing <input type="radio"/> SCBA <input type="radio"/> Respirator <input type="radio"/> Tripod <input type="radio"/> Barricade/Cones <input type="radio"/> Communication Devices <input type="radio"/> First Aid Kit <input type="radio"/> Fire Extinguisher
<b>Vessel Prep/Isolation:</b> <input type="radio"/> Cleaning/Purging <input type="radio"/> Ventilation <input type="radio"/> Signs/Barriers <input type="radio"/> Lagging <input type="radio"/> Lockout/Tagout <input type="radio"/> Blanking/Bleeding <input type="radio"/> Disconnect Mechanical <input type="radio"/> Secure Moving	<b>Special Tools:</b> <input type="radio"/> Low Voltage <input type="radio"/> Non-Sparking <input type="radio"/> Lighting	<b>Special Work Procedures:</b> <input type="radio"/> Never bring gas cylinders or other large equipment into space. <input type="radio"/> Never block entry/exit with equipment. <input type="radio"/> Shut down during breaks or overnight. <input type="radio"/> Fire watch to remain 30 min after completion of hot work.
Supervisor Name: _____ Title: _____ Date: _____		
Emergency Contact: _____		

### Termination of the Permit

The undersigned certifies that all work covered by this permit is complete, all sources of ignition are eliminated, and the area is safe for unrestricted use. All flammable materials used in the operation have been removed from the area. Return the completed permit to the Facility Manager.

Signature \_\_\_\_\_ Printed Name \_\_\_\_\_

Company \_\_\_\_\_