Scope
This Lower 48 Exploration and Production (Lower 48) Hot Work Standard establishes the minimum safe work process required to protect personnel against the hazards associated with Hot Work operations. The requirements of this Standard are mandatory.

Application
The requirements of this Standard apply to Lower 48 locations, employees and contractors.

Asset level requirements are designated by orange text. Asset level tables, processes or requirements are documented and maintained by the asset and are referred to as “Level 2” requirements.

Process
Outlined above are the minimum process steps required to manage Hot Work. The specific requirements of each process step are presented in this Standard.

Responsibilities

<table>
<thead>
<tr>
<th>Provide resources for the implementation of this Standard</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedures and practices are implemented as per the requirements of this Standard</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Personnel with designated roles in a Hot Work operation are provided with appropriate training and retraining</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Understanding in the requirements of this Standard and supporting procedures and practices</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Compliance with this Standard and supporting procedures and practices</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>All personnel involved in the Hot Work to understand potential hazards before performing Hot Work</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Proficiency in Emergency Response procedures and Fire Fighting</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Provide the necessary equipment and PPE for the protection of personnel</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Maintain required training and retraining records</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Maintain required Hot Work Permit records</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Hot Work is defined as a hazardous activity which uses equipment or tools that have the potential to create or introduce an arc, spark, open flame or any other ignition source which presents a fire risk.

Examples of Hot Work include:
- Electric and/or gas welding;
- Cutting and abrasive blasting;
- Grinding;
- Motor vehicle use within 10 feet of a producing wellhead;
- Motor vehicle use into diked containment areas around crude oil or condensate storage tanks;
- Use of hand tools in a way which could produce a spark (such as electric drills, hammers, punches, etc.); and/or
- Opening energized electrical junction boxes.

Hot Work can take place in a Hot Work Permit Area or within a Safe Hot Work Area. The designation details of each are presented below.

A hazardous location is one where fire or explosion hazards may exist due to flammable gases or vapors, flammable liquids, combustible dust, or ignitable fibers. Lower 48 assets and work locations will identify areas where Hot Work presents a fire or explosion hazard to personnel, plant or equipment. These areas must be designated as **Hot Work Permit Areas** and personnel must be made aware of their location through proper training.

As a minimum, the following areas must be designated as Hot Work Permit Areas:
- Areas identified as Classified Hazardous Locations, as part of a process safety assessment;
- Locations which are within 75 feet of a recognized or potential hydrocarbon source;
- Locations within 35 feet of a combustible material;
- Partitions, walls, floors, or ceilings of any building;
- Equipment that contains, or may contain, a flammable or combustible substance or residue;
- Vessels that contain residue which may release flammable or combustible vapors or gases;
- Portable or stationary tanks or vessels used to haul or store combustible or flammable products; and
- Lines, piping, or connections that may contain flammable mixtures.

Safe Hot Work Areas are areas where Hot Work can be performed **without** a Permit because the work location is essentially free of combustible or flammable materials and is comprised of non-combustible or fire-resistant construction. Designated Safe Hot Work Areas may also be referred to as Non-Permit Required Areas.

For gas plants, booster stations, welding shops, maintenance shops, offshore facilities and in-land water facilities, these areas must be designated as Safe Hot Work Areas, displayed on facility drawings and posted throughout the work location.

For onshore Facilities (other than those mentioned above), a designated Safe Hot Work Area can be where Hot Work activities are conducted at a distance greater than 75 feet from any wellhead, production piping, vessels, or related hydrocarbon containing equipment and upwind of vents or other sources of hydrocarbon vapors. These areas must be identified to employees through proper training.
Lower 48 work locations must implement measures necessary to prevent unauthorized Hot Work.

Prior to commencement of any Hot Work, the appropriate COPC Supervisor will use Attachment A - Lower 48 Hot Work Permit and Hot Work Checklist, for the preparation, issue and cancellation of Hot Work Permits. Persons authorized to issue a Hot Work Permit will only do so with appropriate training and understanding of Hot Work hazards.

- Personnel will be assigned responsibilities and complete training in Hot Work;
- Hot Work activities will undergo challenge from the appropriate COPC Supervisor to confirm that the activity is necessary and preparation can proceed without unreasonable risk to personnel, property or the environment. Considerations include hazards to personnel conducting the activity, simultaneous operations, and personnel working in the vicinity;
- Prior to commencement of the Hot Work activity a hazard assessment will be performed to identify and evaluate all potential Hot Work hazards. The means and process to eliminate or control the hazards must be identified and recorded on/or attached to the Hot Work Permit for implementation. The hazards and controls will be discussed with all personnel engaged in the Hot Work operation via pre-job safety meetings;
- Isolations may be required to prevent the introduction of flammable or combustible materials or vapors to the work area or the equipment being worked on. A system will be designed and implemented for an appropriate Hot Work isolation using the Hazardous Energy LOTO Standard;
- Atmospheric hazards from within equipment being worked on (for example, pipe lines, vessels or tanks) must be controlled through purging, flushing, inerting and ventilating. In addition, controls for potential atmospheric hazards introduced into an area by weather conditions must be defined. Controls could include closure of open vessels, tanks and piping, covering of drains and/or the use of a Hot Work Enclosure which is described in the Guidance Section of this Standard;
- A worksite review is required to confirm all combustible materials and flammable liquids present at the work area are removed;
- A Fire Watch must be assigned to monitor the Hot Work Permit activity and will remain at the location for a minimum of thirty (30) minutes after work completion. They will be provided with necessary equipment to provide First Aid and/or take immediate action against a fire. A Fire Watch must not be assigned any other responsibility at the worksite;
- Personnel must be provided with Personal Protective Equipment (PPE) for protection against Hot Work hazards including exposed flames, sparks, welding spatter or flash. Personnel must be trained in the safe use of allocated PPE; and
- Emergency Plans must be developed and implemented for the safe evacuation of a work area and summoning the emergency services.

PERSONNEL MUST NOT ATTEMPT TO PUT OUT FIRES IF THEY BELIEVE IT IS A RISK TO THEIR PERSONAL SAFETY
Preparation for Work in a Safe Hot Work Area

Hot Work activities conducted in a designated Safe Hot Work Area must be risk assessed to determine that hazards associated with the activity are understood and appropriate mitigation measures are implemented. A worksite review must be performed prior to commencement of the Hot Work to confirm combustible hazards have not impinged the Safe Hot Work Area.

NOTE: Personnel may still be exposed to the hazards presented by a Hot Work activity within a Safe Hot Work Area. Mitigation measures, such as PPE must be considered in the assessment.

When planning a Hot Work activity consideration should be given to simultaneous operations (SIMOPS). If SIMOPS exist, the Hot Work Permit process must incorporate appropriate mitigation measures.

SIMOPS

Process Action

Hot Work activities must only be allowed to proceed when the safety requirements and authorizations of Attachment A - Lower 48 Hot Work Permit and Hot Work Checklist have been satisfied, reviewed and signed by the Authorized Permit Writer.

Hot Work Permit requirements include:

- Confirmation of atmospheric testing which conforms to the safe work conditions provided in the Guidance Section of this Standard and Attachment A - Lower 48 Hot Work Permit and Hot Work Checklist;
- Designation of a Fire Watch and provision of the necessary equipment to monitor the Hot Work activity;
- Completion of worksite preparation;
- Implementation and communication of safety precautions; and
- Confirmation, through a signature on the permit, that personnel who will perform the Hot Work have read the permit conditions, understand the conditions and will comply with the conditions. In addition, the Authorized Permit Writer must verify that all personnel have the necessary skills, knowledge, and training to safely perform their duties.

Actions must be taken to test the atmosphere at a Hot Work location for the presence of flammable gases. As a minimum this must be performed:

- After any break;
- After the area has been left unattended for a period of time;
- Periodically throughout the activity; and
- During the work if conditions have changed.

Hot Work Permits may be valid for a maximum duration of twelve (12) hours or a single work (crew) shift. Permits cannot be extended to span crew changes of personnel performing or supervising the activity.

A copy of the authorized Hot Work Permit must be in the immediate vicinity of the Hot Work location for the duration of the activity.

If an unanticipated hazardous condition is detected, the Hot Work must be stopped and Hot Work tools and equipment made safe. The Authorized Permit Writer must determine the cause and necessary controls. A new Hot Work Permit is required before work can recommence.

If the worksite emergency alarm sounds, work must also be stopped and equipment made safe. A new Hot Work Permit is required before work can recommence.

ALL PERSONNEL MUST BE EMPOWERED TO STOP WORK IF THEY BELIEVE ANY UNSAFE CONDITIONS EXIST
Hot Tapping

Hot Tapping or Hot Tie-in is a high risk activity that requires a risk assessment, special permitting and Operations Manager approval. The request for approval must include written scope of work, justification and risk assessment. The authorized justification must be attached to the Hot Work Permit.

**NOTE:** Additional regulatory requirements exist for the risk assessment method and the permit requirement necessary to conduct a hot tap operation. Consult HSE for help with these requirements.

**Process Close-Out**

On completion of the Hot Work activity, the Permit will be returned to the Authorized Permit Writer and cancelled. Any problems encountered during the activity must be noted on the Hot Work Permit.

De-isolation of equipment must be carried out in accordance with the Hazardous Energy LOTO Standard.

**Training**

**General Training**

Employees and contractors who will be involved in Hot Work must be provided with the appropriate level of training in Hot Work hazards and safe work practices.

This includes, but is not limited to, the following:

- Hot Work hazard recognition and risk assessment;
- Welding and metallurgic considerations;
- Air monitoring equipment use and calibration;
- Fire extinguisher training; and
- Personal Protective Equipment.

**Authorized Permit Writer(s)**

Authorized Permit Writer(s) must be trained and familiar with the duties of their position. They must successfully pass a performance test demonstrating the required competency.

**Fire Watch**

The Fire Watch must be trained in fire extinguisher use, basic first aid and the worksite emergency action plan.

**Record Keeping**

**Hot Work**

All written records pertaining to Hot Work must be maintained by the asset. These records include, but are not limited to:

- Designated Safe Hot Work Areas, facility drawings and/or written descriptions for the life of the facility;
- Closed Hot Work Permits and associated documents through job completion; and
- Hot Tap requests and associated documents through job completion.

Records pertaining to Safe Hot Work Areas must be retained for the life of the facility.

**Training**

Records must be maintained at the asset for all training per the Training and Competency Element requirements.
**Guidance**

**Hot Work Permit Exception**

A Hot Work Permit for using the following equipment is not required for work that is performed more than 10 feet away from any hydrocarbon source, is not within a Classified Hazardous Location and is free of atmospheric hazards:

- Non-intrinsically safe instruments, meters, or tools (for example, a cell phone, camera, laptop or pager);
- Permanently mounted auxiliary equipment (for example, drill rigs) which are not designed for use in a classified area;
- Specialty trucks/vehicles (for example, wireline units) which are not designed for use in a classified area; and
- Transportation trucks that have been properly bonded and/or grounded.

Continuous atmospheric monitoring during the work is required for the duration of the work.

**Atmospheric Testing**

Appropriate testing of atmospheric hazards for Hot Work Permit Spaces is mandatory and must be completed to verify a flammable or combustible atmosphere does not exist.

Attempt to reduce the Lower Explosive Limit (LEL) to 0 percent for any flammable gas, vapor, dust or mist. For those cases where 0 percent cannot be attained, Hot Work can be conducted if continuous readings of less than 10 percent of the listed LEL for the material in question are achieved.

**Hot Work Enclosure**

A totally enclosed space built around the Hot Work activity and made from non-flammable material. The air used within the enclosure is provided with positive mechanical ventilation, this ensures a safe atmosphere for the completion of Hot Work.

**References**

OSHA Act 1970 Section 5 General Duty
OSHA 29 CFR 1910 Subpart Q, Welding, Cutting, and Brazing
MMS 30 CFR Subpart A, General
American Petroleum Institute (API) RP 500, Classification of Locations for Electrical Installations at Petroleum Facilities
Lower 48 Exploration and Production HSE Management System
API RP 2201 Safe Hot Tapping Practices in the Petroleum & Petrochemical Industries

**Revision History**

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<th>Revision Number</th>
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<th>Approved By</th>
<th>Approval Date</th>
<th>Description/Reason</th>
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<tr>
<td>00</td>
<td>N/A</td>
<td>M.J. Frampton</td>
<td>02/16/2007</td>
<td>Initial Hot Work Standard</td>
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When printed, this document is no longer controlled  
Lower 48 Exploration & Production  
Revision 00  
HSE Management System  
Document No: TBA  
Safe Operating Standards  
Issue Date: 16th February 2007
Attachment A – Lower 48 Hot Work Permit and Hot Work Checklist

Location (e.g., facility, well name, and rig):

Description of Hot Work:

I have reviewed the proposed work and agree that Hot Work is necessary and may proceed without unreasonable risk.

Initial authorization signature: ____________________________________________________________________ Date: ______________ Expiration time: ______________

Supervisor

The following precautions must be taken to complete the work safely. (Attach details of specific procedures or checklist, if appropriate.)

<table>
<thead>
<tr>
<th>Checklist: (Yes, No or NA)</th>
<th>Yes</th>
<th>No</th>
<th>Checklist: (Yes, No or NA)</th>
<th>Yes</th>
<th>No</th>
<th>Checklist: (Yes, No or NA)</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>All lines depressurized?</td>
<td></td>
<td></td>
<td>Respiratory protection required?</td>
<td></td>
<td></td>
<td>Fire Watch?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All liquids drained?</td>
<td></td>
<td></td>
<td>Combustibles removed?</td>
<td></td>
<td></td>
<td>Pre-job safety meeting complete?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Space cleaned and purged?</td>
<td></td>
<td></td>
<td>Continuous atmosphere monitoring?</td>
<td></td>
<td></td>
<td>Emergency plan established?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Space properly ventilated?</td>
<td></td>
<td></td>
<td>Fire extinguisher/water or other equipment available?</td>
<td></td>
<td></td>
<td>Special PPE required?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lockout/tagout complete?</td>
<td></td>
<td></td>
<td>Ground Fault Circuit Interrupter necessary?</td>
<td></td>
<td></td>
<td>Is associated heat-tracing and cathodic protection isolated?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Positive isolation: □ NA □ Blind □ Double block and bleed □ Disconnect □ Full thickness skilet

Electric lighting and equipment properly rated for hazardous area location:
- □ Yes □ No □ NA

Communication method:
- □ NA □ Hand signal □ Voice □ Radio □ Horn

Personal protective equipment

Rescue equipment

Emergency phone numbers

Head: □ Hardhat □ Other

Eye/face: □ Safety glasses w/side shields □ Face shield □ Goggles □ Other

Arms/hands: □ Leather gloves □ Other

Clothing: □ Flame-resistant clothing

Atmospheric testing:

<table>
<thead>
<tr>
<th>Acceptable conditions</th>
<th>Initial test results</th>
<th>Test results</th>
<th>Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen</td>
<td>19.5% to 23.5%</td>
<td>a.m./p.m.</td>
<td>a.m./p.m.</td>
</tr>
<tr>
<td>Flammability</td>
<td>&lt;10% LEL/LFL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H2S</td>
<td>&lt;10 ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NORMs</td>
<td>&lt;50 μR/hour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Initial test results

Tester signature: ___________________________________________ Initials: __________ Initials: __________ Initials: __________ Initials: __________

Direct reading gas monitoring equipment:

Model and unit ID: __________________________ Calibration date: __________________________

Test results

MSDS location:

Person(s) performing Hot Work

Signature: __________________________________________

Only the Authorized Permit Writer may extend the permit time (max. 12 hr)

Time was extended to: ______ hr Rep. Initials: __________ Time: __________

Permit start time is the same as the initial test time.

Signature: __________________________________________

Signature of fire watch (to remain 30 minutes after Hot Work is completed):

Signature: __________________________________________

CANCELLATION OF PERMIT

Signature: __________________________________________ Date: __________ Time: __________

Authorized Permit Writer

Name:_________________________________________

Distribution: Original—ConocoPhillips Company representative and work site Copy—Initial Authorizer