



# **JOSOP 404 - Hot Work Standard**

**Approved 27 February 2008**  
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## 1.0 Purpose, Objectives and Scope

### 1.1 Purpose

The purpose of this standard is to ensure that hot work is performed in a safe and controlled manner.

### 1.2 Objective

This standard establishes the requirements for the safe performance of hot work.

### 1.3 Scope

This Hot Work Safe Work Practice (SWP) Standard covers work performed by JO employees and their delegates and contractors within JO operational control.

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## 2.0 Requirements

1. Consider all cold work alternatives before performing hot work.
2. A hazard analysis shall be performed in accordance with the U&G Standardized MSW Hazard Analysis OE Procedure when planning work involving hot work.
3. Hazards associated with the hot work shall be identified and mitigated prior to beginning work.  
  
**NOTE:** Hot tapping requires additional precautions.
4. Hot work shall not be permitted in the presence of explosive atmospheres.
5. Hazardous (Classified) locations and safe hot work areas shall be designated and approved by management.
6. Personnel involved in hot work activities shall be trained and competent in the roles for which they are responsible.
7. A Job Safety Analysis (JSA) shall be conducted at the work site in accordance with the U&G Standardized MSW Hazard Analysis OE Procedure prior to commencing work involving hot work.
8. A Qualified Gas Tester must conduct gas testing prior to hot work, including but not limited to:
  - When there is a potential for flammable gases to be present
  - When motorized vehicles (battery or internal combustion) are being operated within areas where flammable vapors may be present
  - When the use of electrical or battery operated equipment or devices that are not intrinsically safe or explosion proof in a Hazardous (Classified) Location.
9. A dedicated fire Watch must be present where open flame hot work is carried out, except in designated safe welding areas.
10. The hot work must begin within 30 minutes after the Qualified Gas Tester has tested the area and cleared it for hot work to start.

11. When the work has been completed according to the job scope, the Work Team Leader must close out and return the Hot Work **Certificate** and permit-related documents to the permit approver after:
  - The jobsite has been left in a safe, clean and orderly condition.
  - Adequate time (30 minutes) has elapsed for the Fire Watch to verify the condition of the jobsite.
  - The work that was performed meets the required scope and specifications.
12. If work is interrupted by Stop Work Authority, weather conditions, alarms or unforeseen dangerous conditions, the Hot Work **Certificate** must be revalidated before work can be restarted.
13. Hot tapping is not covered under this Standard. It is considered a high risk activity which requires Subject Matter Expert input, written procedures and a high level of management approval.

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### 3.0 Terms and Definitions

The following terms and definitions apply to the JO – Safe Work Practice (SWP) Standard for Hot Work:

**Classified Hazardous Area** – Any area classified as a hazardous zone area (Zone 0, 1 or 2 or Class I, Division 1 or 2) in accordance with [API RP 505/API RP 500](#) or other equivalent local standards. **Classified Hazardous Areas shall be approved by management.**

**Confined Space** – A space that:

- Is large enough and so configured that an employee can bodily enter and perform assigned work
- Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults and pits are spaces that may have limited means of entry)
- Is not designed for continuous employee occupancy

**Fire Watch** – An individual who is competent in basic firefighting and whose role is to observe conditions in the immediate and adjacent areas of hot work to ensure it is performed safely, and to sound the alarm if necessary. The Fire Watch will extinguish any incipient fire that occurs, if safe to do so.

#### Gas Testing

- Use of portable detection equipment by the Qualified Gas Tester, including detector tubes and combustible gas indicators, to determine levels of oxygen and flammable or toxic vapors and gases.
- A process whereby the required gas tests are continuously or intermittently monitored. Continuous or intermittent gas testing is normally required when there is a likelihood of changing gas concentrations and/or there is a high risk to workers if the gas concentration changes unexpectedly.

**Hazardous Atmosphere** – Atmosphere(s) that expose personnel to the risk of death, incapacitation, impaired ability to self-rescue, injury, or acute or chronic illness that may be caused by any of the following:

- An atmospheric concentration of any substance in excess of the permissible exposure limit (PEL) that could result in employee exposure, for example, to benzene or hydrogen sulfide.
- Flammable gas, vapor or mist in excess of 10 percent of its lower explosive limit (LEL).
- An atmospheric oxygen concentration less than 19.5 percent or above 23 percent.
- Any other atmospheric condition that is immediately dangerous to life or health (IDLH).

**Hot Tap** – A procedure used in repair, maintenance and service activities that involves welding on and then cutting an opening into a piece of equipment (pipelines, vessels or tanks) that is under pressure or in service, for the purpose of installing connections or appurtenances. A special procedure is required to weld a connection onto a pipe, vessel or tank that is in service without leaking any of the contents or causing an explosion or fire.

**Hot Work** – Any work activities that introduce a potential ignition source of any kind to the jobsite in a Classified Area. Open flame sources include, but are not limited to, activities such as welding, cutting, brazing, burning and grit-blasting. Closed flame sources may include battery-operated personal electronic devices and portable internal combustion engines (those that are not a properly designed and permanently installed part of the facility). Driving vehicles into a classified hazardous area, for example, tank impounding basins, is another source of closed flame ignition.

**Hot Work Certificate**– A [certificate](#) issued in addition to a Permit to Work to grant the Company and/or contractor employees permission to perform hot work.

**Inert Atmosphere** – An atmosphere consisting primarily of an inert gas such as nitrogen or carbon dioxide that is effectively oxygen-free.

**Initial Gas Testing** – Gas test, or tests, that are conducted prior to beginning work and that are designed to determine the following:

- Requirements for confined space entry
- Whether the area is safe for hot work

The tests may be conducted in two parts: testing a confined space initially from the outside and then testing again on the inside to determine if it is safe for work to commence.

**Lower Explosive Limit (LEL)** – The lowest mixture of hydrocarbon vapor and air that will support combustion. Typically indicated on gas testing equipment as “100%,” it is sometimes referred to as lower flammable limit (LFL).

**Qualified Gas Tester** – A person who is competent in the use of portable gas-testing equipment and has successfully demonstrated use of the equipment in the field. This person must also be competent in recognizing risks inherent to hot work and confined space entry.

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## 4.0 Roles, Responsibilities and Training Requirements

There must be clearly defined roles, and personnel must meet the training and competency requirements of this standard prior to starting work. JO is responsible for establishing the methodology to achieve competence.

A single individual may fulfill more than one role as long as he or she meets the competency requirements and is able to fully meet multiple responsibilities. When selecting personnel for these positions, consider the candidate's level of experience and past performance.

The following roles and responsibilities are specific to hot work and are further defined in JO - Training Requirements Tool.

- Qualified Gas Tester
  - Conduct necessary tests as required in accordance with the SWP Gas Detection Standard (tests may be required as part of permit process, JSA requirements or from other business needs)
  - Be familiar with the instrument they are using and the instrument handbook
  - Inspect and zero the instrument before each use
  - Conduct instrument field calibration checks
  - Anticipates where gases and vapors may occur and/or accumulate
  - Enter Gas Test results on the relevant documentation, including the date and time, and then sign the permit in the gas testing section
  - If required to enter a confined space to conduct gas tests, must also meet all the requirements of an Authorized Entrant
  - Stops the work if unsafe conditions develop

**Note:** Only qualified gas testers are permitted to conduct gas test

For updates refer to [JO MSW TrainingRequirementsTool.doc](#)

- Fire Watch
  - Knows the work planned and the hazards involved
  - Inspects the job site prior to Hot Work activities and ensures that combustibles are removed or covered
  - Ensures that any nearby openings are sealed or covered with fire safe materials
  - Observes conditions in the immediate and adjacent areas of hot work to ensure that the work is performed safely and that any requisite conditions on the permits to work are complied with
  - Raises an alarm should a problem occur
  - Extinguishes any incipient fire, if it is safe to do so
  - Maintains watch at the area for at least 30 minutes after completion of hot work and inspects adjacent areas where sparks or flame may have traveled for signs of combustion
  - Stops the work if unsafe conditions develop

**Note:** Only qualified gas testers are permitted to conduct gas test

For updates refer to [JO MSW TrainingRequirementsTool.doc](#)

- Person Performing Hot Work
  - Knows how to perform the work procedures and the hazards involved
  - Only performs hot work when the requisite work permits are in place
  - Stops the work if unsafe conditions develop

For updates refer to [JO MSW TrainingRequirementsTool.doc](#)

#### 4.1 Initial Training

Personnel must meet the competency requirements of this standardized safe work practice prior to starting work. Refer to the JO – Training Requirements Tool.

The SBU shall maintain documentation of employees and contractors authorized to perform high-risk or open-flame hot work.

## 4.2 Refresher Training

Refresher training must be provided as follows:

- As required by applicable regulations or JO policy
  - As needed when identified by: verification, inspections, incidents or audits
- 

## 5.0 Standard Instructions

Hot work must be permitted and managed in accordance with the *JO - Managing Safe Work Process*.

When considering work that involves hot work in a Classified Hazardous area, always consider whether there is a viable alternative, for example, using a hand or pneumatic saw for cold cutting rather than using a cutting torch, or moving the item outside of the Classified Hazardous area.

The following are examples of hot work:

- Using non-explosion-proof electrical equipment or battery operated electronic devices (including mobile phones, inspection and testing equipment, such as ultrasound and X-ray) in a hazardous area if the equipment is not certified intrinsically safe
- Operating motorized vehicles (battery operated or internal combustion) within a hazardous area or diked area where flammable vapors may be present
- Burning acetylene or gas
- Welding, brazing, cutting, grinding or chipping
- Soldering
- Using electric resistance heaters
- Performing abrasion blasting, using high-pressure hydro-jet, etc.
- Using **battery**, electric or air-driven power tools capable of causing “hot” sparks or enough energy to ignite a flammable mixture (i.e., jack hammers, rattle guns, **air compressors, generator sets and drilling** etc.)
- Using any equipment that generates an exposed flame or hot filament

### 5.1 Hot Work Associated with Tanks, Vessels, and Piping

Welding on any tank, vessel, or any piping connected to the tank or vessel while the tank or vessel is in service is a deviation from this hot work standard. It requires Subject Matter Expert input, written procedures, and a high level of management approval.

NEVER do hot work above the liquid level on the shell of any tank, vessel or piping that is not isolated, regardless of service.

Hot work on the shell of a tank, vessel or piping attached to a tank or vessel requires at least 1 meter (3 feet) of liquid coverage above the area of the hot work.

ALWAYS disconnect or blind piping from the tank (or other equipment) before performing hot work on the piping.

ALWAYS assume that the vapor space of any tank that is in service is in the flammable range when planning and conducting hot work activities close to tanks. Gas testing by

itself does not guarantee that the entire vapor space is not in the flammable range. Special precautions may be required to separate the tank and attached piping from the location of the hot work.

Gas testing by a Qualified Gas Tester is mandatory at any openings and within any enclosed spaces anywhere below the location where hot work is being conducted. Gas testing is also required at any openings within 15 meters (50 feet) horizontally of where the hot work is being conducted.

All openings and gaps into equipment, tanks, or piping within 15 meters (50 feet) shall be sealed by using sand bags, drain covers, fire blankets, or other means that prevent sparks from entering the opening or gap before allowing hot work to commence.

## 5.2 Designated Safe Hot Work Areas

Specific area(s) can be designated to be Safe Hot Work Areas. These areas must be pre-approved by [facility](#) Management in consultation [and endorsement](#) with Health, Environment and Safety subject matter experts. These areas vary from facility to facility, and generally have the following characteristics:

- Do not contain combustible and flammable material within 10 meters (35 feet) of the area
- Free of flammable atmospheres

Hot Work carried out in the designated Safe Hot Work Area does not require a Hot Work Certificate, except when hot work is being performed on equipment which may have contained a flammable gas or liquid.

**NOTE:** When personnel are carrying only non-intrinsically safe devices (e.g., battery operated equipment or occupational hygiene monitoring equipment), these personnel must also carry a continuously monitoring gas detector. If the gas detector alarm sounds, they must immediately stop work and vacate the area and inform facility personnel of the alarm. No Fire Watch is required in these situations.

## 5.3 Documentation

### 5.3.1 Permit to Work

All hot work requires permit authorization. Refer to the *JO – Permit to Work Standard* for instructions.

### 5.3.2 Hot Work Certificate

Hot Work [Certificates](#) must be used in conjunction with a Permit to Work. Hot Work [Certificates](#) are distinguishable from other [certificates](#). The [certificates](#) must have a duplicate copy at a minimum. The [certificate](#) and associated documentation must be available in the language appropriate for the Permit Approvers and Work Team Leaders. To ensure a Hot Work [Certificate](#) consistent with this Standard refer to [Appendix A: JO Hot Work Certificate](#) and [Guidance for Specialized Work Permits \(certificates\)](#). The Hot Work [Certificate](#) should include the information found on the sample [certificate](#) in Appendix A and any additional information JO deems necessary.

The Hot Work [Certificate](#) must include the information found on the sample [certificate](#) in Appendix A and any additional information that JO deems necessary.



## 5.4 Permit Changes

Permits are revalidated in accordance with the *JO – Permit to Work Standard*. In all cases, before a Hot Work [Certificate](#) can be extended, there must be a valid Permit to Work in place for the period to be covered by the revalidation.

### 5.4.1 Permit Revalidation

Should site conditions change the Hot Work [Certificate with the General work Permit](#) must be revalidated before work can be restarted. Revalidation requires the Work Team Leader and/or the Area Controller to verify that all conditions and requirements on the permit remain in effect. The work may be resumed only after the Permit Approver has given approval to restart the permitted work.

**NOTE:** If work is stopped for more than 30 minutes without a Fire Watch present to ensure conditions do not change, the Hot Work [Certificate](#) must be revalidated. Before the Hot Work [Certificate](#) is revalidated the Permit Approver or designee must confirm the following:

- The Work Team Leader has not changed.
- The entire work crew has not changed.
- All conditions, requirements, and controls required by the Hot Work [Certificate](#), the related Permit to Work and the JSAs remain in place.
- The on-duty Qualified Gas Tester has conducted the required gas testing.
- Zero percent LEL is present.
- A valid Permit to Work is in place.
- The approved **dedicated** fire Watch is assigned and present in the hot work area.
- The required **dedicated** fire-fighting equipment is on hand and in good operating condition.
- The Permit Approver and Work Team Leader have discussed the jobsite conditions and are in agreement that the work can be continued safely.
- The Permit Approver and Work Team Leader have authorized the Hot Work [Certificate](#) in the revalidation section.
- All copies of the Hot Work [Certificate](#) have been updated.

**NOTE:** The extension or renewal of a Hot Work [Certificate](#) may be performed only by the Permit Approver during the shift(s) for which they are responsible for Hot Work.

### 5.4.2 Recording Changes

Only the Permit Approver can make changes to the information on the permit. Any changes made must be documented on all copies of the permit and communicated to the Work Team Leader.

### 5.4.3 Permit Re-Evaluation

Work must be stopped and the permit, [with certificate](#), re-evaluated under any of the following conditions:

- Change of the entire work crew.
- Change of Work Team Leader.
- No qualified Fire Watch designated for the hot work.
- Change in jobsite conditions (e.g. a leak or spill in the area, environmental conditions change, or if there are conditions that go beyond those approved in the permit).
- Serious injury, incident or near loss (near miss) at the jobsite.

## 5.5 Contractors

Contractors shall use JO's procedures unless they have been reviewed by JO (usually through the CHESM process) to use their own procedure(s).

## 5.6 Jobsite and Equipment Preparation

Competent personnel must complete the steps needed to properly and safely prepare the jobsite and equipment for the start of work.

Typical preparations that are specific to hot work may include, but are not limited to, the following:

- Removing combustible materials within 10 meters (35 feet) of the hot work area. If combustible materials can not be removed, they must be protected by fire-resistant coverings or shields, or kept wet.
- Sealing drains within 15 meters (50 feet) of the hot work by plugging and filling with water, or by another equivalent method, to form a seal. Vents in the vicinity of (including vents on the decks above and below) hot work shall be routed away from the vicinity of the hot work, or the input source to the vents shall be safely isolated.
- Barricade and mark the area.
- Arranging for continuous ventilation during hot work.
- Positioning **dedicated** fire-fighting equipment.
- Notifying facility personnel.
- Ensuring there is a designated Fire Watch at the jobsite.
- Inspecting all hot work equipment and ensure that it is safe to use.
- Gas-testing the jobsite and the surrounding 15 meters (50 feet) by a Qualified Gas Tester.
- Communicating to all affected parties through a pre-job briefing.

Additional preparations specific to opening equipment may include, but are not limited to, the following:

- Ensuring positive isolation (refer to *JO – Isolation of Hazardous Energy Standard*)
- Depressurizing
- Purging, flushing, draining or venting

## 5.7 Gas Testing Requirements

Gas testing is required prior to hot work (where there is a potential for flammable gasses, immediately dangerous to life or health (IDLH) atmospheres or other hazardous atmospheres) except in designated Safe Hot Work Areas. Gas testing must be performed by a Qualified Gas Tester. The frequency of gas testing shall be stated in the Permit to Work for approval.

### 5.7.1 Initial Gas Testing

Initial gas testing must include testing for oxygen and flammable vapor or other toxic gases and vapors as identified in the hazard analysis. The types and frequency of gas testing required must be based on the location of the hot work and potential hazards. The results of such a test will be used to determine:

- Whether the area is safe for hot work
- Whether additional vessel purging is necessary
- Time limitations for hot work to be conducted

Initial testing must be performed after the hot work jobsite and equipment have been properly isolated and prepared.

Gas testing for LEL must be performed in the surrounding area for a distance of 15 meters (50 feet). Hot work must not be performed if the LEL is greater than zero percent and/or if residues of combustible liquids are present except for hot tapping, for which specific precautions must be taken.

If gas test results indicate greater than zero percent LEL, the source of the flammable gas or vapor must be identified and actions must be taken to eliminate it.

**NOTE:** If, at any time during the performance of the hot work, subsequent gas testing reveals an LEL of greater than zero percent, then the hot work is to be immediately stopped and the Hot Work [Certificate](#) must be re-evaluated. The Hot Work [Certificate](#) may not be reissued until the source of the flammable vapor is determined and eliminated and further gas testing indicates a zero percent LEL.

### 5.7.2 Work Delays

The hot work must occur within an agreed period of time after the work is authorized. In all cases, if the hot work did not start within 30 minutes after the Qualified Gas Tester has tested the area and cleared it for hot work to start, the Hot Work [Certificate](#) must be revalidated before hot work can begin again.

### 5.7.3 Follow-up Gas Testing

The Qualified Gas Tester will determine the frequency of follow-up gas testing based on the potential identified hazards. The required frequency of gas testing must be noted on the Hot Work [Certificate](#).

**NOTE:** Any hot work performed inside a confined space requires continuous gas testing in the area of the Hot Work.

## 5.8 Conditions for Work Stoppage

During any non-emergency work stoppage, work site must be left in a safe condition, for example, non-essential equipment must be turned off and secured. Work must be stopped and the Permit Approver and Work Team Leader must reevaluate the Hot Work [Certificate](#) if the jobsite is left unattended and/or under any of the following conditions:

- Changes in jobsite condition(s) that present a risk after permit issuance
- LEL greater than zero percent is detected
- Portable or continuous gas test equipment failure (for example, battery depleted)
- Change in scope of work, such as additional work not originally anticipated
- A safety concern has been raised by a worker or company representative
- Occurrence of a minor incident or near loss during a job task
- The job is left unattended
- When the environmental conditions change
- The Fire Watch leaves the hot work area
- The original finish time listed on the Hot Work [Certificate](#) has been reached
- The Permit to Work is no longer valid

### 5.9 Fire Watch

A **dedicated** person must be designated to act as a Fire Watch. They must be competent and equipped to perform Fire Watch duties.

Fire Watch duties must be maintained for at least 30 minutes after hot work ceases. During this time, the Fire Watch must inspect the adjacent areas where sparks or flames may have traveled and look for signs of combustion.

**NOTE:** When personnel are carrying only non-intrinsically safe devices (e.g., battery operated equipment or occupational hygiene monitoring equipment) these personnel must also carry a continuously monitoring gas detector. If the gas detector alarm sounds they must immediately stop work and vacate the area and inform facility personnel of the alarm. No Fire Watch is required in these situations.

### 5.10 Work Completion

When the work has been completed, the Work Team Leader must return the Hot Work [Certificate](#) and permit-related documents to the permit approver. The permit approver or designee must review the jobsite to ensure that the following conditions have been met:

- The jobsite has been left in a safe, clean and orderly condition.
- At least 30 minutes has elapsed for the Fire Watch to verify the condition of the jobsite.
- The work performed meets the required scope and specifications.

If the above conditions have been met, the permit approver or designee must sign and date the Hot Work [Certificate](#) to signify completion.

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## 6.0 Records

### 6.1 Required Records

The following records will be kept:

- Copies of permits and associated documentation shall be maintained in accordance with the JO Permit to Work Standard.

## 6.2 Retention Requirements

Documentation shall be retained as required by local regulation, JO policy, or for a minimum of six months, whichever is greater.

## 7.0 References


The following is a complete list of the documents referenced by this standard:

**Table 1. Document List**

Title	File Name
JO – Training Requirements Tool	JO_MSW_TrainingRequirementsTool.doc
JO – Permit to Work Standard	JO_MSW_PermittoWorkStandard.doc
JO – Isolation of Hazardous Energy Standard	JO_MSW_IsolationofHazardousEnergyStandard.doc
Guidance for Specialized Work Permits (certificates).	Guidance for Specialized Permits (certificates).doc

## 8.0 Other Guidance Documents

**Table 2. Document List**

Title	File / Link Name
American Petroleum Institute (API) Recommended Practice (RP): <ul style="list-style-type: none"> <li>▪ 505 Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, and Zone 2</li> <li>▪ 500 Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2</li> </ul>	<a href="#">American Petroleum Institute (API)</a> <b>NOTE:</b> You may need a subscription to access API documentation. If so, consult a librarian listed on the home page.
American Petroleum Institute (API) Recommended Practice (RP): <ul style="list-style-type: none"> <li>▪ 2201, “Procedures for Welding or Hot Tapping on Equipment Containing Flammables”</li> </ul>	<a href="#">American Petroleum Institute (API)</a> <b>NOTE:</b> You may need a subscription to access API documentation. If so, consult a librarian listed on the home page.
Chevron Energy Research and Technology Company – Open and Non-open Flame	 <a href="#">Chevron Energy Research and Technology Company – Open and Non-open</a>

Title	File / Link Name
Ignition Source Control Guidance	<a href="#">Flame Ignition Source Control Guidance (101KB)</a>

## 9.0 Document Control

Table 1: Document Control Information

Description	GU Common	SBU-Specific
Approval Date	27 February 2008	<i>17 December 2008</i>
Next Revision Due	27 February 2011	<i>17 December 2011</i>
Control Number		

Table 2: Document History

Version Number	Date	Notes
1.0	27 February 2008	Initial Release
1.1	18 August 2008	Align Requirement 2 with other GU SWP Standards
1.2	8 December 2008	Added bookmarks for OE Mentor
1.2.1	17 December 2008	SAC Adoption
1.2.1.A	29 March 2008	JO Version Created
1.2.1.B	21 January 2010	Call numbers on permits updated
1.3	01 June 2012	Updated to include Corporate Required MSW Process Requirements

## Appendix A: JO Hot Work Certificate

Section 1-5 to be completed by the Work Team Leader or designate and Section 6-7 to be completed by Approver or designate Associated general work permit no. ....	
1. Work Location ..... Area/ Unit / Equipment Etc.	
2. Issue Date	
3. Permission granted to : ..... Name of the division/ section/ contractor	
4. Description of work	
5. Tools/Equipment to be used	
<b>6. SITE PREPARATION</b> (Tick which ever is applicable) Yes    NA	
Area tested initially for combustible gas and test to be done Every _____ hours.	<input type="checkbox"/> <input type="checkbox"/>
Or Continuously ( Attach Gas test Log)	<input type="checkbox"/> <input type="checkbox"/>
Equipment isolated, drained, blinded, vented, flushed/purged and gas freed	<input type="checkbox"/> <input type="checkbox"/>
Sewers, Drains and vents sealed within 15 Meters of work	<input type="checkbox"/> <input type="checkbox"/>
Combustibles removed from the area	<input type="checkbox"/> <input type="checkbox"/>
Cover nearby equipment with fireproof blankets	<input type="checkbox"/> <input type="checkbox"/>
Fire extinguisher at work site	<input type="checkbox"/> <input type="checkbox"/>
Pressurized fire hose at job site.	<input type="checkbox"/> <input type="checkbox"/>
Fire watch at job site	<input type="checkbox"/> <input type="checkbox"/>
Communication equipment with Fire Watch	<input type="checkbox"/> <input type="checkbox"/>
Hot tap checklist ( attached)	<input type="checkbox"/> <input type="checkbox"/>
Fire department site review	<input type="checkbox"/> <input type="checkbox"/>
Special protective equipment and clothing (specify)	<input type="checkbox"/> <input type="checkbox"/>
Vehicles, engines with special safety certificate	<input type="checkbox"/> <input type="checkbox"/>
Other restriction or special precautions if any ( mention)	

### Appendix B: JO Gas Test Log



## JOINT OPERATIONS HOT WORK GAS TEST LOG

- Initial Gas test recorded on front side of permit
- Record subsequent test results here as per the frequency indicated.
- For continuous testing record the results every 30 minutes.
- Gas Detectors are required to be calibrated quarterly or as recommended by Manufacturer. Check the calibration date before use.

<b>Hot work certificate reference no. ....</b>			
Gas detector type ( make , model )	Gas Tester S. No.	Calibration date	Start-up OK?
1.			
2.			

<b>GAS TEST FREQUENCY</b>	<input type="checkbox"/> Continuous	<input type="checkbox"/> Others ( Specify _____ )
---------------------------	-------------------------------------	---

Date / Time	Location	Conducted by	Result (% LEL) <b>Must be 0%</b>



## Appendix C: JO Hot Tap Checklist

### HOT TAP CHECK LIST

This Checklist is a necessary component of the Hot Tap Plan required for any hot tapping and shall be attached to hot work certificate. The Checklist should be progressively completed during the planning and execution stages of the hot tap. The Division that does the hot tap should maintain the completed checklist on file with the Hot Tap Plan.

<i>Item</i>	<i>Response, Comments</i>		<i>Verified by</i>
<b>SECTION 1: BEFORE DECIDING TO HOT TAP</b>			
1. Can the contents be safely hot tapped? What are the special considerations?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2. What is the wall thickness of the line or vessel? Is burn-through or weld-cracking the primary concern?			
3. What will the line temperature be during the hot tap?			
4. Based on the thickness of the line or vessel and the operating conditions, should the flow be maintained, reduced or stopped?	<input type="checkbox"/> maintained <input type="checkbox"/> reduced <input type="checkbox"/> stopped		
5. Will hydrotesting the branch line (before drilling into the parent line) collapse the parent line?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
6. Has the metallurgy of the line or vessel been determined?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
a) Are there special welding considerations for the line or vessel?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
b) Has it been determined that post-weld heat treating of the hot tap welds is not required?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
7. Is there adequate hoisting and support equipment for the tapping machine and subsequent piping?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
8. Is there sufficient room for operational and emergency access?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
9. Has a procedure been prepared to isolate the work area in the event of failure?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>SECTION 2: BEFORE STARTING THE HOT TAP</b>			
10. Is a Hot Tap Plan completed and approved?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
11. Combustible and toxic gas tests have been taken, and safe levels exist.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
12. A Permit to Work has been issued and is at the work site.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

Item	Response, Comments		Verified by
13. The exact location of the hot tap on the line or vessel has been marked.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
14. For tanks and vessels, the hot tap location is located at least 1 meter below the liquid level.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
15. The area to be welded has been inspected for thickness and freedom from lamination, hydrogen attack, and other metallurgical imperfections.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
16. The branch connection and welding electrode have been selected to match the metallurgy of the line or vessel.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
17. The flanges, bolts, gaskets, pipe, and valves to be installed meet the pipeline, piping, tank or pressure vessel code for the line or vessel to be hot tapped.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
18. Stress relieving of the welding area is not required.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
19. If required, suitable protective equipment has been provided to all exposed personnel in the hot tapping area.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
20. Fire-fighting equipment has been provided.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
21. The proposed hot tapping machine has suitable temperature and pressure ratings.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
22. Sufficient external clearance exists to accommodate the operation of the hot tap machine.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
23. The hot tap fitting is of the proper length to accommodate the operation of the hot tap machine.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
24. The tapping machine has adequate cutter travel for this job.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
25. Sufficient internal clearance exists to retract the cutter through the valve.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
26. The hot tap valve is repacked, and the valve guide is either ground off to allow free passage of the cutter or a full port straight through valve is used.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

### SECTION 3: BEFORE WELDING

- |  |                              |                             |  |
|--|------------------------------|-----------------------------|--|
| 27. The weld area has been preheated, if required.   | <input type="checkbox"/> Yes | <input type="checkbox"/> No |  |
| 28. An approved welding procedure is on hand. It is in accordance with the appropriate code and requires low hydrogen electrodes and the temper bead weld pass sequence. | <input type="checkbox"/> Yes | <input type="checkbox"/> No |  |

Item	Response, Comments		Verified by
29. The welders are qualified in accordance with the appropriate code, have experience welding on pressurized flowing lines, and are aware that the line is under pressure and the type of risks involved.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
30. The fitting is properly positioned so the hot tap machine will not be misaligned.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
31. The flow rate has been reduced or stopped to minimize the risk of weld cracking.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
32. If the hot tap is being done on a tank, all valves on the tank have been closed, locked, and tagged.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>SECTION 4: BEFORE CUTTING</b>			
33. Welds have been non-destructively examined.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
34. Hot tap valve, packing, gasket, and bolts have been checked for possible leakage.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
35. If the hot tapping plan requires that the hot tap connection be hydro tested, the system has been checked for the correct hydro test pressure. The test pressure should not exceed the collapse pressure of the main run, the flange rating, or the rupture pressure of the reinforcement sleeve.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
36. The packing or seals on the hot tap machine have been checked and are suitable for the temperature and the contents in the line.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
37. The bleed-off valve has been checked to be sure it has the correct pressure rating, is operative, and is not obstructed.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
38. All bolts on the cutter and pilot bit are tight.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
39. The coupon catcher is on the pilot bit.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
40. The valve is centered on the flange.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
41. The cutting depth has been calculated to avoid cutting the opposite side of the pipe.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
42. The cutter stem is marked to indicate points at which the cut will be completed and at which the cutter is retracted past the valve seats.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
43. The boring bar has been run through the valve to ensure free passage.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

<i>Item</i>	<i>Response, Comments</i>		<i>Verified by</i>
44. <i>The cutter can be fully retracted so that the hot tap valve can be closed.</i>	<input type="checkbox"/> <i>Yes</i>	<input type="checkbox"/> <i>No</i>	
<b>SECTION 5: BEFORE REMOVING THE HOT TAP MACHINE</b>			
45. <i>The manufacturer's instructions have been followed to be sure the boring bar is fully retracted before the hot tap valve is closed.</i>	<input type="checkbox"/> <i>Yes</i>	<input type="checkbox"/> <i>No</i>	
46. <i>The hot tap valve has been closed and the bleeder valve opened.</i>	<input type="checkbox"/> <i>Yes</i>	<input type="checkbox"/> <i>No</i>	
47. <i>The hot tap valve is holding.</i>	<input type="checkbox"/> <i>Yes</i>	<input type="checkbox"/> <i>No</i>	
48. <i>All pressure has been bled off the hot tap machine before removing bolts from the flange.</i>	<input type="checkbox"/> <i>Yes</i>	<input type="checkbox"/> <i>No</i>	
<b>SECTION 6: BEFORE RETURNING THE LINE TO SERVICE AND COMPLETING THE JOB</b>			
49. <i>All valves that were closed, locked and tagged have been returned to service and all locks and tags have been removed.</i>	<input type="checkbox"/> <i>Yes</i>	<input type="checkbox"/> <i>No</i>	
50. <i>The pressure and flow rate have returned to normal.</i>	<input type="checkbox"/> <i>Yes</i>	<input type="checkbox"/> <i>No</i>	