



JOSOP 403 - Confined Space Entry Standard

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1.0 Purpose, Objectives and Scope

1.1 Purpose

The purpose of this standard is to ensure that confined space entries are performed in a safe and controlled manner.

1.2 Objective

This standard establishes requirements for performing confined space entries.

NOTE: Each Global Upstream strategic business unit (SBU) or location may have additional regulatory and or site specific requirements.

1.3 Scope

This Confined Space Entry Safe Work Practice standard covers work performed by JO employees and their delegates and contractors within JO operational control.

2.0 Requirements

1. Use the definition of confined space to identify confined spaces at any location.
2. Consider all viable alternatives to performing an entry, such as the use of mechanical tools to perform tank cleaning from outside the confined space before performing confined space entry.
3. Hazards associated with confined spaces shall be identified and mitigated prior to beginning work.
4. Gas testing for entry into a confined space must be performed by a qualified gas tester.
5. Workers potentially exposed to identified confined spaces in the workplace shall be informed of their existence, location and potential hazards (e.g. signage or other effective means of communication).
6. A rescue plan must be in place before any confined space entry.
Critical: Never attempt to enter a confined space, even in an emergency, until help has arrived. Don't try to lift a person out of a hole without help.
7. Rescue personnel must be trained and competent and have the ability to perform their responsibilities. Rescue personnel must also have the correct rescue equipment at the work location.
8. An Entry Watch must be onsite at all times when personnel are in the confined space. The Entry Watch must maintain an entry log which includes the name of the entrants and the time(s) they entered and exited the confined space. The Entry Watch may not leave his or her position unless a qualified replacement Entry Watch is in place.
9. The confined space must be secured and any flammable gas sources must be removed whenever the confined space is left unattended for any period of time.

3.0 Terms and Definitions

The following terms and definitions apply to this JO – Safe Work Practices (SWP) – Confined Space Entry Standard.

Authorized Entrant – An individual who meets certain competency requirements and is authorized by the company, by means of a permit **and certificate**, to enter a confined space.

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.

Confined Space – A space that:

- Is large enough and so configured that an employee can bodily enter and perform assigned work, and
- 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, and
- Is not designed for continuous employee occupancy

Confined Space Entry – The act of passing any major portion of the body (such as head, torso or legs) through an opening to a confined space. Entry is considered to have occurred as soon as the body part breaks the plane of the opening.

NOTE: Qualified gas testers may insert a portion of the hand and arm in the space for gas detection purposes.

Confined Space Entry Certificate – A **certificate** used by the permit approver to grant personnel permission to perform entry into a confined space. This **certificate** only allows entry into the confined space. Work activities in the confined space may require additional **certificates**.

Continuous Gas Testing – A process whereby gases which may be present or which may be generated during work are continuously monitored. Continuous gas testing is normally required where there is a high likelihood of changing gas concentrations and/or there is a high risk to workers if the gas concentration changes unexpectedly.

Entry Supervisor – The person responsible for determining if acceptable entry conditions are present in a confined space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required.

Entry Watch – A competent person stationed at the entry point of a permitted confined space whose only duties are to control the entry and exit of personnel, to monitor the acceptable entry conditions both in and outside the confined space, to maintain communication with the entrants and to raise an alarm if any problem should occur.

Follow-Up Gas Testing – Testing at intervals, performed after the initial testing, sufficient to ensure that the atmosphere remains safe for the work being performed.

Gas Testing:

- Use of portable detection equipment by a 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 when there is a high risk to workers if the gas concentration changes unexpectedly.

Hazardous Atmosphere – An atmosphere that exposes 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 Work – Any work activities that introduce a potential ignition source of any kind to the job site. 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.

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 conducted prior to personnel beginning work to determine the following:

- Requirements for entry
- Whether the area is safe for the planned work

The tests may be performed in two parts:

- 1) Testing a confined space from the outside, and then
- 2) Testing 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 LFL or “lower flammable limit.”

Oxygen-Depleted Atmosphere – An atmosphere that has an oxygen content that is less than 19.5 percent.

Oxygen-Enriched Atmosphere – An atmosphere that has an oxygen content that is greater than 23 percent.

Confined Space with Special Hazardous Characteristics – A space that meets all the criteria of a confined space and has one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere, or
- Contains a material that has the potential to engulf an entrant, or
- Has an internal configuration such that an entrant could be trapped; or asphyxiated by inwardly contracting walls; or by a floor that slopes downward to a smaller cross-section, or
- Contains any other recognized safety or health hazards.

Qualified Gas Tester – A person who is trained and has been tested in the use of portable gas-testing equipment and has successfully demonstrated use of the equipment in the field. This person must also be trained to recognize hazards inherent in hot work and confined space entry.

Rescue Personnel – Personnel who meet certain competency requirements and who are on call to rescue confined space entrants.

4.0 Roles, Responsibilities and Training Requirements

Roles must be clearly defined, and personnel must meet the training and competency requirements of this standard prior to starting work. JO or country regulations may specify additional training and competency requirements.

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.

The following roles and responsibilities are specific to confined space entry and are further defined in the [JO – Training Requirements Tool](#):

- Authorized Entrant
- Entry Supervisor
- Entry Watch
- Qualified Gas Tester
- Rescue Personnel

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](#).

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

When considering work that involves a confined space, always consider whether there is a viable alternative to performing an entry, such as the use of mechanical tools to perform tank cleaning from outside the confined space.

NOTE: Entry into a confined space under an inert atmosphere requires special consideration and is prohibited for everyone except persons specially trained in inert atmospheric entry. See [Appendix E: Entry into Inert Atmospheres](#).

The following are some examples of a confined space:

- Any type of vessel
- Any type of steam generator, boiler, heat exchanger or furnace
- Stationary and portable tanks
- Sumps or pits
- External floating roofs that are not at their maximum height
- Access to the top of an internal floating roof
- Excavations
- Pipeline (large enough to allow a person to place his or her head inside)
- Barge compartments

5.1 Assessing and Managing Hazards

Confined space entry must be permitted and managed in accordance with the *JO - Managing Safe Work Process*. The confined space entry hazard analysis must include at least the following. Other potential hazards may need to be considered depending on the type of work to be done:

- The nature of the work that will be done in the confined space
- The potential hazards including:
 - The identity and nature of the substance last contained in the confined space
 - Chemical: gases & vapors (benzene, carbon monoxide, steam, etc.), liquids (hydrocarbons, sulfuric acids, etc.), solids (dust, welding fumes, etc.)
 - Physical: electrocution risk, heat stress, oxygen deficiency, noise, naturally-occurring radioactive materials (NORM).
 - Other: engulfment, entrapment, fall potential, etc.
 - Pyrophoric Scale – Iron sulfide that can be formed in tanks which store sulfur containing products, e.g., sour crude oil, naphtha, etc., due to a reaction between sulfur compounds and rust. The reaction between iron sulfide and air can generate sufficient heat to ignite any flammable vapors in the vicinity.
- The types of personal protective equipment required
- The types of engineering controls (such as ventilation) required
- An arrangement for rescue, first aid and resuscitation

- The number of persons occupying the space
- The number of persons required outside the space to maintain equipment, to ensure adequate communication with observation of persons within the confined space, and to properly initiate a rescue
- The structural integrity of the structure
- The need for illumination
- The state of health, fitness and training of the authorized entrants
- Any areas that could trap and later release product or vapor
- Any hazardous energy requiring isolation

A rescue plan and the rescue personnel and equipment for each confined space entry must be in place to rescue personnel who may be in difficulty. See section [5.8 Emergency Rescue](#).

5.2 Documentation

5.2.1 Permit to Work

All confined space entries require [certificate](#) authorization. Refer to the [JO – Permit to Work Standard](#) for instructions.

An annual documented permit review of confined space entries with special hazardous characteristics shall be conducted. This review will include extended, suspended and cancelled permits. The intent of this annual review is to validate that there are no gaps in the SBU management of confined spaces.

5.2.2 Confined Space Entry Certificate

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

5.2.3 Confined Space Entrant Log

A log must be kept of all persons entering and leaving a confined space, and the log must be posted at the site of entry. The log must be updated for each authorized entry and exit from the confined space. The log must include the time in and time out of each Authorized Entrant to account for all entrants. This log is helpful to the Entry Watch, for example, if Authorized Entrants are wearing a self-contained breathing apparatus (SCBA), then the Entry Watch will know approximately when personnel should be exiting the space to obtain more air. An example log is included in [Appendix B: JO Confined Space Entrant Log](#).

Workers shall never enter a confined space without an Entry Watch at the work site.

5.2.4 Certificate for Qualified Gas Tester

A separate Confined Space [Certificate](#) must be issued for the Qualified Gas Tester in accordance with the [JO – Permit to Work Standard](#) if he or she must enter the space for initial testing.

5.3 Permit Changes

Permits are extended or revalidated in accordance with the [JO – Permit to Work Standard](#).

5.3.1 Permit Extension

The Permit Approver or designee must perform the following steps to extend the permit:

- Confirm that all conditions, requirements, and controls of the Confined Space Entry [Certificate](#), related Permit to Work and the JSA remain in effect.

If all remain in effect, the Permit Approver or designee shall:

- Request that the Qualified Gas Tester perform new gas tests on the confined space and record the results on the Confined Space Entry [Certificate](#).
- Obtain a signature from the work team leader on all copies of the extended permit.
- Have the approver or designee initial or sign all copies of the extended permit.

NOTE: A new Confined Space Entry [Certificate](#) must be issued for each work shift.

5.3.2 Certificate Revalidation

If site conditions change or the work is stopped for a period of more than 30 minutes with no one in attendance, the Confined Space Entry [Certificate](#) must be revalidated before work can be restarted. Revalidation requires the Permit Approver or designee to verify that all conditions and requirements on the permit [and certificate](#) remain in effect. The work may be resumed only after the Permit Approver or designee has given approval to restart the permitted work, and has done so by signing the Permit Revalidated section at the bottom of the Confined Space Entry [Certificate](#).

5.3.3 Downgrading from Permit Required Confined Space Entry to Non-Permit Required Confined Space Entry

A Permit Required Confined Space Entry may be downgraded on a case-by-case basis to a Non-Permit Required Confined Space Entry if and only if the following criteria are met:

- Any engulfment risks associated with the confined space entry have been eliminated by isolation techniques used from outside the space, and
- All actual or potential atmospheric risks inside the confined space have been eliminated by techniques used outside the confined space, and
- Data has been collected by the Entry Supervisor from outside the confined space to confirm entry conditions inside the confined space have been achieved, and
- The work to be performed inside the confined space will not create any new hazards nor change confined space conditions identified at the time of entry, and
- The Entry Supervisor documents the information gathered and the decision process used to downgrade the Permit Required Confined Space Entry to a Non-Permit Required Confined Space Entry.

NOTE: The only confined space entry conditions which are downgraded when a confined space with special hazardous characteristics is downgraded to a confined space for entry are the requirements for a Rescue Team and the requirement for a dedicated Entry Watch.

5.3.4 Permit Cancellation

Work must be stopped and the permit, [with associated certificates](#), canceled under any of the following conditions:

- Change of entire work crew
- Change of work team leader
- No qualified Entry Watch is designated for confined space entry
- Change in job site conditions, such as a leak or a spill in the area, an alarm, or the established permit conditions were exceeded
- Serious injury, incident or near loss at the job site

5.4 Contractors

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

5.5 Preparation of the Job Site and Equipment

Typical preparation specific to confined space entry may include, but is not limited to, the following:

I. Planning

- A. Equipment and materials necessary for the job
- B. Potential hazards (during entry and work in the confined space)
- C. Train affected employees (persons cleaning and entering space, standbys, etc.)
- D. Obtain deviation request approval if necessary

II. Preparation

- A. Obtain equipment and materials necessary for the job
- B. Obtain safety equipment (during entry and work in the confined space)
- C. Prepare standby personnel
 1. Determine the number of standbys needed
 2. Ensure standby(s) are trained
 3. Ensure that an additional employee is within sight or radio call of standby(s)
 4. Establish a communication system (radios, etc.)
 5. Establish emergency procedures
- D. Set up job site
- E. Have all necessary personnel at job site
- F. Isolate/Secure equipment. Refer to the [JO – Isolation of Hazardous Energy Standard](#)
- G. Clean equipment
- H. Purge and ventilate to prevent hazardous atmosphere

- I. Review other work activities being carried out in the area that may affect the confined space work plan

5.5.1 Heat Stress

The potential for heat stress during confined space entry must be evaluated and managed based on the conditions at the entry site by the Work Team Leader.

5.6 Gas Testing

5.6.1 Gas Detection Requirements

All gas testing must be performed by a Qualified Gas Tester using calibrated gas testing equipment.

The gas testing results must be recorded on the Confined Space Entry [Certificate](#). When continuous gas testing is required, the initial testing results shall be recorded to document the conditions in the area at the time and to specify deviations that require evacuation of the area.

5.6.2 Initial Gas Testing

Initial gas testing includes testing for oxygen, flammable vapor (percentage of LEL) and any toxic gases or vapors, such as hydrogen sulfide (H₂S), as identified in the hazard analysis. The types of gas testing required are to be based on the historical content of the confined space. The results of such tests will be used to determine:

- If the space is safe for entry
- If additional vessel purging will be needed
- Which PPE is required for entry
- The time limitations for entry into the space

Initial gas testing must be performed outside the confined space prior to the worker's entry and as close as possible to the time work starts. An extension wand must be used to sample as far into the space as practical.

Additional initial testing is needed inside larger confined spaces where it is not possible to test all areas of the space from the outside. If initial readings are not acceptable, then further ventilation is required. See [Appendix C: Ventilation of Confined Spaces](#).

Once the initial outside readings are within the acceptable range, the Qualified Gas Tester, wearing PPE that includes a supplied-air breathing apparatus, shall go inside the space to conduct further testing. **A confined space entry certificate must be issued for the Qualified Gas Tester's entry.**

Additional follow-up testing may be required and, if so, must also be listed on the permit documentation.

NOTE: When performing gas testing of larger vessels (such as tanks) where a ventilation system is used to maintain a continuous air flow, the Qualified Gas Tester must shut down the ventilation for at least 30 minutes before performing the gas test to get a representative sample. Once a representative sample has been obtained, the ventilation system can be returned to service. The ventilation system must never be stopped while personnel are inside the confined space.

[Appendix D: Atmospheric Testing, Acceptable Limits](#) lists some examples of testing considerations and limits. Refer to the permit documentation for additional testing requirements and acceptable limits.

5.6.3 Work Delays

Entry must occur within an agreed period of time after the work is authorized. In all cases, if entry is delayed for 30 minutes past the allowable time specified in the [certificate](#), then gas testing must be performed again, and the permit must be revalidated before the entry is allowed.

5.6.4 Follow-up Gas Testing

Continuous gas testing must occur unless the type of work to be conducted does not allow for it. For example, continuous gas monitoring may not be feasible during water washing of a tank. Documentation of gas testing must occur at least every four hours.

5.6.5 Fluctuations or Changes in Air Concentrations

Competent personnel must investigate any changes in air concentrations, because the changes may be an indication of a hazard not considered or a change in overall conditions.

Do not be complacent if fluctuations occur within the acceptable ranges. For example, while it may be safe to enter when the oxygen content ranges from 19.5 to 23 percent, a 1.4 percent decrease from the normal percentage of 20.9 percent oxygen in the air represents a minimum 14,000 parts per million (ppm) increase of another gas. It is imperative to understand changing conditions to continue managing the risk. Oxygen depletion and oxygen enrichment must be examined and corrected before workers reenter the space to ensure that no health or explosion risks exist.

5.7 Conditions for Exercising Stop Work Authority

Work must be stopped and the Confined Space Entry [Certificate](#) returned to the Permit Approver for re-evaluation to assess whether the permit and [associated certificates](#) can be revalidated under the following conditions:

- The Qualified Gas Tester did not conduct gas testing
- Gas test results exceed established parameters
- The mechanical ventilation system in the confined space fails or is shut down
- Changes occur in the condition of the job site after the permit is issued
- The Entry Watch leaves his or her post without obtaining a qualified replacement
- The scope of work has changed, such as work not originally anticipated being added
- Unsafe conditions are found that were not previously known
- Portable or continuous gas-testing equipment fails (for example, the battery is depleted)
- Serious safety concerns were raised by a worker or company representative
- Facility emergency alarms were activated
- Events from adjacent processes occurred, such as a gas release, fire or spill
- A minor incident or near loss occurred onsite
- The workers reached the time limit designated on the Confined Space Entry [Certificate](#)

- All personnel exited the confined space due to a lunch break or work stoppage lasting more than 30 minutes **and** no one remained at the site to monitor the conditions in the confined space
- The Permit to Work for the confined space is no longer valid

During any non-emergency work stoppage, the job site must be left in a safe condition, with non-essential equipment turned off and the entrance secured.

5.8 Emergency Rescue

Critical: Never attempt to enter a confined space even in an emergency until help has arrived. Don't try to lift a person out of a hole without help. Rescue personnel must be trained and competent, and have the ability to perform their responsibilities. Rescue personnel must also have the correct equipment.

A rescue plan must be in place for each entry. It is important to select rescue services or teams, either onsite or offsite, that are adequately trained and equipped to perform confined space rescues of the kind needed at the facility and that can respond in a timely manner.

If an offsite rescue service is being considered, the service must be contacted to plan and determine their capabilities to respond. Merely posting the service number or relying on the emergency phone number to obtain these services at the time of a permit-space emergency does not comply with this standard.

Issues to consider when determining which rescue approach to take (either onsite or offsite):

- **Rescue need** – Determine how quickly a rescue team must be able to respond. For example, if entry is to be made into an IDLH atmosphere or into a space that can quickly develop an IDLH atmosphere (if ventilation fails or for other reasons), the rescue team or service must be standing by at the permit space. On the other hand, if the danger to entrants is restricted to mechanical hazards that would cause injuries (broken bones, abrasions, etc.) a response time of 10 to 15 minutes may be adequate.
- **Response time** – This is the time it takes for the rescue team or service to receive notification, arrive at the scene, set up equipment, and be ready for entry. Determine how quickly the rescue team or service can get from their location to the confined space where the rescue is to take place. Relevant factors to consider include:
 - The location of the rescue team or service relative to the workplace
 - The quality of the roads and highways to be traveled
 - Potential bottlenecks or traffic congestion that may be encountered in transit
 - The reliability of the rescue team's vehicles
 - The training and skill of the rescue team's drivers
- **Availability of the rescue team** – Consider whether the rescue team is unavailable at certain times of the day or in certain situations.
- **Willingness to rescue on company premises** – For offsite services, verify that the service is willing to perform rescues at the designated workplace. JO cannot rely on a rescuer who declines, for whatever reason, to provide rescue services.

- **Availability of adequate communications** – For a timely rescue, it is important that an adequate method for communication between the Entry Watch and prospective rescuers be available.
- **Rescue equipment** – For rescues into spaces that may pose significant atmospheric hazards and from which rescue entry, patient packaging and retrieval cannot be safely accomplished in a relatively short time (15 to 20 minutes), consider using air supplying respirators (with escape cylinders) for the rescuers and supplying rescue air to the patient. If the decision is to use a SCBA, ensure that the prospective rescue service has an ample supply of replacement cylinders and that the procedures for rescuers to enter and exit (or be retrieved) fall well within the SCBA's air supply limits.
- **Space entry and elevated rescue** – If the space has a vertical entry greater than five feet in depth, determine if the prospective rescue team or service can properly perform entry rescues. Furthermore, check if the team or service has the technical knowledge and equipment to perform rope work or elevated rescue, if needed.
- **Necessary skills** – It is imperative that the rescue team or service has the necessary skills in medical evaluation, patient packaging and emergency response.
- **Necessary equipment** – Ensure that the rescue team or service has the necessary equipment to perform confined space entry rescues.

5.9 Work Completion

The confined space may be closed after the Work Team Leader makes the final inspection. The Work Team Leader must ensure that the space is clear of workers and debris and that tools have been removed. If there is a reason to keep the entry points open, then they must be properly barricaded with warning signs stating that no entry is allowed. Equipment that may create a potentially hazardous situation if left unattended at the site must be removed and stored in a safe and secure location.

The Work Team Leader will return the permit and related documents to the Permit Approver when the work is complete. The Permit Approver or designee must review the jobsite to ensure the following:

- The job site has been left in a safe, clean and orderly condition.
- The work performed meets the required scope and specifications.

The Permit Approver or designee shall sign and date the permit to acknowledge that the above conditions have been met.

6.0 Records

6.1 Required Records

The following records will be kept:

- Copies of permits, [certificates](#) 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
Joint Operations – Permit to Work Standard	JO_MSW_PermittoWorkStandard.doc
Joint Operations – Isolation of Hazardous Energy Standard	JO_MSW_IsolationofHazardousEnergyStandard.doc
Joint Operations –Training Requirements Tool	JO_MSW_TrainingRequirementsTool.doc
Guidance for Specialized Work Permits (certificates)	Guidance for Specialized Permits (certificates).doc
<p>American Petroleum Institute (API) Recommended Practice (RP):</p> <ul style="list-style-type: none"> - 505 Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0 and Zone 2 - 500 Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2 	<p>American Petroleum Institute (API)</p> <p>NOTE: You may need a subscription to access API documentation. If so, consult a librarian listed on the home page.</p>
Upstream and Gas – Hot Work Standard	JO_MSW_HotWorkStandard.doc
Upstream and Gas – Work at Height Standard	JO_MSW_WorkatHeightStandard.doc
API RP 505/API RP 500	API RP 505/API RP 500

8.0 Other Guidance Documents

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		<i>Optional</i>

Table 1: Document History

Version Number	Date	Notes
1.0	27 February 2008	Initial Release
1.1	8 December 2008	Added bookmarks for OE Mentor
1.1.1	17 December 2008	SAC Adoption of MSW
1.1.1.A	30 March 2009	JO Version Created
1.1.1.B	10 August 2009	Update for Confined Space Entry Standard
1.1.1.C	21 January 2010	Update permit contact numbers
1.1.1.D	20 July 2010	Added CSE Rescue Plan
1.2	02 April 2013	Updated document to include Corporate Required MSW Process requirements

JOINT OPERATIONS Confined Space Entry Certificate

Printed Sl. No.-----

Section 1-6 to be completed by the Work Team Leader or designate and Section 7-8 to be completed by Approver or designate	7. SITE PREPARATION																																													
Associated General work permit no.	(Tick which ever is applicable) Yes NA																																													
1. Work Location Area/ Unit / Equipment Etc.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Gas test carried out initially and periodic test to be carried out Every _____ hours. Or</td> <td style="width: 10%; text-align: center;"><input type="checkbox"/></td> <td style="width: 10%;"></td> </tr> <tr> <td>Continuously (Attach CSE Gas test log)</td> <td></td> <td></td> </tr> <tr> <td>Equipment isolated, drained, blinded, flushed/purged and gas freed</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Man ways opened and ventilated</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Adequately cooled.</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Emergency Rescue Plan (Attached)</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Supplied Breathing Air</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Air Purifying Respirator</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Life line & Safety Harness</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Personal Hoist & Rescue equipment</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>CSE Attendance sheet attached</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Personal gas alarm</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Communication System</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Proper Lighting provided.</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td colspan="3">Other restriction or special precautions if any (specify)</td> </tr> </table>	Gas test carried out initially and periodic test to be carried out Every _____ hours. Or	<input type="checkbox"/>		Continuously (Attach CSE Gas test log)			Equipment isolated, drained, blinded, flushed/purged and gas freed	<input type="checkbox"/>	<input type="checkbox"/>	Man ways opened and ventilated	<input type="checkbox"/>	<input type="checkbox"/>	Adequately cooled.	<input type="checkbox"/>	<input type="checkbox"/>	Emergency Rescue Plan (Attached)	<input type="checkbox"/>	<input type="checkbox"/>	Supplied Breathing Air	<input type="checkbox"/>	<input type="checkbox"/>	Air Purifying Respirator	<input type="checkbox"/>	<input type="checkbox"/>	Life line & Safety Harness	<input type="checkbox"/>	<input type="checkbox"/>	Personal Hoist & Rescue equipment	<input type="checkbox"/>	<input type="checkbox"/>	CSE Attendance sheet attached	<input type="checkbox"/>	<input type="checkbox"/>	Personal gas alarm	<input type="checkbox"/>	<input type="checkbox"/>	Communication System	<input type="checkbox"/>	<input type="checkbox"/>	Proper Lighting provided.	<input type="checkbox"/>	<input type="checkbox"/>	Other restriction or special precautions if any (specify)		
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Other restriction or special precautions if any (specify)																																														
2. Issue Date :																																														
3. Permission granted to : _____ Name of the division/ section/ contractor																																														
4. Description of work																																														
5. Max, number of people allowed at time _____																																														
6. Tools/ Equipment to be used																																														

8. Gas Test

Time	LEL % (0)	O2 % (≥ 19.5 & ≤ 23)	H2S (≤ 5 ppm)	CO (≤ 25 ppm)	Other (Mention)	Temp. (C)	Gas tester's Name	Signature

9. Permit Approval (Initial Duration)

Date	Time		Name /Signature / Contact No.				
	From	To	Permit User (Permit conditions understood & agreed)	Work Team Leader (Permit conditions understood and agreed)	Area Controller (Work may begin safely)	Permit Approver (Control measures have been made & precautions taken)	Entry Watch (Understood the responsibilities)

10. Permit Extension (Declaration : Inspected the area, found permit conditions are not changed and job can be carried out safely.)

Date	Time		Name /Signature / Contact No.				
	From	To	Permit User	Work Team Leader	Area Controller	Permit Approver	Entry Watch

11. WORK COMPLETED <input type="checkbox"/> WILL CONTINUE ON			Printed Name	Signature	Date /Time
Permit User (Site handed over in safe condition, Housekeeping done)					
Work Team Leader (Site handed over in safe condition, Housekeeping done)					
Area Controller (Agreed to above and site checked and found OK)					
Permit Approver (Agreed to above and site checked and found OK)					

Fire & Security: 2398-4444 / 6647-1717 SAC Clinic: 2398-5428 / 6643-2111 KOC Clinic: 2398-5465

1 – White Copy – Work Site 2- Blue Copy – Issuer 3-Pink Copy – EHS

12. Permit Suspension	13. Permit Reactivation
Permit suspended : _____ Name , Signature & Contact no. Date & Time : _____ Notified to Approver <input type="checkbox"/> Reason for suspension : _____	Permit Reactivated – Work may start safely , Date & Time : _____ Area Controller : _____ Name & Signature Permit Approver : _____ Signature Name & Permit User : _____ Signature Name &

SPECIAL PRECAUTIONS AND CONDITIONS FOR CONFINED SPACE ENTRY

- 1 Keep this certificate available at the entry point with general work permit.
 - 2 Provide positive isolation by blinding or other means and check at every renewal. Do not disturb once isolated. Valve closure alone is not acceptable. Follow JO LO/TO Procedure.
 - 3 Isolate any power driven internal equipment. Use multilock.
 - 4 Maintain continuous and adequate ventilation using educator/blower/A.C.
 - 5 Never use utility/instrument/compressed air directly or oxygen for ventilation.
 - 6 Ground/bond educators/blowers to avoid static.
 - 7 Provide enough lighting using explosion proof type lamp.
 - 8 Provide easy access for entry/exit.
 - 9 Initial gas test is a must. Do fresh test at every renewal or as per gas testing section.
 - 10 Values shown in gas testing section are limits allowed without Breathing Apparatus (airline mask).
 - 11 Entry without Breathing Apparatus not allowed if LEL more than 0% or toxic gases above TLV(Example H2S - 5 ppm, CO -25 ppm etc) and O2 % in air is Less than 19.5 % or more than 23%.
 - 12 Do not use canister/cartridge masks. Use airline mask or SCBA set.
 - 13 Do not allow entry even with Breathing Apparatus if LEL more than 10% or H2S more than 100ppm or O2 in air is more than 23 %.
 - 14 Scales/sludge inside the equipment to be kept wet during ventilation, during removal and after removal.
 - 15 Provide reliable communication system between Entry Watch (Attendant) and workers inside.
 - 16 Men inside must come out if attendant leave or if ventilation or communication is interrupted.
- Entry Watch (Attendant) Duties**
- 17 Keep rescue equipment ready if identified by Approver . He must have same PPE as people inside.
 - 18 Maintain count of entrants and identify who is inside.

- 19 Frequently communicate with entrants.
- 20 Remains at **entry point** during entry until relieved.
- 21 Evacuate confined space if any hazardous condition is detected.
- 22 Do not attempt rescue by putting own life in danger. Call Emergency as per plan.
- 23 Do not allow unauthorized persons to enter.
- 24 Do not perform any other duty which can interfere with the attendant's duty.

HOW TO FILL THE PERMIT ?

Section 1 (Location of Work) : Describe the exact area, facility or well name, process area/unit, equipment or component.

Section 2(Validity of permit) : Specify the valid dates and time period during which the job is going to take place. The permit can be issued for one work shift, may be extended for two consecutive shifts in the same day after re-gas test and re-inspection of work site.

Section3 (Permission granted to) : Mention the exact division and contractor who are going to carry out the job.

Section4 (Description of work) : Fully describe the exact scope of work. Attach sketch if necessary.

Section 6 (Equipment to be used) : Mention the exact equipment to be used for carrying out the job like Gas Cutting torch, Boom Truck, Welding Generator, Crane, Jack Hammer etc.)

Section 7 (Site Preparation) : Approver and User will jointly decide if items mentioned in the section are required.

Section 8 (Gas testing) : Enter gas test result at the beginning of the shift. Gas test may be carried out continuously or at a regular interval if identified in Section.7. Calibrated gas tester shall be used and it should be tested in fresh air before going to the site. Initial gas test at the beginning of shift to be done by Approver representative and subsequent gas test may be carried out by User representative.

Gas Test Limit without Breathing Apparatus Set : LEL 0 %, H2S < 5 ppm, O2 ≥ 19.5 & ≤23 % ,
Others less than TLV.

Gas Test Limit with Breathing Apparatus Set ÷ LEL < 10 %, H2S < 100 ppm, O2 > 16.5 % <19.5 %

Section 9 (Permit Approval / Extension) Permit will be issued for one shift, may be extended for two consecutive shifts in the same day after re-gas test and re-inspection of work site. All the permit role players should sign the permit with their names and contact numbers.

Section 10 (Work completed) :Each permit must be closed at the end of job the site. Ensure that housekeeping of the site is done and site is safe for normal operations. Enter the date and time closed and sign.

Roles & Responsibility

1. **Approver** : Approver's signature confirms that the control measures have been made and precautions taken, except where these can only be taken during the work.
2. **Area Controller** : His signature confirms that he has inspected the work site, verified that all precautions and conditions are in place. Work may start safely.
3. **Work Team Leader** : His signature confirms that he has understood the work to be done, hazards involved, precautions required and also permit information has been explained to all workers involved.
4. **User** : His signature confirms that he has understood the work to be done, hazards involved, precautions required and also permit information has been explained to all workers involved.

10. JO Confined Space Entrant Log



JOINT OPERATIONS CONFINED SPACE ENTRY 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 field calibrated monthly and as recommended by the manufacturer. Check the calibration date before use.

Confined space entry certificate ref. no.			
Gas detector type (make , model)	Serial No.	Calibration date	Start-up OK ?
1.			
2.			

GAS TEST FREQUENCY	<input type="checkbox"/> Continuous	<input type="checkbox"/> Others (Specify _____)
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Date / Time	Location	Conducted by	Gas Test Result				Others
			O2 > 19.5 % & <23%	LEL < 10 %	H2S < 5 ppm	CO (<25 ppm)	

Gas Test Limit without Breathing Apparatus : LEL 0%, H2S < 5 ppm, O2 > 19.5 % & <23% , Others less than TLV.

Gas Test Limit with Breathing Apparatus : LEL < 10 % , H2S < 100 ppm, O2 > 16.5 % ,

11. Ventilation of Confined Spaces

Either natural or mechanical ventilation may be used in confined spaces. If mechanical ventilation is to be used, the exhaust must be pointed away from personnel or ignition sources. Confined space ventilation must follow these guidelines.

- Describe the procedures to be used, and diagram the ventilation equipment arrangement.
- Ventilation equipment must be bonded to equipment and grounded (bonded to earth) at all times to prevent static and electric hazards.
- An extraction ventilation configuration must be used when removing flammables from a space or vessel.
- Flexible ducting must be arranged to ensure no dead spaces or short circuiting will occur while ventilating.
- General ventilation must always be provided to ventilate the entire workspace volume for entry work.
- Point ventilation may be required to extract fumes or dust at the point of creation (origin) to prevent the entire workspace volume from being contaminated.
- Ventilation exhaust (fan/duct) outlets must be located so the exhausted air will not:
 - Be near a source of ignition
 - Be drawn back into the space/vessel being ventilated
 - Expose or endanger persons
 - Delay dispersion of exhausted air
- Ventilation supply (fan/duct) inlets must be located so the air supply will not:
 - Be contaminated by local contaminants, toxics or the exhausted air
 - Have its flow restricted
 - Be affected by wind or weather conditions
- Ensure complete ventilation of the space/vessel being ventilated. (Without dead spots, short-circuiting or re-circulating exhaust.)
- Ventilation equipment must provide sufficient air changes and turbulence to prevent dead spots or trapped vapors throughout the confined space.
- Ventilation equipment, tools and lighting power must be supplied from separate circuits, regardless of power source.
- Reference: Industrial Ventilation: A Manual of Recommended Practice for Design, 26th Edition.

12. Atmospheric Testing, Acceptable Limits


Level of Entry ⇒	Safe to Enter	Respiratory Protection Required		No Entry Allowed	Comments
Contaminant ↓		Mechanical Filter	SCBA or Airline		
Oxygen	19.5 to 23%	Not Allowed	≤ 19.5	<16.5%	
LEL * <u>1</u>	0%	Allowed if less than 2%	≤10%	> 10%	
H ₂ S	≤ 5 ppm	Not Allowed	5-100 ppm	>100 ppm	
Benzene	≤ 0 ppm	Greater than 0 to 5 ppm	≥6 ppm	N.A.	Skin protection required to prevent contact
Toluene	≤ 50 ppm	51 to 250 ppm	>251 ppm	N.A.	Skin protection required to prevent contact. Use chemical goggles or full facepiece for eye protection.
Xylene	≤ 100 ppm	>101 to 300 ppm	>301 ppm	N.A.	Skin protection required to prevent contact. Use chemical goggles or full facepiece for eye protection.
Hydrocarbons	≤ 150 ppm	>150 - 1000 ppm	>1000 ppm (2% LEL)	> 10% LEL * <u>2</u>	Skin protection required to prevent contact
Carbon Monoxide	≤ 25 ppm	Not Allowed	>26 ppm	N.A.	
Sulfur Dioxide	≤ 2 ppm	>2 to 20 ppm	21-100	≥100 ppm	Skin protection required to prevent contact. Use chemical goggles or full facepiece for eye protection.
Ammonia	≤ 25 ppm	>25 to <300 ppm	≥300	N.A.	Skin protection required to prevent contact. Use chemical goggles or full facepiece for eye protection.
Chlorine	0	Not Allowed	>0 to 9 ppm	≥10 ppm	Skin protection required to prevent contact. Use chemical goggles or full facepiece for eye protection.

ppm: parts per million

Entry into a space where the temperature is:

- Greater than 27° C (> 80° F) requires heat stress monitoring
- Greater than 32° C (> 90° F) requires medical monitoring and control
- *1: Hot work is not allowed inside a confined space unless there is a zero percent LEL reading in the space.
- *2: No entry allowed if LEL is greater than 10 percent (> 10%).
- Although the table shows that it is safe to enter an atmosphere that registers between 19.5 and 23 percent oxygen, it must be determined why the oxygen levels are changing from the normal percentage of oxygen in the air (20.9 percent). See section [5.6.5 Fluctuations or Changes in Air Concentrations](#).
- Inert atmosphere entry by specialist contractors may be permitted outside the ranges shown in the oxygen and LEL rows.

13. Rescue Plan

	<i>CONFINED SPACE ENTRY RESCUE PLAN</i>		<i>Permit to Work Number</i>		<i>Rescue Plan Created By?</i>	
	<i>Date</i>					
1. TASK DETAIL						
<i>Job/Task Description</i>						
<i>Supervising department/ division</i>		<i>Worksite Location</i>				
<i>Permit Approver (Name)</i>		<i>Work Team Leader (Name & Company)</i>				
2. EQUIPMENT (List of Equipment available at entry point)						
<i>Do rescue/ entry personnel require fall protection equipment to perform the rescue ?</i>					<i>Yes</i>	<i>No</i>
<i>List all equipment available at entry point</i>						
<i>Selected Rescue System:</i>						
<i>Is rescue system length sufficient to access all parts of the Confined Space?</i>					<i>Yes</i>	<i>No</i>
<i>Has suitable rescue system anchor point(s) been selected ?</i>					<i>Yes</i>	<i>No</i>
<i>List Rigging Equipment required to perform the rescue:</i>						
<i>Are there any specific risks from the confined space</i>						
3. EMERGENCY CONTACT						
<i>Emergency Contact Number</i>		<i>Emergency Services Notified of Work Before Start</i>	<i>Yes</i>	<i>No</i>		
4. METHOD STATEMENT (Include sketch of rescue equipment setup, if applicable)						
<i>Step</i>	<i>Description</i>					

<i>Possible Worst Case Scenario</i>	
<i>Rescue Plan</i>	
<i>Other Scenarios to consider</i>	

14. Entry into Inert Atmospheres

Entry into inert atmospheres is only permitted where specific written procedures have been prepared and authorized in writing. Only employees or contractors who are specially trained in working in inert atmospheres may perform this work at JO facilities. In general, it is recommended that specialty contractors be hired for inert entry jobs.

Contractors for this specialized work should be classified as high-risk contractors and should be required to demonstrate special qualifications before commencement of work. The work specifications include:

- Comprehensive written safety and operating procedures and instructions are required to perform inert atmosphere handling which define:
 - Maximum allowable oxygen content
 - Minimum inert gas flow rate
 - Total daily consumption of inert gas
 - Number and position of inert gas injection points
 - Persons responsible for monitoring inert gas pressure gauges
 - Number and location of oxygen-measuring elements and responsibility for monitoring and calibration
 - Restrictions for access to the immediate vicinity of the inert space to persons involved in the work
 - Arrangements for securing the work site in the event of work interruption
- Training certificates for entry into inert atmospheres showing dates of refresher training and experience of the personnel selected for the job
- Confirmation that named personnel undergoes regular medical checks and are physically capable of performing inert entry work
- Details of the gas testing equipment to be used. **Note that normal gas detectors (explosimeters) with catalytic sensors are not suitable.**
- Close cooperation between JO supervisors and contractor staff must be established and maintained from the pre-planning stage onward in order to safeguard against identified hazards and foreseeable difficulties.
- Areas of responsibilities in the execution of work must be clearly defined, easily understood and strictly followed.

Entry into inert confined spaces must only be made using air-supplied positive pressure breathing apparatus, together with a self-contained cylinder (escape set) or other independent backup supply. Entry using conventional self-contained breathing apparatus must be limited to emergency life-saving interval.