



**AZERBAIJAN BUSINESS UNIT  
(AzBU)**

**Procedure for:  
Confined Space Entry**

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## 1.0 INTRODUCTION

### 1.1 Purpose

The purpose of this procedure is to:

- Identify and define confined spaces
- Describe the proper procedures and preparations to protect the health and safety of all personnel who must work in confined spaces.

### 1.2 Deviations

The procedures are written in sufficient detail that they should be able to be applied consistently at all sites. There may still be the requirement for some local rules covering site specific logistical/administrative arrangements and local variations in responsibilities to reflect differences in organisational arrangements. These local rules should not deviate from the core processes within this document. Any form of deviation from this procedure, including but not limited to local rules, shall be requested and authorised in accordance with the SSOW Deviations from Regulations and Procedures procedure (Doc. No. UNIF-HSE-PRO-101)

### 1.3 Scope

The scope covers defined activities of BP and Contractors at all BP AzBU sites and installations.

### 1.4 Document Review

This document will be reviewed on an annual basis when users from the sites will have an opportunity to propose changes to the existing processes and procedures. The document Technical Authority will be responsible for coordinating this review.

### 1.5 SSOW Specific Cross references

This SSOW procedure shall, where appropriate, be used in conjunction with this suite of AzBU SSOW Procedures referenced below.

Document Number	Title of Procedure
UNIF - HSE- PRO - 101	Deviations from Regulations and Procedures
UNIF - HSE- PRO - 102	Incident Investigation and Reporting
UNIF - HSE- PRO - 103	Permit To Work
UNIF - HSE- PRO - 104	Authorization
UNIF - HSE- PRO - 105	Task Risk Assessment
UNIF - HSE- PRO - 106	Energy Isolations-Electrical
UNIF - HSE- PRO - 107	Energy Isolations-Process
UNIF - HSE- PRO - 108	Confined Space Entry
UNIF - HSE- PRO - 241	Leak Testing

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## 1.6 BP Golden Rules

Entry to Confined Spaces is covered specifically by one of BP's 8 Golden Rules, which states:

*"Entry to such spaces must be controlled, and only authorised following a risk assessment and the establishment of controls over the hazards. The actual detailed permitting requirements will be based on local rules and national regulatory requirements, the frequency of entry, and full knowledge of the hazards present"*

## 1.7 Caution

**A Level 2 Risk Assessment (L2RA) must be completed before any entry into a confined space (See UNIF-HSE-PRO-105).**

The Risk Assessment should identify the:

- The Process and Electrical positive Isolation of the area to be entered
- Sequence of work to be performed in the confined space for which a separate permit to work is mandatory
- Specific hazards known or anticipated
- Control measures to be implemented to eliminate or reduce each of the hazards to an acceptable level.
- In order to allow a gas tester to test the atmosphere in a confined space a Confined Space Entry Permit must be issued – the gas tester then records the concentrations of gas found and signs that the atmosphere is safe for people to enter. The Confined Space Entry Permit may then be used with a Permit to Work to control the work in the Confined Space

No entry shall be permitted until the Risk Assessment and the completed Confined Space Entry (CSE) Permit and the appropriate Permit to Work have been reviewed and discussed in a Toolbox Talk by all persons engaged in the activity.

## 1.8 Definition

A confined space is a place which is substantially, though not always entirely, enclosed and where serious injury can occur from hazardous substances or conditions within the space or nearby. This includes large pipelines, tanks, vessels, separators, silos, ducts, sewers, pits, flues, manholes and voids between modules and in legs on offshore Installations. It also includes any space in which dangerous levels of contaminants can accumulate and ventilation is restricted, eg excavations (normally deeper than 1.2m), the space above floating roofs on floating roof tanks, open-topped tanks, closed or unventilated rooms, sumps and culverts, and any other poorly ventilated areas.

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The hazards that this document addresses arise through the confined nature of the place of work in combination with one or more of the following:

1. The possible presence of flammable and/ or toxic substances
2. An oxygen-deficient atmosphere
3. An oxygen-enriched atmosphere
4. Ingress of solids or liquids
5. The presence of excessive heat

For more information on hazards associated with CSE see Appendix B.

## **1.9 Language Facilitation**

Due to the various languages spoken at site, there is a necessity to assist all with “an ease of understanding”. Therefore, the development and use of information tools are available.

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## 2.0 ROLES AND RESPONSIBILITIES

**Note:** For all confined space work, the responsibility for safety, during the entire operation, rests with the Performing Authority, Confined Space Attendant, Authorised Entrants and Rescue Team personnel. These personnel must ensure that adequate steps have been taken to eliminate or control the hazards present.

### 2.1 OIM / Site Controller / Site Manager

Is responsible for the implementation of this Safe System of Work procedure on all his/her facilities. This includes the training of staff and contractors in the use of the procedure and the keeping of records. The OIM/Site Controller is responsible for ensuring the competence of all authorities involved in Confined Space Entry Permit work. He must approve the outcome of the Level 2 Risk Assessment (see **UNIF-HSE-PRO-105**)

### 2.2 Area Authority (AA)

Area Authorities are responsible for:

Identifying and labelling all confined spaces existing within their areas of responsibility that require a Confined Space Permit to enter

- Ensuring all persons involved in confined space entry work have received appropriate training and certification
- Leading the Level 2 Risk Assessments for Confined Space Entry (CSE) operations to ensure personnel are protected from confined space hazards, using a Level 2 Risk Assessment (see UNIF-HSE-PRO-105)
- Issuing the Entry Permit and Permit to Work authorising entry for the work to begin (provided that the requirements of this procedure have been met)
- Cancelling or suspending the Confined Space Entry (CSE) Permit when the job is complete or when unacceptable conditions arise.

### 2.3 Performing Authority

The Performing Authority shall:

- Know and recognise hazards that may be faced during entry by participating in a Level 2 Risk Assessment before entry
- Ensure that he understands all the conditions on the PTW and cross-referenced Certificates and signs to confirm his responsibility for complying with all the conditions on the Permit
- Ensure that roles and responsibilities are effectively communicated to ensure the competence of the workforce – including leading a toolbox talk
- Ensure that personnel entering a confined space have all necessary personal protective equipment
- Ensure that rescue services are informed about the entry and that they are readily

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available in an emergency

- Ensure that the necessary rescue and resuscitation equipment are readily available
- Ensure acceptable safe entry conditions are maintained consistent with the terms of the Confined Space Entry (CSE) Permit.
- Stop work and remove everyone from the confined space if the conditions of entry, including the scope of work, change

## 2.4 Gas Tester

Approved persons who have been fully trained and certified in gas testing for confined space entry purposes, i.e. Authorised Gas Tester Level 1 (AGT1), is trained to gas test prior to work in confined spaces.

There are two levels of AGT – 1/2. Only AGT1 can test for CSE.

The AGT1 shall:

- Prove the safe atmosphere (i.e. free of toxic and flammable gases) in the confined space using correctly calibrated gas testing equipment in his charge with an understanding of the limitations of the equipment
- Prove Oxygen Levels within levels required
- Enter the readings obtained while testing the atmosphere in the Confined Space onto the Confined Space Entry Permit
- If the atmosphere is within the acceptable limits for entry, sign section 8 of the Work Permit.
- Where the gas concentrations are outside the acceptable limits sign the permit to this effect discuss with the Area and Performing Authorities measures to further purge the space.
- Observe and record any sludge or scale in the Confined Space and record it on the Confined Space Permit ensuring that the findings are clear and easy to read.

## 2.5 Authorised Entrants

The authorised entrants shall:

- Follow established safety standards and practices
- Participate in a Toolbox Talk
- Read the conditions required by the Confined Space Entry Permit and the associated Permit to Work
- Know and recognise the hazards that may be faced during entry including signs or symptoms, and consequences of the exposure
- Inspect, test and make proper use of equipment and protective devices
- Maintain communication with the Confined Space Attendant to enable the attendant to monitor the entrants' status
- Alert the attendant if an unsafe condition exists or when symptoms of exposure

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appear

- Come out from the confined space as soon as possible when:
  - Ordered by the attendant
  - The entrant recognises the warning signs or symptoms of exposure
  - An unsafe condition exists.

## 2.6 Confined Space Attendant

The Confined Space Attendant has a vital function to perform. **Under no circumstance may the Confined Space Attendant enter the confined space or leave his post whilst there are personnel inside.** The Area Authority must ensure that the Entry Attendant understands his duties and is competent to perform them.

The attendant must be properly trained to carry out his duties and must attend the toolbox talk before the start of work. He must remain outside the confined space, in a safe atmosphere and safe physical position, at all times during a confined entry operation and perform the assigned duties under this procedure. He must also:

- Maintain an accurate count of all persons in the space by:
  - Using a tally board on which the name, entry and exit times for all personnel entering or leaving the confined space shall be recorded
  - Marking airlines and / or safety lines so that each individual inside the tank is clearly identified in the event of a problem
- Be aware of the hazards that may be faced during entry, including the mode, signs or symptoms, and consequences of any exposure
- Monitor conditions and activities inside and outside the space to determine if it is safe for entrants
- Remain outside the confined space during entry operations until relieved by another Attendant
- Keep entrants under effective surveillance and maintain effective and continuous communication with them during entry by one or more of the following methods
  - Line-of-sight (not always possible)
  - Voice contact (allowing for distance and ambient noise)
  - Radio with agreed periodicity of contact
  - Pre-arranged signals on air-klaxons, whistles etc
  - Pre-arranged lifeline signals
  - Distress signal unit
- Order authorised entrants to evacuate the confined space immediately if:
  - a condition is observed that is not allowed
  - behavioural effects of hazard exposure are detected
  - a situation occurs outside the confined space that could endanger the entrants



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- an uncontrolled hazard is detected inside the confined space
- the attendant must leave the work station
- ensure unauthorised persons are not allowed to approach or enter a confined space while entry is underway
- Be equipped with a device (e.g. radio, telephone) to summon assistance rapidly if Entrants get into trouble.
- Notes:
  - Normally, rescue and resuscitation equipment shall be near to the worksite and personnel trained in its use will be readily available and aware of the entry.
  - Consideration must be given to having the rescue team attend the pre-job briefing to ensure familiarity with the proposed work.
  - Ensure that an adequate supply of respirable air is maintained whilst Entrants are inside the confined space.

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### 3.0 AUDITING AND MONITORING

Each Business Asset shall undertake internal audits of the operation of Confined Space Entry. The auditing process including; frequency, checklist, register, actions, tracking and close out may be included in the audit program of the Permit to Work System at each site.

These audits must examine the detailed reviews of Confined Space Entry, and check compliance with this procedure and any deviations in place."

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## 4.0 COMPETENCY, TRAINING AND AWARENESS

BP and its Contractors must provide adequate training for all personnel likely to be involved in confined space entry, either as entrants, attendants, rescue team members or gas testers, to ensure that they possess the understanding, knowledge and skills necessary to safely perform their assigned duties.

### 4.1 Training

Training shall include, but not be limited to:

- AGT1 shall be fully trained and certified in gas testing for confined space entry purposes. Assessed and confirmed competent in accordance with UNIF-HSE-PRO-103, Permit to Work System.
- Confined Space Entry Attendants shall be formally briefed on all aspects of the proposed entry activities and on their particular duties; and shall be prepared to demonstrate their competency to the Area Authority.
- Entrants shall be briefed by the Performing Authority, Supervisor or Confined Space Attendant to ensure that they understand the hazards of the task in hand, signs, symptoms and consequences of exposure; and are aware of the emergency signal to be used by the attendant, if evacuation becomes necessary.
- The Rescue Team Members shall receive approved PPE and rescue equipment (including BA sets) and be trained in their use. In addition to rescue training, each team member must undergo basic first aid and resuscitation training.
- Employees and Contractors' personnel who will be involved in the entry must also be fully conversant with the scope of work, Emergency Response Plan, response actions and be trained in:
  - hazard recognition
  - Safe Systems Of Work (SSOW) - permit to work procedures, isolation procedures, purging and/or ventilation procedures
  - the use of continuous gas monitoring equipment
  - the use of safety equipment such as airline breathing equipment, respirator, retrieval harness and lines
  - the use of communication equipment
  - self rescue.

New personnel shall not be assigned to the above tasks, unless under training and accompanied by a competent person (maximum 2 new starts to 1 supervisor) who is familiar with the hazards of confined space entry.

### 4.2 Registers

A register will be held on site of all personnel deemed competent for all the roles associated with Confined Space Entry, and will be managed by the Site Manager / Site Controller /

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Offshore Installation Manager.

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## 5.0 PLANNING AND PROCEDURE

### **All alternatives to entry must be considered before starting to plan for Confined Space Entry.**

Prior to entry into a confined space, the equipment shall be positively isolated, emptied, cleaned and gas freed as necessary.

A Confined Space Entry Permit form (see UNIF-HSE-PRO-103 Permits to Work) shall be completed to allow the Gas Tester to test the atmosphere in the Confined Space. He will sign the permit after the test to indicate the atmosphere is safe for the work to be done. The Confined Space Entry Permit is then attached to the Permit to Work

Positive isolation (see UNIF-HSE-PRO-107) must be effected on all live process, utility and service lines and electrical/control equipment for any task requiring entry to a vessel or confined space. Spool removal is preferred, although spade isolation may be used where it is not reasonably practicable to remove pipe work sections. It should be noted that in some cases it may not be reasonably practicable to comply with this requirement when making entry to mud tanks, pump pits, ballast tanks, or other utility systems. Here, a Level 2 Risk Assessment must be undertaken and approval obtained from the OIM or Site Controller before entry can be permitted under work control.

Vessel nozzles should normally be left open to assist with free ventilation. Air movers or ducted fans may also be used to create a flow of clean air through the vessel. If there is any likelihood of fumes, water or other contaminant entering the vessel from sources other than the isolated pipe work while persons are inside, the need to blank off any affected nozzles must be considered. Blanks used for this purpose do not need to be pressure-rated. However non-pressure rated blanks must be clearly identified by a tag, painted circumference or other marking. In the case of tanks with 'swan necks', mechanical plugs may be an option, to prevent ingress of fumes, etc.

**The 'man-way' doors on a vessel being prepared for entry must be removed last and reinstalled first to reduce the risk of unauthorised entry.**

### 5.1 Planning Process

Planning for confined space entry shall include the following:

- Confined space hazard identification and Level 2 Risk Assessment (mandatory)
- Positive Isolation to ensure no process or utility fluids or gases may enter during the entry
- Entry Permit preparation to enable Gas Tester to enter the vessel
- Gas testing and confined space inspection:
- Prior to any entry into a confined space, the atmosphere shall be tested to determine

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the precautions necessary, and an Entry Permit issued.

- Throughout the period of entry into confined spaces, the atmosphere in the space must be strictly controlled to prevent persons being exposed to risks associated with toxic and/or flammable fumes and vapours in the atmosphere, and with atmospheres that may be deficient (or enriched) in oxygen.
- Entry Permit issue and duration of validity
- Procedures for control of work including procedures for any non-compliance with normal standards based on the Level 2 Risk Assessment
- The resources available to deal with any potential emergency that may arise should limit the number of personnel entering a confined space.
- An Entry Permit is not a permit to work and for all work in the Confined Space a relevant Permit to Work shall be issued
- Gas tests required for hot work shall be carried out separately (i.e. the tests done for entry are not valid for the hot work permit).
- Emergency response arrangements

Access and egress arrangements should take into consideration the possibility that a casualty may need to be evacuated in an emergency. It would require a winch to vertically hoist an average person from a space below. Wearing a harness and lifeline shall only be considered practicable if the nature of the confined space is such that the attendant could hoist or drag out the person from the space if the latter were immobilised, and if the rope would not impede an unassisted exit. Wearing only the harness should also be considered - a rescuer could attach the lifeline to effect evacuation of the person

- Procedures for entering confined spaces with and without Breathing Apparatus (BA) are described in Paragraphs 5.6 and 5.7.

## 5.2 Hazard Identification and Level 2 Risk Assessment (L2RA)

A Level 2 Risk Assessment shall be made to establish whether the proposed confined space entry and the work to be done can be performed safely. Some of the dangers that should be considered are described in Appendix B:

The main hazards associated with entering and working in confined spaces are listed in Appendix B as a checklist for the Risk Assessment

## 5.3 Gas Testing

Only approved persons who have been fully trained and certified in gas testing for confined space entry purposes, i.e. Authorised Gas Tester Level 1 (AGT1), shall carry out gas testing for entry,

The AGT1 shall request an Entry Permit from the Area Authority to confirm that the confined space is isolated and to authorise entry (if required) for the AGT1. Any special operational conditions inside or outside the space will be conveyed to the AGT1 on the permit.

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Where practicable, the gas test shall be carried out from outside the confined space (e.g. using extension probes). In some circumstances it may not be possible to sample a representative portion of the space from the entrance, taking into account ventilation arrangements and the possibility of heavier than air gas remaining in low areas. In this event, the AGT1 may have to enter the space in order to complete his tests.

The conditions for the entry of the AGT1 shall include:

- The AGT1 shall not enter if the conditions at the entrance are outside the criteria for entry with BA (refer to Table 1).
- A Confined Space Attendant (refer to Paragraph 2.6) shall be stationed at the entrance so that he is able to see the AGT1 and equipped to raise the alarm if the AGT1 should get into trouble and also to warn the AGT1 of an external emergency.
- The AGT1 shall wear BA. He shall only enter the confined space without BA if he is updating a valid Entry Permit that has already certified the space fit for entry without BA.
- If practicable, the AGT 1 shall wear a harness and a lifeline. This shall only be considered practicable if the nature of the confined space is such that the attendant could hoist or drag out the AGT 1 from the space if the latter were immobilised, and if the rope would not impede the AGT 1 in making an unassisted emergency exit.

**Note:** It would require a winch to vertically hoist an average person from a space below.

- Reviving Resuscitation equipment ready for immediate use shall be kept close at hand.

### 5.3.1 Gas Test Requirements

Testing must be carried out in accordance with the following requirements:

- Ventilation equipment must be shut off before the tests commence.
- The atmosphere must be tested at the bottom, top, and the middle of all confined spaces.
- The atmosphere inside must be continuously monitored while work is being conducted in the confined space.
- If the confined space is left for any reason, the atmosphere shall be re-tested before re-entry may be permitted.

### 5.3.2 Test Equipment

Testing instruments must be calibrated and operationally checked before and after use in accordance with manufacturer specifications. Test records must be held on site.

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## 5.4 Criteria for Confined Space Entry

The space shall only be classed as fit for entry without BA if:

- The oxygen and flammable gas levels are the same as measured outside in fresh air, and
- Toxic contaminants do not exceed current occupational exposure limits
- Also:
- The AGT1 shall confirm that there are no materials left inside which in his judgement may give off sufficient quantities of vapour and fumes if disturbed, such that the atmosphere would cease to be classed as fit for entry without BA.

**Table 1 Permitted Limits for Confined Space Entry and Work**

<b>Criteria</b>	<b>ENTRY WITHOUT BA</b> (Refer to paragraph 5.6)	<b>Entry with BA</b> (Refer to paragraph 5.7)
Oxygen Content (%)	20.8 to 22.5% (Same as in fresh air)	19 to 20.8%
Toxicity (Occupational Exposure Limits (Note 1))	<LTMEI (8 hours) (Long-term Exposure Limit) (Note 2)	<STMEI (15 minutes) (Short-term Exposure Limit)
Hydrocarbon Vapour (% Lower Explosive Limit – measured on a combustible gas indicator) (Note 3)	<1% LEL Inspection, Hot and Cold Work Permitted (Note 4)  1 to 4% LEL Only Inspection and Cold Work Permitted (Note 4)	>4 to <25% LEL Only Inspection and Cold Work Permitted (Note 4)  <b>&gt; 25% LEL entry NOT permitted under any circumstance</b>
Notes: (1) Occupational Exposure Limits for various toxic substances are defined in the UK HSE Guidance Document EH40 (2) For longer work shifts (e.g. 12 hours) LTMEI must be extrapolated to give 12-hour Time Weighted Average (TWA). (3) Lower Explosive Limit (LEL) synonymous with Lower Flammable Limit (LFL). (4) Continuous gas monitoring must be performed throughout confined space occupancy.		

## 5.5 Entry Permit Issue and Validity

When the gas test has been completed, the Area Authority shall consider the results. He shall then issue the appropriate Work Permit, cross-referenced to the Confined Space Entry Permit on which is specified the period in which he considers it safe to enter the space, taking into account the nature of the space, possible contaminants, type of isolations and the type of work proposed.



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**An Entry Permit on its own does not authorise entry for any purposes other than testing by AGT1.**

The Entry permit shall be displayed at the job site. Entry points shall be barriered off when the vessel is not manned

Entry to the confined space shall commence and continue at any time during the period for which the permit is valid. If the space is vacated during the period of validity, a gas test shall be undertaken before re-entry. Alternatively, if continuous gas monitoring equipment has been in use throughout the vacated period, entry may proceed without the gas test. The period of validity shall not normally exceed one shift.

In appropriate circumstances, the Site Controller (or his formally delegated nominee) in consultation with the Site HSE Advisor, may permit the validity of an entry permit to be extended beyond a single shift to a specified period of time, if the nature of the isolations and the degree of cleanliness of the vessel are such that conditions within the space will not change significantly during that period.

A proprietary Entry tag System may be used to supplement the Entry permit to enhance the control of entry into confined spaces. The advantages are:

- It can be prominently displayed at the entrance to a confined space
- It clearly indicates 'DO NOT ENTER' or details the conditions of entry
- It is easily updated

## **5.6 Procedure for Entry into Confined Spaces without BA**

### **5.6.1 Confined Space Attendant**

A suitably trained Entry Attendant shall be stationed at the designated entrance to the confined space and shall perform the duties outlined in Section 2.6

### **5.6.2 Entrants**

Entrants to the confined space shall:

- Wear suitable PPE, as required
- Wear a harness and lifeline, if specified on the Level 2 Risk Assessment
- According to the type of work and the risk, take adequate rest periods out in the open air
- Continuously monitor for oxygen, hydrocarbons and H<sub>2</sub>S

This may be achieved by one of the Entrants monitoring Crowcon Triple meter (or similar) to ensure that the conditions are not worsening. If this should occur, the space should be vacated, ventilated and re-tested until conditions have improved to within the limits set out on the Entry Permit.

### **5.6.3 Work Activity Affecting Entry without BA**

Even though a gas test may indicate that a confined space is fit for entry without BA, if work

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is to take place within that is likely to generate toxic or flammable vapours to such an extent that the atmosphere cannot be kept free of contaminants by forced or natural ventilation (e.g. application of paint coatings), the space shall be treated as not fit for entry without BA and the additional precautions listed in Paragraph 5.7 shall be followed.

## **5.7 Additional Procedure for Entry into Confined Spaces with BA**

### **5.7.1 Confined Space Attendant**

The Confined Space Attendant shall perform the duties listed in Section 2.0 paragraph 2.6. Additionally, where the space contains residual fluids (e.g. water) into which a person might fall so that his face and BA are submerged, he shall be assisted by a rescue person who shall be stationed at the opening in addition to the Confined Space Attendant, equipped to make an entry wearing BA so as to give immediate help, if he considers it safe to do so.

### **5.7.2 Entrants**

Entrants shall perform the duties listed in Section 2.0 paragraph 2.5. In addition, they shall wear approved positive pressure BA and be trained in its use.

#### **Note:**

- Canister respirators shall not be used in any circumstances. Air-supplied apparatus shall be used.

- All personnel expected to wear BA and carry out work at the same time are recommended to be clean-shaven in order to provide a good seal between mask and face.

If it is not possible to class the space as 'fit for entry without BA', entry WITH BA may be permitted, subject to the criteria in Table 1 and in accordance with the additional precautions below:

- Approved positive pressure BA is worn.
- Authorisation for ENTRY WITH BA has been given.
- Where practicable, retrieval gear is worn.
- The Entry Attendant must be stationed outside the space entrance at all times.
- Rescue and reviving equipment and qualified personnel shall be readily available.

## **5.8 Cleaning**

### **5.8.1 Removal of Sludge, Scale and Hard Deposits**

After a tank or vessel has been opened up, as much oil, sludge and scale as possible shall be removed by means of bailers, squeegees etc, aided, if convenient, by adequately earthed water hoses. As much removal as possible should be carried out from the open manhole door but invariably it will be necessary to enter the tank/vessel to remove all sludge and scale. Rules for entry as laid down in Paragraphs 5.2 and 5.6 shall be strictly adhered to.

Earth sumps or suitable containers shall be provided for the reception of oil or oily sludge. This material shall be contained and disposed of in a safe and environmentally acceptable

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manner.

All pyrophoric scale shall be disposed of in an approved manner. During the time that it is exposed to the air after removal, it shall be kept wet. Pyrophoric scale is removed from offshore installations in sealed drums, the scale being 'slurred' with water.

Where there are hard deposits, necessitating the use of chipping tools, the PTW shall specify that the surface being chipped must be kept thoroughly wetted during the operation.

Where high-pressure water jets are used in the removal of sludge and scale, only specifically trained operators shall be used. Where standard water hose and nozzles are used to wash out, the nozzles shall be earthed.

### **5.8.2 Use of Chemical Cleaners**

If chemical cleaners are to be used then the MSDS for the chemical shall be consulted and a risk assessment (CARA) conducted prior to use. In particular, additional ventilation or respiratory protection may be required

When introducing a chemical into a confined space, the compatibility of that chemical with the contents of the confined space must be checked. If any doubts exist regarding the compatibility of a chemical, the HSE Department shall be consulted.

Sludge and spent cleaning fluids must be contained and disposed of in a safe and environmentally acceptable manner.

When chemical cleaning takes place there is a possibility for the production of toxic gases, including H<sub>2</sub>S. Therefore a closed drain system, outside the confined space, shall be used for the disposal of effluent from these operations. Personnel engaged in these operations shall wear suitable chemical protective clothing/equipment and suitable toxic gas monitoring/warning devices shall be provided.

### **5.8.3 Removal of Trapped Oil or Vapour**

When repairs are to be carried out within a tank or vessel, care shall be taken to ensure that oil is not trapped inside internal structural members. Any hollow supports or bracing steelwork exposed to hydrocarbon should be carefully drilled at the lowest and highest point to detect the presence of oil. If it is found, the hollow member must be purged by one of the methods discussed above before work on the tank or vessel is allowed to proceed.

Any linings or wear plates attached to the shell of a tank or vessel may trap liquid hydrocarbons behind them. This liquid can percolate into the vessel or tank by way of minute cracks. Therefore, the vessel or tank shall frequently be tested to ensure that it remains gas free.

## **5.9 Ventilation**

### **5.9.1 'Clean-out' Doors**

Where confined spaces are provided with clean out doors, these doors shall be opened after purging, and the confined space thoroughly ventilated.

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### 5.9.2 Use of Ventilation Equipment

Ventilation shall preferably be accomplished using a positive method of mechanical ventilation that is arranged to:

- introduce sufficient fresh air and remove contaminants from all pockets or corners of the confined space
- avoid re-circulating contaminated air.

Even after the confined space is cleaned and ventilated, the mechanical ventilation equipment must be kept operating to provide secondary protection:

- in case of accidental introduction of harmful substances
- to remove contamination or heat that may be produced by the work (e.g., welding and cutting, painting, coating).

The atmosphere must continue to be monitored for hazardous atmospheres while personnel are inside the confined space.

### 5.9.3 Ventilation Air Source

The ventilation air used will be from either:

- an electrical blower approved for a Zone 1 hazardous area, or
- an air driven blower.

The air intakes for these devices shall be located where no contaminants may enter the stream.

### 5.9.4 Disposal of Confined Space Atmosphere

Outlets for power driven blowers, pneumatic air adductors, or air/steam adductors used to draw vapours out of a confined space must be directed to a safe place far from possible sources of ignition.

### 5.9.5 General Ventilation

When welding (especially MIG/TIG) or other work is to be carried out in a confined space, precautions shall be taken to ensure that an adequate flow of fresh air is available and that welding fumes are removed. Great care shall be taken to ensure that the airflow is always away from the breathing zone of the welder and that contaminated air does not 'short circuit' back to the welder.

Where exhaust ventilation is used in a confined space, the extracted air shall be diverted well away from the confined space so that replacement air shall be fresh. When adequate ventilation cannot be provided, approved breathing apparatus or a suitable facemask supplied with fresh air shall be worn.

**Compressed oxygen or instrument air shall never be used to ventilate a confined space.**

## 5.10 Lighting and Portable Tools

### 5.10.1 Temporary Lighting

The following precautions shall be observed when using temporary lighting:

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- Where the confined space has not been declared gas free, air driven flameproof lights or certified battery powered torches shall be used. Lights must be certified for a Zone 1 (Division 1) area.
- Confined spaces, which have been certified gas free but where flammable residues could remain, may be illuminated as above; or by extra low voltage (25V ac) portable lighting equipment, approved for use in a Zone 1 (Division 1) area.
- Where the confined space has been cleaned of all flammable residues and certified gas free, or is a confined space by virtue of restricted access alone and there has never been the possibility of it containing a flammable atmosphere, standard low voltage industrial lighting may be used.
- The supply cables to the (approved for use in a Zone 1 (Division 1) Area) transformers, for extra low voltage portable lights, must always be supported above ground and the transformers never taken inside the Confined Space.
- Particular attention must be paid to the protection of cables passing through doors and entry points

#### **5.10.2 Tools**

If the atmosphere inside the confined space requires BA to be worn (see Table 1) because of the presence of hydrocarbon, no electrical tools must be used by the entrants. Air-driven tools only may be used. Tools with the potential to produce sparks, e.g., grinders or needle guns, shall not be used.

## **6.0 WELDING**

Before any welding, cutting and grinding may be carried out in a confined space; the space shall be proved completely gas free, and free of all flammable residuals

## **7.0 CONFINED SPACE PLANNING FLOW-SHEET**

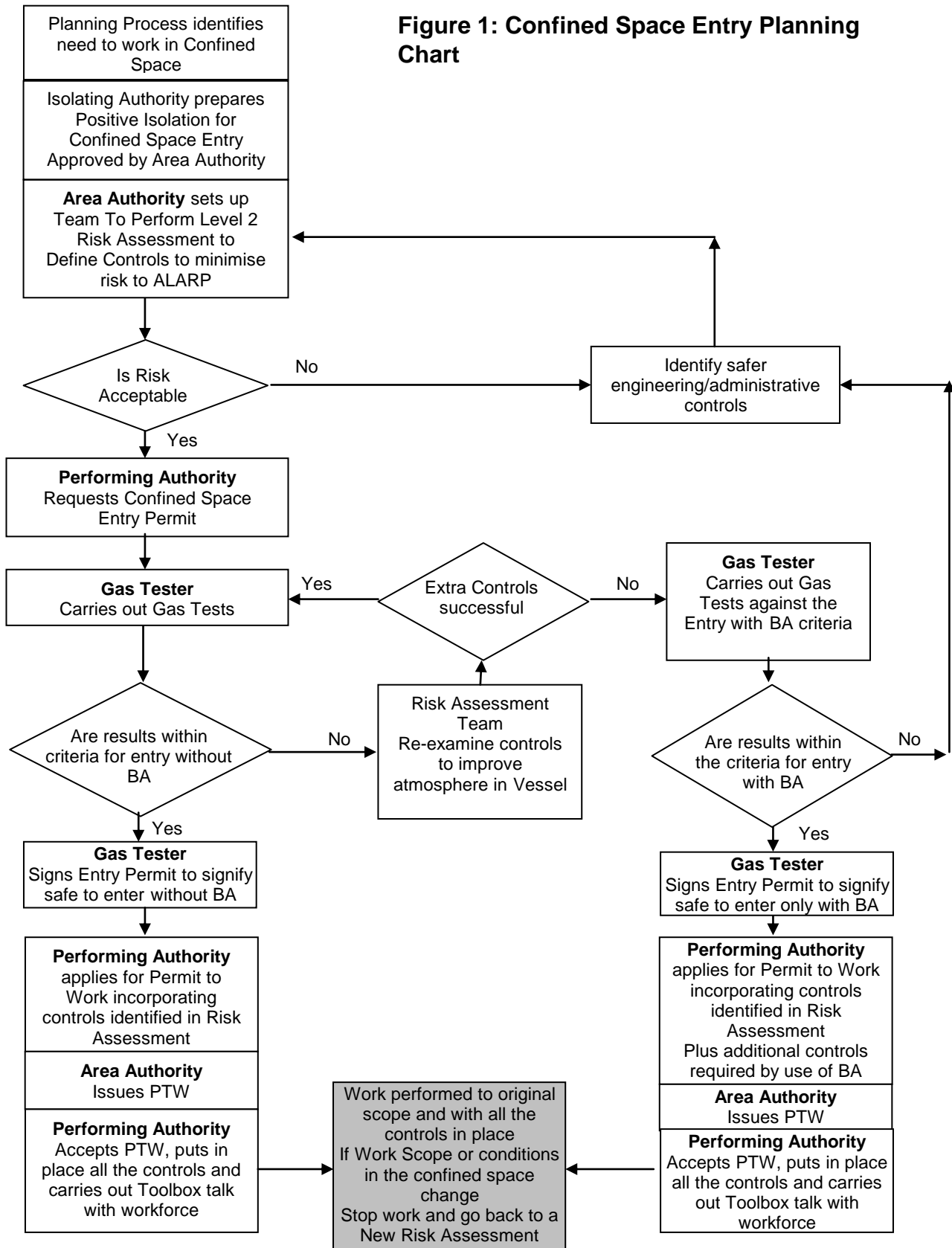
A schematic diagram to show the sequence of planning for Confined Space Entry is shown in Figure 1

## **8.0 JOB COMPLETION**

If the vessel is unmanned for any period of time the entry points shall be barriered off. The Entry Permit must be cancelled upon completion of the entry and after all entrants have exited. At the end of a job, a thorough check must be made by Area and Performing Authority to ensure that no personnel, tools or equipment have been left behind.

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**Figure 1: Confined Space Entry Planning Chart**



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## 9.0 RESCUE

Emergency Response arrangements shall be considered in the Risk Assessment and shall cover, rescue, resuscitation, and treatment of casualties

### 9.1 The Rescue Team

The Rescue Team should respond immediately to rescue calls from the Attendant or any other person recognising a need for rescue from the confined space.

The Rescue Team must be trained to perform the assigned rescue functions. In particular, members must be trained in the proper use of personal protective and rescue equipment, including breathing apparatus. Also, at least two Rescue Team members shall be certified in first aid and in Cardio-Pulmonary Resuscitation (CPR).

### 9.2 The Rescue Plan

The rescue plan should be written to include as a minimum:

- A means of raising the alarm by the Confined Space Attendant or other person observing an emergency situation
- an assessment of the hazards associated with the confined space
- the required gas testing/monitoring equipment
- the personnel required to perform the rescue
- all precautions to be taken while in the confined space
- the required personnel protective equipment (PPE)
- the required rescue equipment
- the required tools and any other special equipment
- first aid and resuscitation equipment

A means of communication shall be provided and a system of signals (agreed in writing) and understood by all personnel involved. These communication arrangements shall be maintained throughout the duration of the entry.

In all cases of confined space entry, a trained attendant shall be posted outside the entry/exit in order to handle emergencies. Circumstances may require an assistant to the attendant or more than one attendant posted at different access/entry points. The attendant(s) must be aware of their responsibilities and be trained as rescue team members.

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## APPENDIX A: DEFINITIONS AND ABBREVIATIONS

### Acceptable Entry Conditions

Conditions that must exist in a Confined Space to ensure that employees can safely enter and perform work.

### Confined Space

Is any enclosed or partially enclosed space which:

- Is large enough for a person to bodily enter it and perform work, and
- Has limited or restricted means of entry or exit, or
- Has the possibility for the presence or build up of dangerous levels of contaminants (solids, liquids or gases), or
- Where ventilation is restricted, or
- Is not designed for continuous occupancy.

A confined space is a place that is substantially, though not always entirely, enclosed and where serious injury or illness can occur from hazardous substances or conditions within the space or nearby. This includes large pipelines, tanks, vessels, silos, ducts, sewers, pits, flues, manholes, and voids between modules and in legs of offshore installations. It also includes any space in which dangerous levels of contaminants can accumulate and ventilation is restricted, e.g. excavations (normally deeper than 1.2m), the space above floating roofs on floating roof tanks, open topped tanks including mud pits, closed or unventilated rooms, sumps and culverts and any other poorly ventilated areas

### Confined Space Attendant

An individual stationed outside the confined space who monitors the authorised entrant(s) and performs attendant's duties defined in this procedure.

### Authorised Entrant

An employee who is authorised by BP or a competent contractor and trained to enter a confined space.

### Authorised Gas Tester 1

An individual designated by the OIM/SC/SM to undertake gas test in confined spaces. An AGT2 cannot test for CSE.

### Breathing Apparatus (BA set)

A device, which ensures that the wearer has a continuously available supply of uncontaminated air through a face mask, helmet or mouthpiece. SCCABA or airline mask



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**Entry**                      The action by which a person passes through an opening into a Confined Space.

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**Engulfment**            The surrounding and effective capture of a person by a liquid or finely divided (flow able) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction or crushing.

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**Entry Permit**            A document that is provided by BP or contractor to allow and control entry into an entry permit controlled confined space.

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**Hazardous Atmosphere**    An atmosphere that may expose authorised entrant(s) to the risk of death, impairment of ability to self-rescue, injury or acute illness

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**Ionising Radiation**        Gamma rays, X-rays or corpuscular radiation, such as alpha and beta, which are capable of producing ions either directly or indirectly.

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**Naturally Occurring Radioactive Material (NORM)**    Radioactive material produced in conjunction with oil and gas as deposits within process equipment. Sometimes known as Low Specific Activity (LSA) scale

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**Performing Authority (Entry Supervisor)**    A designated supervisor appointed by area authority to accept the Confined Space Entry Permit and subsequently be in charge of the confined space entry work. This person is responsible for ensuring that all precautionary measures stipulated on the Confined Space Entry Permit and accompanying documentation are followed

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**Permit To Work (PTW)**    Describes the task to be undertaken and the precautions to be taken while completing work inside a Confined Space

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**Rescue Team**              The personnel designated to rescue entrants from confined space.

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## APPENDIX B: HAZARDS ASSOCIATED WITH CONFINED SPACES

**Dangerous concentrations of gases and vapours can arise from sources inside or outside a confined space. These include:**

Gases or vapours can be of two types:

- toxic substances in hazardous concentrations, e.g., hydrogen sulphide (H<sub>2</sub>S), benzene and hydrocarbon gases that remains from the process or enters from adjoining plant because it has not been effectively isolated
- flammable gases, vapours and liquids with potential for fire or explosion
- Gas or vapour emitted from scale or sludge, particularly resulting from mechanical disturbance during access or cleaning or due to the heat from welding operations
- Gas, vapour or fumes produced by operations being carried out in the confined space such as welding and cutting, brush and spray painting and the use of adhesives and solvents
- Exhaust gases drawn into the confined space from prime movers or heating equipment

**Dangerous situations can arise from sources inside or outside a confined space**

- Failure to positively isolate the confined space
- Mechanical equipment in the space
- The ingress of steam, hot water or other liquids which may cause scalding or drowning
- Communication difficulties
- Poor access and egress restricting movement for normal work and escape
- Poor access and egress for rescue
- Slippery surfaces
- Sources of ionising radiation (e.g. level gauges, sludge and LSA scale or NORM)
  - Any confined space that might normally contain naturally occurring radioactive material shall be checked by a certified Radiological Protection Supervisor and shall be subject to the requirements of procedure *UNIF-HSE-PRO-305 Radioactive Sources Management*.
  - Where vessels are fitted with Nucleonic Gauges for measuring levels or product density, or where the source must be disarmed or retracted, the source must be made safe in accordance with procedure *UNIF-HSE-PRO-305 Radioactive Sources Management*.
- Vessel boots and sumps full of liquid which could be fallen into
- Pyrophoric scale formed in systems which may contain H<sub>2</sub>S
- Excessive noise

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- Inadequate visibility
- Excessive temperature in the confined space (causing heat stress to personnel)
  - Possible ingress of fumes from drain systems etc
  - Possible collapse of excavations
  - Inadequate shoring; appropriate shoring shall be in place prior to entry

### **Dangerous situations can arise from oxygen enriched or deficient atmospheres**

The special dangers of working in oxygen-enriched atmospheres cannot be over emphasised. Oxygen enrichment may occur by leakage of oxygen supplies or by buildup of oxygen during oxygen-rich flame cutting processes.

- Enrichment of only a few percent will make materials that will normally only burn slowly or with difficulty, burn fiercely with catastrophic results for the occupants of the confined space.
- Every precaution shall be taken to avoid oxygen enrichment. In particular:
  - Oxygen cylinders shall be kept outside the confined space where practicable
  - Oxygen supplies shall be isolated outside the space during work breaks
  - Hoses supplying oxygen shall be removed from the space during work breaks
  - Oxygen shall never be used to 'sweeten' the atmosphere of a confined space
  - The space shall be adequately ventilated at all times

There is also a danger of oxygen deficiency due to combustion processes, purging with inert gas, inert gas welding (MIG/TIG) or oxidation processes (e.g. rusting) occurring in steel vessels left completely closed for some time.

- Other potential risks include: electric shock or ignition of flammable gases from portable lights, tools, or associated electrical equipment
- possibility of static electricity build up due to a lack of proper bonding and grounding procedures
- injury from mechanical equipment such as mixers, conveyors, etc., inadvertently activated
- direct contact with corrosives or irritants
- contaminants entering from other areas through ducts, piping, etc
- ignition from static electricity
- general safety hazards, including communication problems and physical hazards. For example:
  - ⇒ falling objects, inadequate visibility, excessive temperature / noise / vibration, etc
  - ⇒ possible collapse of excavations.

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## **APPENDIX C: PERSONAL PROTECTIVE EQUIPMENT (PPE)**

### **Personal Protection**

Appropriate personal protection, e.g., head, foot, hand, eye, ear, face, body and respiratory protection, must be worn when entering an Entry Permit Controlled Confined Space.

Where required by the Risk Assessment a life-line attached to a full body harness should be used by all entrants during entry into a confined space.

### **Respiratory Protection**

Dependent upon the type and concentration of contaminants, respiratory protection may range from a simple cartridge respirator to air-supplied breathing apparatus.

When the level of airborne contaminants is beyond the filtration capability of a respirator, as defined by the vendor, or where there is an oxygen deficiency, then breathing apparatus must be used.

### **BREATHING AIR STANDARDS**

The need to ensure a continued provision of good quality breathing air relies on regular changing of air filters and maintenance of dryers, supported by periodical analysis of the breathing air supply.

Under no circumstances shall Instrument or Plant Air be used for breathing duty

**Note:** Breathing air shall conform to *BS 4275, 1974, "Recommendations for the Selection, Use and Maintenance of Respiratory Protective Equipment"*.

### **Air Line Mask**

Air line breathing apparatus shall be approved and conform to *EN 139*. The full face mask enables the wearer to work for a long periods in harmful atmospheres, whilst breathing air is supplied by either portable air compressors fitted with reservoir air tanks, or a battery of compressed air bottles.

Connections to the air line mask hose are made via instantaneous bayonet spring couplings. These couplings must be kept in good condition and **must not** be used for any purpose other than supplying air to breathing apparatus.

### **Using Portable Air Compressors**

Where no compressed air bottle supply is available, portable air compressors having a reservoir air tank may be used. In such cases:

- the compressor air intake(s) of the compressor must be upwind of any known source of contamination to ensure clear air being fed to the user (a wind sock indicating wind direction should be flown in the vicinity of the intake to the compressor)
- the system of air supply employed should incorporate a receiver of sufficient capacity to enable persons to escape from an irrespirable atmosphere in the event of a failure of the prime mover supplying the air
- the air must be passed through suitable filters to remove excess moisture and oil mist.

**Note:** To ensure that an adequate supply of air is available and being received by the wearers, a suitably competent person must be appointed who is responsible for checking the pressure in the air receiver, and for ensuring the filters are functioning properly.

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### **Self Contained Compressed Air Breathing Apparatus (SCCABA)**

SCCABA shall conform to *EN 137 "Self Contained Compressed Breathing Apparatus"*. These sets are provided where a portable supply of air is required for a short period of time.

The air for this apparatus is supplied under pressure either from compressed air cylinders carried by the wearer or from trolley sets.

### **Escape Breathing Apparatus**

Any person entering a Confined Space using an airline Breathing Apparatus or a SCCABA set shall be provided with an Escape Breathing Apparatus set with a bottle capable of supplying an emergency air supply for approximately 10 minutes. This set shall also conform to *EN 137 "Self Contained Compressed Breathing Apparatus"*.

All persons required to use breathing apparatus must receive initial training and refresher training at intervals not exceeding six months. The training shall be recorded.

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## **APPENDIX D: EXAMPLES OF A CONFINED SPACE**

**A “Confined Space” may be any place included in the following list, in which by virtue of its enclosed nature, there arises a reasonable foreseeable specified risk. The list below is not a complete listing; therefore do not assume if not on the list that it is not a Confined Space.**

**Note: - A confined space may not necessarily be enclosed on all sides.**

Vessels including; -

- Chambers
- Cooling Towers Natural and Forced Draught
- Drums
- Filters
- Furnaces
- Open-Topped Tanks and Vats
- Reactors
- Separators
- Silo
- Tank
- Towers
- Skips, Freight Containers
- Road Tankers
- Ships Cargo Holds/Tanks

Buildings which contain hazardous substances; -

- Closed and Unventilated or Inadequately Ventilated Rooms
- Roof spaces, Floor spaces

Bored Piles, Constructions that become Confined Spaces during their Manufacture including; -

- Culverts
- Drain and Effluent System Manholes
- Excavations (Deeper than 1.2mtrs.)
- Flare Stacks
- Floating Tank Roofs
- Flumes
- Habitats
- Inspection Pits
- Manholes
- Pumping Pits
- Sewer
- Sump
- Trench
- Tunnels
- Wells

**Ducts**

- Exchanger shells
- Flue

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## APPENDIX E: EXAMPLES OF A RESCUE PLAN

This is an example of a basic Rescue Plan for Confined Space Entry. Exact details must be developed on each occurrence. The HSE Administrator in a shared location shall retain a master set of Rescue Plans. Any revisions should be distributed accordingly.

### Confined Space RESCUE PLAN

<b>WORK LOCATION/TAG No.</b>	
<b>DATE WORK STARTS</b>	
<b>PERSON(S) IN CHARGE</b>	
<b>COMPANIES INVOLVED</b>	
<b>COMMUNICATION METHOD</b>	
<b>DESCRIPTION OF WORK</b>	
<b>MAIN SAFETY PRECAUTIONS</b> <b>All persons involved to ensure they are familiar with and observe these requirements</b>	<ul style="list-style-type: none"> <li>• Entry points and local vicinity must be kept clear to ensure unrestricted access for Emergency Services.</li> <li>• Single Man-way only</li> <li>• ALL conditions of the Task Risk Assessment and Permit to Work must be applied with and in force.</li> <li>• Entrants made aware of hazards within vessel</li> <li>• Gas monitors to be sited at each entry point throughout the duration of the Entry.</li> <li>• Site Rescue Team and Control Room operator to be informed of work taking place and informed at point of entry / exit to / from the Confined Space.</li> </ul>
<b>EMERGENCY ACTION</b>	<ul style="list-style-type: none"> <li>• Stand-by attendant to raise the alarm by informing control-room personnel giving details of situation.</li> <li>• Control room operator to contact Rescue Team</li> <li>• In the case of a casualty being completely immobile, any movement of the person will be under the control of the Site Rescue Team.</li> <li>• The Site Medic will determine the best method and equipment to be used to remove the injured person from the vessel.</li> <li>• The Site Medic will review the extent of the injuries and on the removal of casualty from structure decide to either treat in the First Aid Room, or transport to appropriate hospital.</li> </ul>
<div style="display: flex; justify-content: space-between;"> <div><u><b>Name</b></u></div> <div><u><b>Signature</b></u></div> <div><u><b>Date</b></u></div> </div> <b>Prepared By:</b> <b>OIM / SC / SM:</b> <b>Site Rescue Team:</b>	