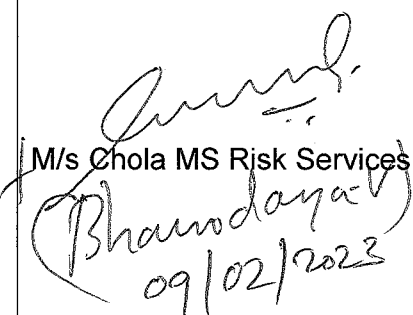
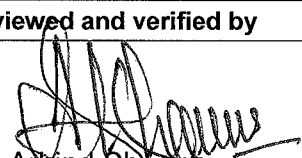

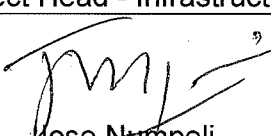

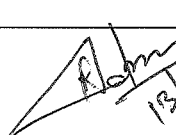


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## TECHNICAL STANDARD (TS)

# WORKING IN CONFINED SPACE

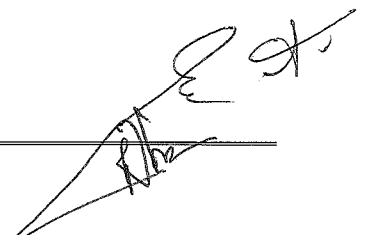
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13/02/2023

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### Document Change Note

Rev. No	Rev. Date	Comments / Changes
00	15-12-2022	New Issue



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## 1 PURPOSE

The purpose of this procedure is to prevent accidents while entering and working in Confined Spaces.

## 2 SCOPE

This procedure shall apply to all AMNS project sites and related work areas including contractors to meet-

- Legal and regulatory requirements
- Project specific HSE requirements
- ISO 45001 and ISO 14001 standard requirements
- AMNS HSE Policy

## 3 DEFINITIONS

### Confined Space

Confined Space is a space which -

- Is not intended as a regular workplace
- Enclosed and have ability to accumulate and retain hazardous substances
- Has restricted means of entry or exit
- Is large enough for an employee to enter and perform assigned work.
- Is at atmospheric pressure during occupancy

In addition to the above, the space has at least one of these characteristics –

- Contains or has the potential to contain hazardous atmosphere
- Contains material that has the potential for engulfment or entrapment
- An internal configuration such that the entrant could be trapped. It contains any other serious safety or health hazard
- Possible Oxygen deficiency
- Open-topped spaces (Excavations) of more than 1.2 meters in depth

### Confined Space Entry Permit

A document outlining a procedure to restrict access to a potentially hazardous space for the purpose of work or inspection

**Permit Issuer:** Is an authority authorised for specific project/ site to issue PTW. It is the responsibility of the permit issuer to ensure that all requirements of PTW are met prior to issuing PTW.

**Permit Holder:** The person responsible for ensuring that all aspects of confined space procedure are complied by the personnel involved with the work. The permit holder shall be trained in the procedure that deems him/her competent to oversee the work being performed. The permit holder does not have to be a part of the work group performing the task.

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**Area Authority:** Is the individual who is responsible for the area in which the work is to be performed and approves the work to commence. The Area Authority shall be defined for each project with regards to PTW.

**Standby Person / Observer:** A person who is trained to observe any hazard that exists from around and in the confined space & keep watch on the person (s) inside confined space.

**Authorized Entrant:** An employee who is authorized by the Project Manager to enter a confined space

**Entrant Supervisor:** The person who is responsible for determining if acceptable entry conditions are present at a confined space where entry is planned, for authorized entry and overseeing entry operations and monitor the activities till end of the work inside the confined space.

**Contaminant:** Any dust, fume, mist, vapour, gas or other substance in liquid or solid form, the presence of which may be harmful to health and safety.

**Immediately dangerous to life or health (IDLH):** Any atmosphere that poses an immediate hazard to life.

**Isolation** - The process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system.

**Purging:** The method by which contaminants are displaced from a Confined Space.

**Safe Oxygen Level** - Minimum oxygen content in air of 19.5 percent and a maximum oxygen content in air of 23.5 percent by volume under normal atmospheric pressure.

## 4 RESPONSIBILITIES

### Project Head

The Project Head is responsible for ensuring that the project is in compliance with the general requirements and those given in this procedure.

### Project HSE Manager

The HSE Manager is responsible for ensuring that all personnel involved in Confined Space Entry are trained.

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## 5 SAFETY WHILE WORKING IN CONFINED SPACE

All activities involved working in confined spaces shall be controlled. Before any confined space is entered, the following must be determined:

- What entity "owns" (is responsible for) the confined space? (This entity will approve the entry permit[s].)
- What procedure and permit process will be used for entry?
- Who will perform each preliminary action before entry?
- If multiple entities are involved in the preliminary actions, which entity will be "the lead" for the entry?

### 5.1 CONFINED SPACE ENTRY HAZARDS

The specific hazards associated with confined spaces are:

- Oxygen deficiency/ Higher Oxygen levels
- Exposure to toxic substances
- Flammable atmosphere (Fire/ Explosion)
- Congested or restricted workplace and while entry/exit
- Heat stress/ lack of ventilation/ Humidity
- Disruption/ lack of communication
- Ingress of liquids or free-flowing powders

Other hazards associated with confined spaces are:

- Slip/ Trip due to slippery and uneven walking surfaces
- Obstacles within the space
- Poor lighting and visibility
- Electricity
- Excessive noise
- Improper process isolation
- Drowning in deep pockets of liquids
- Radioactive level gauges (If applicable)
- Hit by falling objects
- Presence of internal equipment/machinery (mixers, heat exchangers, etc.)
- Falling from height (columns, etc.);
- Corroded walkways or objects;
- Bacteriological risks (legionella, etc.);
- Poisonous creatures/ Animals (snakes in pits, etc.).

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## 5.2 CONFINED SPACE ENTRY PROCEDURE

All activities involved working in confined spaces shall be controlled. AMNS Project specific Permit to Work (PTW) procedure (AMNS/Project/TS/HSEM/11) shall be followed while carrying out any work in confined spaces.

- The permit is valid upon approval by the Area Authority and valid for the period specified in the permit. The permit is deemed null and void and requiring new permit when there is any changes of the condition(s) listed on the permit.
- A risk assessment and/or Job Safety Analysis should be made available prior to the permit being issued
- The permit shall be prominently displayed at the entrance to the space
- All closed permits shall be kept for a period of no less than 6 months or as per project/contractual requirements.
- The observer and authorised entrant shall sign on and off on a register even for short breaks.
- No person is to enter a confined space without first ensuring that they:
  - Have completed the confined space training
  - Understand the hazards and safety requirements stipulated on the permit
  - Have been instructed in the work to be performed
  - Have ensured that the observer has signed on to the register
  - Have signed onto the entry register themselves
  - Are medically and mentally fit to work.
  - Never store compressed gas cylinders/tanks in a confined space, regardless of their contents

When authorizing entry to confined spaces, remember to consider what is to be taken into the confined space by the workers, such as paints, coatings, solvents, burning gas, and inert gas for weld shielding. Consider also the consumption of oxygen by metal spraying processes and generation of welding/burning fumes.

Upon completion of the task or expiry of the permit, the permit holder shall ensure that the entry register is signed off by all personnel involved, thus no person is left in the confined space, thus the space is safe and operation can resumed.

## 5.3 CONFINED SPACE ENTRY REQUIREMENTS

### 5.3.1 Confined Space Entry Register

A register of the confined spaces on the AMNS Project will be maintained and kept at the site HSE office.

### 5.3.2 Confined Space Entry Permit

- Before work can commence, a Permit to Work is required. Refer AMNS Project specific Permit to Work (PTW) procedure (AMNS/Project/TS/HSEM/11).
- A dedicated Hole watcher / stand by person should be ensured outside the entrance and the name of the hole watcher should be mentioned on the permit

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### 5.3.3 Preparation for Entry

The following general steps will be taken before entry into a confined space:

- Positive Isolation (for vessels)
- Decontamination, if required
- Cleaning and purging
- Atmosphere tested as safe
- Provision of personal protective equipment (PPE)
- Obtain a Permit to Work in accordance with requirements
- Identify a Confined Space Entry Supervisor
- Instruct attendant/ standby person(s)
- Test communication equipment (mobile or portable radio etc.)
- Means of access/egress and means of rescue identified and secured
- Signages/ posters like Unauthorized entry not permitted, Only authorized person, Do not open - cautionary confined space signage at man hole gate etc in English and Hindi
- Battery operated torch light, head light or emergency lamp

### 5.3.4 Isolation requirements

- The Permit to Work Authorized Permit Initiator will make the appropriate isolations and follow LOTOTO procedure
- The Permit to Work Authorized Issuer will confirm isolations and counter sign each "Do Not Operate Tag" and the isolation sheets
- For entry into a confined space, it is mandatory that process streams be positively isolated by either breaking of lines (such as removal of a valve, spool piece, or expansion joint) and fitting a blank or deflector plate to the open end of the line or inserting of spades (slip plates/blinds) in piping between the flanges nearest to the confined space.
- For electrical isolations, both a process lock/tag and a personal lock/tag by each person entering the confined space must be applied to the isolator.

### 5.3.5 Purging and Cleaning

- A confined space should be cleaned before entry.
- Cleaning and purging will include all process lines and connections to a Confined Space.
- Where practicable, all substances, which are likely to present a hazard to persons who enter the confined space, should be removed prior to any entry to the confined space. Potentially hazardous levels of contaminants may be trapped in sludge, scale or other deposits, brickwork or behind loose linings, in liquid traps, or in instrument fittings, and may be released only when, for example, it is disturbed or heat is applied. Similarly, such material may lodge in joints in vessels or in bends of connecting pipes or other places where removal is difficult.

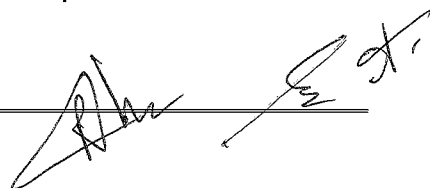


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- Personnel shall be properly trained and aware of the hazards related to oxygen-deficient atmospheres surrounding purging activities and/ or Confined Space openings. Barricades and adequate signage shall be in place to prevent personnel from entering or getting close to any oxygen-deficient areas where purging activities are in progress. Care shall be taken in the purging of a confined space to preclude rupture or collapse of the enclosure due to pressure differentials.

### 5.3.6 Safety and Atmosphere

- Testing of the internal atmosphere of a confined space will be carried out as near as practicable to time of entry and be repeated as circumstances dictate throughout the entry and before cancellation of the Confined Space Entry Permit governing the entry. Only trained personnel shall sample and test the atmospheres in and around Confined Spaces. The testing is carried out in a safe manner using a direct reading instrument.
- Test equipment used in confined spaces will be maintained in good order and calibrated in accordance with manufacturer's specifications/frequencies. Maintenance, servicing, and calibration records will be kept.
- Persons will not enter the confined space unless:
  - The oxygen concentration is in the range 19.5 percent to 23.5 percent.
  - The confined space is free from extremes of temperature and Thermometer and hygrometer should be available and reading should be registered in the checklist
  - The atmosphere is not explosive
  - The concentration of toxic materials is less than the occupational exposure standards specified.
  - Adequate ventilation to prevent the accumulation of a hazardous atmosphere is provided.
  - Where portable equipment is used (e.g. agitator, portable ladders etc.), particular care should be taken to ensure it is firmly secured to prevent movement.
  - Adequate lighting, access are provided inside the confined space.
  - Precautions to guard against static electricity discharge are taken.
- Where periodic testing is required, the maximum time between testing is 2 hours.
- In cases where there is the possibility of a release of toxic or flammable gases/vapors (such as removal of scale or polymer buildup or cleaning with solvents or coating of surfaces), it may be necessary to monitor the atmosphere continuously. This can be achieved by the wearing of a personal monitor by persons entering the space. In the event of significant interruption to the work under these circumstances, the atmosphere will be retested before reentry.



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- If there is any possibility of entry of natural contaminants e.g. groundwater and gases into the confined space from the surrounding land, soil or strata it is necessary to monitor the atmosphere continuously.
- Rescue team shall be in place at the point of entry.

### 5.3.7 Portable Electrical Equipment

The portable electrical equipment shall be

- connected, individually or collectively, to an earth-free, extra-low voltage (less than 24 volt) supply from an isolating transformer(s), with the transformer(s) being located outside the confined space.
- Be protected through a RCCB of 30mA with the device being located outside the confined space.
- Additionally, the equipment should be fitted with a flexible supply cable not inferior to a heavy-duty type. The cables should be located, suspended, or guarded to minimize accidental damage.
- Double-insulated electrical tools be used.

### 5.3.8 Personal Protective Equipment

- Safety helmet with chin strap
- Safety shoes
- Hand gloves
- Self-Contained Breathing Apparatus / Supplied air respirator
- Full body safety harness
- Lifelines
- Clear Safety goggles
- High visibility clothing

## 5.4 EMERGENCY RESCUE PLAN

The arrangements will depend on the nature of the confined space, the risks identified and the types of emergency situations which are foreseeable.

Possible confined space rescue strategies include the following:

- Condition of the victim shall be considered as –
  - Conscious and able to self-rescue
  - Conscious but unable to come out due to injuries and need rescue team
  - Unconscious and need rescue team
- Rescue by team members (trained rescue personnel) using non-entry methods if feasible
- Rescue by team members (trained rescue personnel) using a safe entry technique

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- Rescue using a safe entry technique by the local public emergency services subject to adequate time being available (this depends on the nature of the hazards and the response time of the emergency services)

It is important for suitable and sufficient emergency arrangements to take account of:

- Rescue considerations
- Rescue logistics
- Training of rescue personnel
- Provision of rescue equipment
- Provision of safety data sheet

It is important to consider the following characteristics when deciding the appropriate rescue plan for a confined space entry work:

#### Internal Configuration:

- Open: There are no obstacles, barriers, or obstructions within the space. One example is a water tank.
- Obstruction: The space contains some type of obstruction that a rescuer would need to maneuver. For example, a baffle or mixing blade. Large equipment, such as a ladder or scaffold, brought into the space for work purposes would be considered an obstruction if the positioning or size of the equipment would make rescue more difficult.

#### Elevation:

- Elevated: A permit space where the entrance or opening is above ground by 4 feet or more. This type of space usually requires knowledge of high angle rescue procedures because of the difficulty in packaging and transporting a victim to the ground from the space.
- Non-elevated: A permit space with the entrance located less than 4 feet above ground. This type of space will allow the rescue team to transport an injured worker normally.

#### Portal (entry/exit point) Size:

- Restricted: A portal of 24 inches or less in the smallest dimension. Portals of this size are too small to allow a rescuer to simply enter the space while using SCBA. The portal size is also too small to allow normal spinal immobilization of an injured worker.
- Unrestricted: A portal of greater than 24 inches in the smallest dimension. These portals allow relatively free movement into and out of the permit space.

#### Space Access:

- Horizontal: The portal is located on the side of the permit space. Use of retrieval lines could be difficult.
- Vertical: The portal is located on the top or bottom of the permit space. Rescuers must climb down or up the permit space respectively to enter it. Vertical portals may require knowledge of rope techniques, or special patient packaging to safely retrieve a downed entrant.
- Rope ladder access: If rope ladder to be used, its suitability to be assessed prior to use. Where possibility of hot surfaces, ladders with manila rope should not be used.

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## 6 CHECKING, CORRECTIVE AND PREVENTIVE ACTION

- Periodic inspections & Audits shall be carried out to assess compliance to this procedure & effectiveness of the controls.
- Any deviations shall be reported to Project Head & Corrective and preventive action shall be taken.

## 7 TRAINING

- All employees shall be trained in general hazards and precautions to be taken while entering & working in Confined space
- Relevant supervisors/ Engineers shall be trained in this procedure for compliance

## 8 RECORDS

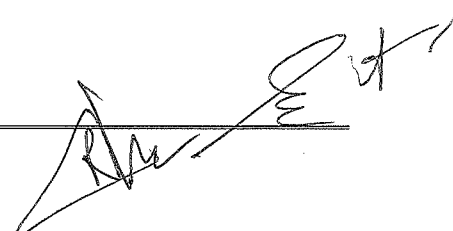
S. No.	Title	Location	Retention period
01	Permit to work form	HSE Department	Until the completion of project
02	Confined space entry register	HSE Department	Until the completion of project

## 9 REFERENCE DOCUMENTS

AMNS/Project/SS/HSEM/05	Training, Awareness and Competence
AMNS/Project/SS/HSEM/08	Hazard identification, risk assessment and control
AMNS/Project/SS/HSEM/12	Emergency Response Procedure
AMNS/Project/TS/HSEM/13	PPE
AMNS/Project/TS/HSEM/11	Permit to Work

## 10 ANNEXURES

AMNS-Project-TS-HSEM-14-F01      Confined Space Entry Register



<b>AM/NS INDIA</b> (AMNSIL)	<b>CONFINED SPACE ENTRY REGISTER</b>	AMNS/Project/TS/HSEM/14/F01
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Confined Space Identification/Equipment No. .... Date:.....

Work description: .....

Supervisor's name: .....	Mobile No.: .....
Attendant's name: .....	Mobile No.: .....
Rescuer's name: .....	Mobile No.: .....
Rescuer's name: .....	Mobile No.: .....

Sl.No.	Entrant's Name	Required training underwent	TIME		TIME		TIME	
			IN	OUT	IN	OUT	IN	OUT

ATMOSPHERIC READING MUST BE DOCUMENTED BELOW AT A MINIMUM OF EVERY 2 HOURS								
TIME	O2	LEL	TIME	O2	LEL	TIME	O2	LEL