V. GENERAL PRE-ENTRY REQUIREMENTS FOR CONFINED SPACES ON CAMPUS

Industrial Safety
Confined Spaces

A. Space Determination
- EH&S, Facilities Services, and TNS work together to determine which types of spaces on campus are defined as “confined spaces.” A list of these types of spaces already identified at SDSU can be found as Attachment B. This list includes general descriptions of spaces and specifies spaces that will always be considered “Permit Required Confined Spaces.”
- All permit required confined spaces on campus will be considered “Permit Required” until pre-entry procedures determine otherwise. The only individuals authorized to designate a particular space as “Non Permit Required” or “Alternate Entry Procedure” are designated “Entry Supervisors.” Refer to the Confined Space Evaluation section.

B. Identification
- Employees shall be informed of permit required confined spaces by posted signs including the information below or by another equally effective means. Information shall include the location and danger posed by the permit spaces.

  “DANGER”
  PERMIT REQUIRED CONFINED SPACE
  DO NOT ENTER

- Permit information shall include work practice safety requirements and required safety equipment for each permit required confined space.

C. Hazard Assessment
- Before entry is made into a confined space hazardous conditions shall be assessed including:
  - Controlled access of the area and confined space.
  - Evaluation of space configuration.
  - Evaluation of work to be done and materials to be used.
  - Evaluation of atmospheric and other hazards.
  - Determination of proper personal protective equipment required prior to entry into the confined space.
  - Ensuring that equipment and/or hazardous energy sources have been disabled by Lock Out/Tag Out, Block & Bleed,
Double Block & Bleed, etc. as necessary and applicable for work tasks to be performed.

- The Confined Space Pre-Entry Checklist in the Confined Space Permit must be completed.
- After a permit is issued by the Entry Supervisor, the permit required confined space work team, consisting of the Authorized Entrant and Attendant, can proceed to the job site.

D. Confined Space Evaluation

Refer to the Confined Space Entry Decision Flow Chart (Attachment A).

- The goal of the evaluation is to determine if Permit Required Entry Procedures or Alternate Entry Procedures will be used.
- The Entry Supervisor may use Alternate Entry Procedures for entering a permit required confined space under the following conditions:
  - The only hazard in the space is an actual or potential hazardous atmosphere.
  - The potential atmospheric hazard can be eliminated and controlled through the use of continuous forced air ventilation.
  - Previous and current atmospheric monitoring data verify that conditions a. and b. are correct and all testing results and monitoring data are documented, retained and made available to each employee who enters the space.
  - If an initial entry into the permit space is necessary to obtain the data required for item c., the entry is performed in compliance with permit required confined space guidelines.
  - Employees can safely enter and do work in the space.
- If all of the conditions above are met and the gas tests indicate that the atmosphere is non-hazardous with the use of continuous forced air ventilation, the space may be entered using Alternate Entry Procedures (Section VII.A).
- If the potential for atmospheric hazards cannot be eliminated using ventilation, the space must be entered using Permit Required Entry Procedures.
- A space classified as a permit required confined space may be reclassified as a non-permit confined space under the following conditions:
  - If the permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated without entry into the space, the permit space may be reclassified as a non-permit confined space for as long as the hazards remain eliminated.
  - If it is necessary to enter the permit space to eliminate hazards, such entry shall be performed according to the
procedures for entering a permit required confined space. If testing and inspection during that entry demonstrate that the hazards within the permit required space have been eliminated, the permit required space may be reclassified as a non-permit confined space for as long as the hazards remain eliminated.

E. The Confined Space Entry Permit

- The Entry Supervisor shall review and issue confined space entry permits. The permit is required to confirm that all the proper steps and procedures as specified on the permit checklist for entering the confined space have been taken.
- Each Authorized Entrant or their authorized representative shall be given the opportunity to observe the pre-entry testing and subsequent testing of confined spaces.
- The permit is required to be displayed at each permit required confined space site. Information contained on the permit includes the following:
  - Atmospheric testing and monitoring results
  - Engineering and work place controls
  - Rescue and emergency equipment
  - Communication equipment
  - Personal protective equipment
  - Any additional permits required for the space (for example: Hot Works)*
  - Space lighting equipment*
  - Space ventilating equipment*
  - Any other equipment necessary for safe entry and rescue from the permitted space.*

  (*) Item required for space entry only if necessary

- At the end of the job the permit is to be returned to the issuing Supervisor for filing. The files should be maintained for at least one year to provide an audit trail for parties reviewing the program.
- The Entry Supervisor shall terminate entry and cancel the permit when:
  - The entry operations covered by the entry permit have been completed, or
  - A condition that is not allowed under the entry permit arises in or near the permit space.

F. Personal Protective Equipment and Tools

- All San Diego State University departments and contractors who may enter a confined space are responsible for the proper maintenance, inspection, and use of tools, equipment, and personal protective equipment.
- Tools and equipment shall meet all Federal and State requirements.
• Tools and equipment shall be checked prior to use in confined spaces.
• Lighting must be intrinsically safe and/or explosion proof and recognized by Underwriters Laboratory.
• Work involving the use of a source of ignition is prohibited within a confined space (or any adjacent space having common walls, floor, or ceiling with the confined space) that contains or is likely to develop oxygen enrichment or dangerous air contamination due to flammable and explosive substances.
• Personal protective equipment shall include, but is not limited to:
  ▪ Head, eye, face, feet, hand, and hearing protection;
  ▪ Atmospheric testing devices;
  ▪ Protective clothing, safety belts, harnesses and lifelines;
  ▪ Intrinsically safe lighting, ventilation equipment, and tools;
  ▪ Respiratory protection equipment;
  ▪ Intrinsically safe compressed gas cylinders.

G. Training Requirements

• No employees shall be involved in confined space work unless they have been trained in confined space entry and understand the provisions of this SOP. This includes Supervisors, Attendants, and Entrants. Each of these positions requires specific training related to their job duties. Students shall not be authorized to participate in confined space work.
• Entry Attendants shall be trained and immediately available to perform non-entry rescues in permit required confined spaces and to contact University Police and outside rescue services personnel in the event of an emergency. Refresher training to review non-entry rescue shall be carried out.
• Training shall be provided to each affected employee:
  ▪ Before the employee is first assigned duties under this section, and
  ▪ Before there is a change in assigned duties, and
  ▪ Whenever there is a change in permit space operations that presents a hazard about which an employee has not been previously trained, and
  ▪ Whenever there is reason to believe that there are deviations from the permit space entry procedures or there are inadequacies in the employee’s knowledge or use of these procedures.
• Employees who participate as Supervisors, Attendants, and Entrants shall review basic confined space entry procedures and policy requirements annually.
• Due to the specialization of each trade, the immediate Supervisor is best qualified to coordinate specific confined space entry training. It is the immediate Supervisor’s responsibility to coordinate the training in confined space entry and on the equipment necessary for the job. EH&S, at the Supervisor’s request, will provide training assistance.
The training shall establish employee proficiency in the duties required and shall introduce new or revised procedures, as necessary, for compliance with this written program.

Training records are to be maintained by the Supervisor. Documentation that the training has been carried out shall include each employee’s name, the signatures or initials of the trainers, and the dates of the training. The documentation shall be available for inspection by employees and their authorized representatives.

H. Monitoring for Toxic Atmospheres and Oxygen Deficiency

Atmospheric Testing Procedures are to be conducted in the following manner:

- The gas detector must be available prior to entering a confined space, calibrated per manufacturer’s recommendations, and in good working order.
- Gas detectors must be checked and calibrated prior to each use. This includes:
  - Inspection of the hoses, batteries, pump, sensors, and filters.
  - Field testing using test gas cylinders containing known amounts of the substances being tested for in the space.
- Sample the air quality of the confined space, for example a manhole, by slightly moving the lid or by testing the space through the hole in the lid before completely opening the space. This is a surface reading.
- Lower the probe slowly into the space, allowing time for the instrument to detect atmospheric changes at different vertical heights in the space. Take meter readings approximately 3 feet from the surface, approximately 6 feet from the bottom, and approximately 3 feet from the bottom.
- Measure in the following order:
  - Percent Oxygen
  - Lower Flammable Limit for Flammable Gases and Vapors
  - Carbon Monoxide
  - Hydrogen Sulfide
- Record measurements in the Confined Space Pre-Entry Checklist Atmospheric Check Section of the Confined Space Entry Permit (Section IV, 1).
- If there is no indication from the meter that there is a problem with the confined space atmosphere, all required sections of the Confined Space Entry Permit have been completed, and the Entry Supervisor has signed the permit, workers may proceed into the space.
- No source of ignition shall be introduced into the confined space until testing has verified that flammable gases are not present.
- The gas detector shall be located near the Entrants and left on throughout the duration of the work in a Permit Required or Alternate Entry Procedure Confined Space. Results of environmental testing shall be documented at least hourly. Readings must be recorded in the Periodic Atmospheric Test Results Table (Section VI) of the Confined Space Entry Permit.
Whenever oxygen-consuming equipment (for example torches) is used in any confined space, continuous environmental testing must be performed.

If the following concentrations are noted at any time, discontinue operations, remove entry personnel, and ventilate the space until new test results are within the safe range and it is safe to enter.

- Oxygen reading less than 19.5% or greater than 23.5%
- Combustible gas reading greater than 10% LFL
- H2S reading greater than 10 ppm
- CO reading greater than 25 ppm

Evaluate work processes that will be carried out in the confined space to determine if any other harmful substances will be present or potentially present. If hazardous substances are potentially present, monitoring and appropriate personal protection must be implemented. Entrance into the confined space is not permitted under any circumstances until this has been addressed.