

CONFINED SPACE PROGRAM

1.0 PURPOSE

The purpose of the Confined Space program is to provide basic guidelines for the safe entry and work within the various confined spaces throughout CSU East Bay, and to comply with California Code of Regulations (CCR), Title 8, Article 108, Sections 5156-5159.

2.0 SCOPE

This program establishes requirements for all employees and non-university employees (contractors) who work in confined space environments at CSUEB, including but not limited to: entry employees; attendants/standbys; first aid responders; rescue personnel; hazardous materials response; facilities management; facilities planning; and contractors.

3.0 POLICY STATEMENT

- 3.1 Unauthorized entry is forbidden.
- 3.2 CSUEB employees will perform work only in non-permit confined space.
- 3.3 Entry for emergency purpose(s) and in permit required confined spaces shall be performed by a contractor.

4.0 RESPONSIBILITY

- 4.1 Department of Environmental Health & Safety (EHS)
 - 4.1.1 Responsible for the establishment and maintenance of the Confined Space Program.
 - 4.1.2 Provide training.
 - 4.1.3 Advises on interpretation and compliance measures to ensure that all work being performed is in conformance with all occupational safety requirements and applicable codes.

4.1.4 Assists in the identification of confined space locations.

4.2 Supervisor

4.2.1 Ensure confined space training is provided to applicable employees.

4.2.2 Maintain a current listing of employees who have completed confined space training.

4.2.3 Ensure employees in their department understand and follow the procedures in this program.

4.2.4 Work with EHS to identify all confined spaces on campus.

4.3 Employee

4.3.1 Understand and follow the procedures and practices developed under this program.

4.4 Contractors

4.4.1 Obtain any available information regarding confined space hazards and entry operations from appropriate CSUEB representative.

4.4.2 Coordinate entry operations with appropriate CSUEB representative, when both CSUEB employees and contractor employees will be working in or near a confined space.

4.4.3 Inform appropriate CSUEB representative of their confined space program that will be followed and of any hazards confronted or created in the confined space, either through a debriefing or during the entry operation.

4.4.4 Submit a copy of Confined Space Program to appropriate CSUEB representative; including rescue procedures, permit and atmospheric testing for permit required confined space(s); and pre-entry log, atmospheric testing for non-permit confined space(s). Contractors failing to adhere to the provisions of Cal/OSHA Confined Space Requirements will be asked to terminate their work until requirements are brought into compliance.

4.4.5 Submit energy control procedures, in writing, if involved in lockout of equipment or machinery. Contractors failing to adhere to the provisions of Cal/OSHA Hazardous Energy Control standard

will be asked to terminate their work until their program is brought into compliance.

4.4.6 Restrict unauthorized access to confined space work area. If this is impractical or cannot be accomplished, CSUEB representative must assure the contractor's compliance with proper work procedures.

4.5 Facilities Planning or Facilities Management

4.5.1 Inform and apprise the contractor of the elements, including the hazards identified and any experience with the confined space(s) that make the space in question a confined space.

4.5.4 Review the contractor's confined space program for compliance with Cal/OSHA and CSUEB.

4.5.3 Apprise the contractor of any precautions or procedures for the protection of persons in or near the confined space.

4.5.5 Coordinate entry operations.

4.5.6 Debrief the contractor at the conclusion of the confined space operation regarding the confined space program followed and any hazards confronted or created in the confined space during entry operations.

5.0 DEFINITIONS

5.1 A confined space is defined as a space which has any or all of the following characteristics:

5.1.1 Limited openings for entry and exit.

5.1.2 Hazardous atmosphere and/or poor natural ventilation.

5.1.3 Is not designed for continuous human occupancy.

5.2 A non-permit confined space means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

5.3 A permit-required confined space (permit space) means a confined space that has one or more of the following characteristics:

- 5.3.1 Contains or has a potential to contain a hazardous atmosphere;
 - 5.3.2 Contains a material that has the potential for engulfing an entrant;
 - 5.3.3 Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section; or
 - 5.3.4 Contains any other recognized serious safety or health hazard.
- 5.4 Confined Space Team:
- 5.4.1 The entrant does the work within the space.
 - 5.4.2 The attendant remains outside the space while the work is being done.
 - 5.4.3 The entry supervisor authorizes the space safe to enter.
 - 5.4.4 The rescue team is personnel designated to rescue entrant(s).

6.0 TRAINING

- 6.1 Training will be provided to each affected employee:
 - 6.1.1 Before the employee is first assigned duties.
 - 6.1.2 Before there is a change in assigned duties.
 - 6.1.2 Whenever there is a change in permit space operations that presents a hazard which an employee has not previously received training.
 - 6.1.4 Whenever the supervisor or EHS has reason to believe that either there are deviations from the permit space entry procedures.
 - 6.1.5 Inadequacies in the employee's knowledge or use of this program.
- 6.2 The training will establish employee proficiency in the duties required and will introduce new or revised procedures, as necessary, for compliance.
- 6.3 A certification will be given to the employee. The certification will include the employee's name, the signatures or initials of the trainers, and the dates of training.

6.4 The certification will be available for inspection by employees.

7.0 PRE-ENTRY PROCEDURES FOR NON-PERMIT CONFINED SPACE (Entry without Permit)

7.1 A space can be considered a non-permit confined space if the below conditions can be demonstrated.

7.1.1 The only hazard posed by the permit space is an actual or potential hazardous atmosphere;

7.1.2 Continuous forced air ventilation alone is sufficient to maintain that permit space safe for entry.

7.1.3 Monitoring and inspection data supports 7.1.1 and 7.1.2 (above).

7.1.4 If an initial entry is required to obtain data required for 7.1.1 and 7.1.2, the entry will be performed in compliance with a permit required confined space.

7.1.5 If welding or high voltage work is to be done, or if the confined space is a blocked sewer, permit required confined space procedures will be followed.

7.2 The below items will be completed before entry and documented on the pre-entry log. Maintain the pre-entry log at the jobsite for duration of job. **See Appendix I for log.**

7.2.1 Control of atmospheric and engulfment hazards:

7.2.1.1 All pumps and lines which may reasonably cause contaminants to flow into the space will be disconnected, blinded and locked out, or effectively isolated.

7.2.1.2 All affected laterals will be blocked if there is a reasonable potential for contamination of air or engulfment into an occupied sewer.

7.2.1.3 If blocking and/or isolation requires entry into the space, the entry is considered permit required and should not be entered by CSUEB employees.

7.2.3 Survey the surrounding area to avoid hazards such as drifting vapors from tanks, piping, or sewers.

7.2.4 Test the atmosphere within the space to determine whether dangerous air contamination and/or oxygen deficiency exists. Only detector tubes and/or alarm type gas monitors and explosion meters will be used.

7.2.4.1 The minimum parameters to be monitored are oxygen levels, lower flammability level (LFL), and hydrogen sulfide concentration. The hazardous levels are as follows:

- Atmospheric oxygen concentration levels below 19.5% or above 23.5% at sea level.
- Flammable or explosive gas, vapor, or mist in a concentration greater than 10% of its LFL or lower explosive limit (LEL).
- Hydrogen sulfide concentration greater than 10ppm permissible exposure limit (PEL) which is the maximum permitted 8-hour time weighted average (TWA).

7.2.4.2 Some gases are lighter than air and will be found around the top of the confined space. Therefore, it is necessary to test all areas (top, middle and bottom) of a confined space.

7.2.4.3 All testing must be performed by a Qualified Person using approved equipment.

7.2.4.4 All equipment must be used and calibrated according to manufacturers' instructions and all results recorded on the atmospheric monitoring results sheet. This sheet will be maintained at the work site for the duration of the job.

7.2.4.5 The entry supervisor will certify in writing, based upon the pre-entry testing results that all hazards have been eliminated. Supervisor authorization section can be found on the bottom of the pre-entry checklist.

7.2.4.6 Affected employees can review the testing results.

8.0 INITIAL AIR MONITORING PROCEDURES

8.1 Monitoring will be performed outside the space before opening the cover.

8.2 If the air test is acceptable, next crack open the cover and place the probe inside a test hole in the top of the cover.

- 8.3 Next, open the cover and test the top and every four (4) feet until just above the bottom of the space.
- 8.4 Allow at least one second for each foot of hose on the gas monitor for accurate readings.
- 8.5 Record testing results on pre-entry log.

9.0 CONTINUOUS AIR MONITORING PROCEDURES

- 9.1 This type of monitoring is used to determine whether dangerous air contamination or oxygen deficiency exists during the performance of any job task(s). The following atmospheric conditions are test:
 - 9.1.1 Oxygen levels at or above 19.5 and not above 23.5 percent,
 - 9.1.2 Lower Flammable Limit less than 10%,
 - 9.1.3 Carbon Monoxide less than 25ppm,
 - 9.1.4 Hydrogen Sulfide less than 10ppm, and
 - 9.1.5 Any other known actual or potential hazardous substance.
- 9.2 Gas meter(s) with audible alarm systems will be used for the testing.
- 9.3 If the entrants are working in a location inside the space away from the original entry point, they should have an air monitor attached to them in the space.
- 9.4 Record results on Atmospheric Monitoring Log. The log is located in Appendix II.

10.0 VENTILATING CONFINED SPACES

- 10.1 Continuous ventilation is mandatory whenever: (a) welding is to be performed in a confined space, (b) oxygen consuming equipment is used, (c) if a safety harness is not being worn by the entrant, and (d) if ventilating the space maintains it in a safe condition for entry without a permit or attendant.
- 10.2 Continuous forced air ventilation should be used as follows:
 - 10.2.1 Whenever pre-entry atmospheric testing indicates any of the following hazardous conditions, the confined space must be ventilated: oxygen less than 19.5%, LFL greater than 10% or any air contaminant in excess of its permissible exposure level (PEL);

- 10.2.2 Entrants should not enter a confined space until forced air ventilation has eliminated any hazardous atmosphere;
- 10.2.3 The forced air ventilation should be directed as to ventilate the immediate areas where an employee is or will be present within the space and shall continue until all employees have left the space;
- 10.2.4 The air supply for the forced air ventilation will be from a clean source and may not increase the hazards in the space;
- 10.2.5 The atmosphere within the space will be test as necessary to ensure that the continuous force air ventilation is preventing the accumulation of a hazardous atmosphere.

11.0 NECESSARY EQUIPMENT FOR NON-PERMIT CONFINED SPACE

- 11.1 Atmospheric monitoring Equipment – alarm type four gas meter.
- 11.2 Ventilating equipment, if necessary.
- 11.3 Communications equipment.
- 11.4 Personal protective equipment – hard hat, etc.
- 11.5 Lighting equipment to enable employees to see well enough to work safely and exit the space quickly in an emergency.
- 11.6 Barriers and shields to protect the confined space work area from unauthorized entry.
- 11.7 Ladders and similar equipment required for safe entry and exit.
- 11.8 Retrieval system – harness and tripod.
- 11.9 Any other necessary equipment.

12.0 ENTRY PROCEDURES FOR NON-PERMIT CONFINED SPACE

- 12.1 At least two and preferably three employees will conduct all work operations in a confined space.
- 12.2 Check the pre-entry log to ensure the space has been authorized to be entered by the entry supervisor.

- 12.3 Notify the University Police Department (UPD) at extension 3791 prior to entry.
- 12.4 There must be continuous atmospheric testing performed by the attendant to identify and minimize any potential hazards. **See Appendix II for log.**
- 12.5 There must be communication maintained at all times between the entrant and attendant.
- 12.6 A safe entrance and exit must be provided.
- 12.7 Provisions have been taken to prevent inadvertent entrance or presence of flammable, injurious or incapacitating substances into the confined space.
- 12.8 Provide continuous ventilation if attendant is not available or if the space cannot be maintained in a safe condition. Make sure the ventilation is adequate for size of confined space, intake is clean air and exhaust from equipment is vented to the outside.
- 12.9 The pre-entry log and initial atmospheric testing will be posted within the surrounding area of the confined space.

13.0 DUTIES OF AUTHORIZED ENTRANT

- 13.1 Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- 13.2 Use equipment properly (testing and monitoring equipment, ventilating equipment, communications equipment, personal protective equipment, lighting equipment, barriers and shields, safe ingress and egress equipment, rescue and emergency equipment).
- 13.3 Qualified to conduct continuous atmospheric monitoring.
- 13.4 Communicate with attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space.
- 13.5 Alert the attendant whenever the entrant recognizes any warning signs or symptom of exposure to a dangerous situation or the entrant detects a prohibited condition.
- 13.6 Exit from the space as quickly as possible whenever an order to evacuate is given by the attendant or the entry supervisor or the entrant recognizes

any warning sign or symptom of exposure to a dangerous situation or the entrant detects a prohibited condition or an evacuation alarm is activated.

14.0 DUTIES OF ATTENDANT

- 14.1 Knows the hazard that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- 14.2 Is aware of possible behavioral effects of hazard exposure in authorized entrants.
- 14.3 Continuously maintains an accurate count of authorized entrant(s) in the confined space.
- 14.4 Remains outside the confined space during entry operations until relieved by another attendant.
- 14.5 Communicates with authorized entrant(s) as necessary to monitor entrant status and to alert entrant(s) of the need to evacuate the space if the attendant detects a prohibited condition; if the attendant detects the behavioral effects of hazards exposure in an authorized entrant; if the attendant detects a situation outside the space that could endanger the authorized entrant; or if the attendant cannot effectively and safely perform all other duties (12.1-12.4).
- 14.6 Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the confined space if the attendant detects the behavioral effects of hazards exposure in an authorized entrant; if the attendant detects a situation outside the space that could endanger the authorized entrant; or if the attendant cannot effectively and safely perform all other duties (12.1-12.4).
- 14.7 Initiate on-site rescue procedures, and if necessary summon emergency services.
- 14.8 Conducts continuous atmospheric monitoring and record results on the atmospheric monitoring log.

15.0 DUTIES OF ENTRY SUPERVISOR

- 15.1 Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

- 15.2 Verifies, by checking that the appropriate entries have been made on the pre-entry checklist.
- 15.3 Authorizes the confined space for entry.
- 15.4 Verifies that rescue procedures will be followed and that the means for summoning additional services are operable.
- 15.5 Determines that acceptable entry conditions will be maintained.

16.0 EMERGENCY AND RESCUE PROCEDURES FOR NON-PERMIT CONFINED SPACE

- 16.1 Self rescue is the preferred plan if the entrant(s) is still able to escape from the space unaided and as quickly as possible.
 - 16.1.1 Whenever authorized entrant recognize their own symptoms of exposure to a dangerous atmosphere.
 - 16.1.2 Whenever authorized entrant detects a prohibited condition.
- 16.2 Non-entry rescue is the approach to take when self rescue is not possible.
 - 16.2.1 To facilitate non-entry rescue, retrieval systems will be used whenever an authorized entrant enters a confined space, unless the retrieval equipment would not contribute to the rescue of the entrant.
 - 16.2.2 The retrieval system (harness and tripod) will meet the following requirements:
 - Each authorized entrant will use a chest or full body harness, with a retrieval line attached at a suitable point so that when rescued, the entrant presents the smallest possible profile (for example at the center of the entrant's back near shoulder level, or above the entrant's head).
 - Wristlets may be used in lieu of the chest or full body harness if it can be demonstrated that the use of a chest or full body harness is infeasible or creates a greater hazard, and that the use of wristlets is the safest and most effective alternative.
 - The other end of the retrieval lines will be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as

the rescuer becomes aware that rescue is necessary. The mechanical device must be able to retrieve personnel from vertical type permit spaces more than 5 feet deep.

- 16.3 It is important to know that the period of time for successful rescue is very limited. Otherwise, a rescue attempt will become body retrieval. After only four minutes without oxygen, it is very likely that a worker will experience asphyxiation, which may result in brain damage or death.
- 16.4 Contact UPD to summons emergency services.

17.0 PERMIT REQUIRED CONFINED SPACE

- 17.1 All spaces are considered to be permit required confined spaces until the pre-entry procedures demonstrate otherwise.
- 17.2 Work in a permit required confined space will be performed by non-university employees (contractor).
- 17.3 Review the contractor's permit required confined space program for the below elements.
- 17.3.1 Implement measures necessary to prevent unauthorized entry;
- 17.3.2 Identify and evaluate the hazards of permit spaces before employees enter them;
- 17.3.3 Implement means, procedures, and practices necessary for safe permit space entry operations, including, but not limited to the following:
- Specifying acceptable entry conditions;
 - Isolating the permit space;
 - Purging, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards;
 - Provide pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards; and
 - Verify that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry.
- 17.3.4 Provide an entry permit that authorizes entry to a permit space and identifies the following:

- The permit space to be entered;
- The purpose of the entry;
- The date and the authorized duration of the entry permit;
- The authorized entrants within the permit space, by name or by such other means that will enable the attendant to determine quickly and accurately, for the duration of the permit, which authorized entrants are inside the permit space
- The personnel, by name, currently serving as attendants;
- The individual, by name, currently serving as entry supervisor, with a space for the signature or initials of the entry supervisor who originally authorized entry;
- The hazards of the permit space to be entered;
- The measures used to isolate the permit space and to eliminate or control permit space hazards before entry;
- The acceptable entry conditions;
- The results of the initial and periodic atmospheric testing performed accompanied by the names or initials of the testers and by an indication of when the tests were performed;
- The rescue and emergency services that can be provided on-site and additional service that can be summoned and the means such as the equipment to use and the numbers to call for summoning those services;
- The communication procedures used by authorized entrants and attendants to maintain contact during the entry;
- Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment to be provided,
- Any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety, and
- Any additional permits, such as hot work, that have been issued to authorize work in the permit space.

17.3.5 Provide at least one standby person at the site trained and immediately available to perform rescue and emergency services. The following requirements must be met to perform rescue services:

- Each member of the rescue service must be trained properly to use the personal protective equipment and

rescue equipment necessary for making rescues from permit spaces.

- Each member of the rescue service must be trained to perform the assigned rescue duties.
- Each member has received authorized entrant training.
- Each member has received practice making permit space rescues at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit spaces or from representative spaces.
- Each member must be trained in basic first aid and in cardiopulmonary resuscitation (CPR). At least one member of the rescue service holding current certification in first aid and in CPR will be available.

17.3.6 If the contractor arranges to have persons other than themselves to perform permit space rescue, the following has to meet:

- Inform the rescue service of the hazards they may confront when called to perform rescue;
- Provide the rescue service with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.

17.3.7 To facilitate non-entry rescue, retrieval systems or methods will be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems are required to meet the following:

- Each authorized entrant will use a chest or full body harness, with a retrieval line attached at a suitable point so that when rescued, the entrant presents the smallest possible profile (for example at the center of the entrant's back near shoulder level, or above the entrant's head).
- Wristlets may be used in lieu of the chest or full body harness if it can be demonstrated that the use of a chest or full body harness is infeasible or creates a greater hazard, and that the use of wristlets is the safest and most effective alternative.
- The other end of the retrieval lines will be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary.

The mechanical device must be able to retrieve personnel from vertical type permit spaces more than 5 feet deep.

17.3.8 A material safety data sheet (MSDS) or other similar written information is required to be kept at the worksite, if an entrant will be exposed to a known hazardous substance. The MSDS is required to be made available to the medical facility treating the exposed entrant.

17.3.9 It is important to know that the period of time for successful rescue is very limited. Otherwise, a rescue attempt will become body retrieval. After only four minutes without oxygen, it is very likely that a worker will experience asphyxiation, which may result in brain damage or death.

18.0 CONFINED SPACES AT CSUEB (Non-Specific)

18.1 Campus wide – All manholes, meter vaults, telecommunications vaults

18.2 KPE – Ventilation Crossovers off of Rm. 100-A

18.3 KPE – Surge Pit

18.4 KPE – Maintenance Tunnel

18.5 M&B – Maintenance Tunnel

18.6 Field House – Sewage Pumps