

SONOMA STATE UNIVERSITY
CONFINED SPACE ENTRY POLICY & PROCEDURE



1.0 POLICY

- 1.1 It is the policy of Sonoma State University that any individual entering into a confined space on SSU property will do so in accordance with the procedures outlined in this document. This document complies with applicable regulatory standards and includes specific non-regulatory requirements set forth by Environmental Health & Safety.
- 1.2 All Sonoma State University employees planning on entering a confined space on campus must obtain a Confined Space Entry Permit from Environmental Health & Safety (EH&S) or an EH&S designee and have it signed by their supervisor. EH&S staff or individuals designated by EH&S are responsible for atmospheric testing of confined spaces and completing Confined Space Entry Permits.
- 1.3 Environmental Health & Safety will provide personal protective equipment, operating equipment, and initial supervision necessary to ensure the health and safety of authorized entrants. All current practices in confined space entry will meet or exceed applicable federal, state and local safety regulations.
- 1.4 Contractors that enter confined spaces on the SSU campus are required to implement their own confined space program in accordance with applicable regulations. Sonoma State University personnel shall not perform atmospheric testing, issue permits, or provide equipment to contractor personnel for the purpose of entering confined spaces on campus. Appropriate designation of responsibilities in campus service contracts is essential for this purpose. See Appendix C for standard contract language (p. 16).

2.0 PURPOSE

- 2.1 To ensure that all individuals entering a confined space adhere to established safety practices and utilize required confined space entry equipment.

3.0 DEFINITIONS

3.1 CONFINED SPACE

A space defined by the concurrent existence of all of the following conditions:

- (1) Large enough and so configured that an employee can bodily enter and perform assigned work.
- (2) Has limited or restricted means for entry or exit.
- (3) Is not designed for continuous employee occupancy.

Examples of Confined Spaces at SSU:

Manholes, boilers, tanks, vats, sewer pipelines, vaults without existing general ventilation. Note: Trenches typically are not confined spaces, check applicable state and federal OSHA regulations for trench operations requirements.

3.2 NON-PERMIT CONFINED SPACE

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.

3.3 PERMIT REQUIRED CONFINED SPACE

A confined space that has one or more of the following characteristics:

- (1) Contains or has the potential to contain a hazardous atmosphere. Note: Permit procedures are not required where existing ventilation is sufficient to remove potential dangerous air contamination.
- (2) Contains a material that has the potential for engulfing an entrant.
- (3) Ready removal of a suddenly disabled employee is difficult due to the location and/or size of access openings.
- (4) Contains any other recognized serious safety or health hazard.

Note: A full permit is issued for all confined space entries at Sonoma State University, whether the confined space is designated as permit-required or not.

3.4 ENCLOSED SPACE

Spaces that do not meet the definition of a confined space, but may require precautionary measures upon entering. Examples of enclosed spaces at SSU are crawl spaces and service tunnels with existing general ventilation.

3.5 DANGEROUS AIR CONTAMINATION

An atmosphere capable of causing death, injury, acute illness, or disablement due to the presence of flammable, explosive, toxic, or incapacitating substances.

3.6 OXYGEN DEFICIENT/ OXYGEN ENRICHED ATMOSPHERE

An atmosphere containing less than 19.5% or greater than 23.5% oxygen by volume.

3.7 PERMISSIBLE EXPOSURE LEVEL (PEL), THRESHOLD LIMIT VALUE (TLV)

The permissible amount of exposure to a toxic substance that an employee is allowed to receive in any given time period. This may be a Time Weighted Average (TWA) or a Threshold Limit Value (TLV).

3.8 TIME WEIGHTED AVERAGE (TWA)

The average exposure calculated over a set period of time. The National Institute for Occupational Safety and Health establishes these standards as Recommended Exposure Limits (for most industrial/workplace chemicals) to which nearly all persons can be exposed to for up to a 10 hour work day during a 40 hour work week without any adverse health effects.

3.9 THRESHOLD LIMIT VALUE-TIME WEIGHTED AVERAGE (TLV-TWA)

Established by the American Conference of Government Industrial Hygienists; the time weighted average concentration for a normal eight hour work day and a forty hour work week, to which all workers may be repeatedly exposed, day after day, without adverse effect.

3.10 THRESHOLD LIMIT VALUE-SHORT TERM EXPOSURE LIMIT (TLV-STEL)

The concentration to which workers can be exposed continuously for 15 minutes without suffering from irritation, chronic or irreversible tissue damage, narcosis of sufficient degree to increase the likelihood of accidental injury, impair self-rescue, or materially reduce work efficiency, provided that the daily TLV-TWA is not exceeded.

3.11 THRESHOLD LIMIT VALUE-CEILING VALUE (TLV-C)

The concentration that should not be exceeded during any part of the working exposure.

3.12 LOWER EXPLOSIVE LIMIT (LEL)

The lowest concentration of a substance in air that will produce a flash of fire when an ignition source (heat, arc, or flame) is present. At concentrations lower than the LEL, the mixture is too "lean" to burn.

3.13 UPPER EXPLOSIVE LIMIT (UEL)

The highest concentration of a substance in air that will produce a flash of fire when an ignition source (heat, arc, or flame) is present. At concentrations higher than the UEL, the mixture is too "rich" to burn.

3.14 CONFINED SPACE ENTRY PERMIT

A permit (Attachment A) that must be completely filled out by Environmental Health & Safety personnel or designee prior to entering the space (Attachment B). Employees entering confined spaces must have signature approval from their supervisor on the confined space entry permit prior to entry. No permit shall be valid for more than 24 hours after the time of issue by the supervisor.

4.0 RESPONSIBILITIES

4.1 ENVIRONMENTAL HEALTH & SAFETY

- a. Develop, implement and maintain the Confined Space Procedure, as directed by the Chief of Police Services.
- b. Issue Confined Space Entry Permits to SSU personnel or designate campus employees qualified to issue Confined Space Entry Permits. A current list of designees will be maintained on an authorized list in Appendix B.
- c. Provide centralized monitoring and certification of Confined Spaces as requested.
- d. Maintain monitoring records as needed.
- e. Maintain all confined space entry equipment and calibrate gas detectors as necessary.

4.2 DEANS, DIRECTORS, DEPARTMENT HEADS

- a. Ensure that each supervisor adheres to these procedures.

- b. Contact Environmental Health & Safety prior to initiating contracts with off campus contractors that will involve confined space entry. Specific contract language (p. 16) is required to ensure that contractors provide an adequate level of protection to their employees while working at SSU.

4.3 DEPARTMENT SUPERVISORS

- a. Ensure that SSU employees under their direct supervision understand and adhere to adopted procedures during confined space entry operations.
- b. Assure that necessary education and training will take place prior to the employee being assigned to work in a confined space (see Section 6.0).
- c. Contact Environmental Health & Safety with as much advance notice as possible prior to performing confined space work. Notification should be made 24 hours in advance although immediate entry supervision is available during regular work hours.
- d. Maintain copies of all Confined Space Entry Permits, including all air testing results.
- e. Provide necessary operations equipment and resources including confined space attendants.
- f. Identify locations and potential hazards of each confined space that may require entry by employees.
- g. Contact Environmental Health & Safety prior to initiating contracts with off campus contractors that will involve confined space entry. Specific contract language (p. 16) is required to ensure that contractors provide an adequate level of protection to their employees while working at SSU.

4.4 ENTRY SUPERVISORS

- a. Determine if acceptable entry conditions are present at a permit space where entry is planned. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- b. Oversee entry operations for the duration of assigned work and terminate entry when conditions are determined to be unsafe.
- c. Perform air monitoring as required.
- d. Complete all sections of the Confined Space Entry Permit(s).
- e. Verify that rescue services are available and that the means for summoning additional services are operable.

- f. Control access to the confined space, prohibiting entry of unauthorized individuals.

4.5 ENTRANTS

- a. Because of the number of potential hazards that may exist or develop in the work environment, confined space entrants are required to use extreme caution at all times. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- b. Confined space entrants are responsible for reading and complying with procedures and guidelines and using equipment provided by their supervisors and Environmental Health & Safety.
- c. Communicate with the 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 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 entrants, or if the attendant cannot effectively and safely perform assigned duties.
- d. Alert the attendant whenever the entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or the entrant detects a prohibited condition.
- c. Ensure that his/her confined space entry training is up to date.

4.6 ATTENDANTS

- a. Assist entry supervisor and entrants as directed by the entry supervisor.
- b. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- c. Be aware of possible behavioral effects of hazard exposure in authorized entrants;
- d. Continuously maintain an accurate count of authorized entrants in the permit space and ensure that the means used to identify authorized entrants under subsection (f)(4) accurately identify who is in the permit space.
- e. Remains outside the permit space during entry operations until relieved by another attendant.

- f. Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants 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 entrants, or if the attendant cannot effectively and safely perform assigned duties.
- g. Initiate on-site rescue procedures and, if necessary, summon additional rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards. Contact Police Services (911) and request Rancho Adobe Fire Department for rescue.
- f. Warn unauthorized persons that they must stay away from the permit space. Advise unauthorized persons that they must exit immediately if they have entered the permit space, and inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.
- g. Perform non-entry rescues or other rescue services as part of SSU's on-site rescue procedure. This includes providing air to the space, obtaining rescue equipment, and any other non-entry rescue activities.
- h. Do not perform any duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

5.0 SPECIFIC PROCEDURES

5.1 MINIMUM NUMBER OF EMPLOYEES

A minimum of three employees will be immediately available during all permit-required confined space entries. A minimum of two trained employees will be within line of sight and verbal communication distance of one another outside of the confined space. A typical confined space team consists of an entry supervisor, an attendant, and entry personnel. For non-permit required confined spaces, one attendant shall carry out the duties as specified for attendant and entry supervisor.

5.2 INITIAL AIR MONITORING

- a. Keep manhole covers and access doors to confined spaces closed until air testing instruments are ready for testing.
- b. Turn Gastech GX-86 unit on and allow to cycle through self-diagnosis mode. Note minimum battery required power vs. actual displayed. The

unit may display non-zero values at the end of the cycle. In fresh air environment, press both red “Cal” buttons for four seconds until “AUTO ZERO SPAN” displays. The unit will zero out the readings for the four gases and is ready for use.

- c. Remove manhole cover or access door and immediately begin testing the atmosphere of the space with the Gastech GX-86 four gas detector. Sensors mounted on the cable extension of the Gastech GX-86 monitor will analyze in real time. Use additional monitoring instruments as necessary for specific contaminants.
 - i. For vaults and manholes, refrain from leaning over the area to be tested; lower the unit slowly and to within six inches of the bottom or standing water surface. Do not allow the sensor head to get wet! Record the worst-case values on the permit form and note any layering in the diagram area. Layering occurs where test instruments show changes in air quality in horizontal layers (e.g. settled flammable vapors showing an elevated %LEL at bottom of space).
 - ii. For horizontal spaces (e.g. boilers), move the sensor head into the space with a pole or other means. If all vertical layers cannot be sampled in the space remotely, have the entrant carry the sensor head into the space after thorough remote testing. A tag line and harness are required on the entrant. Record the worst-case values on the permit form and note any layering in the diagram area. Have the entrant evacuate the space if there is an indication of a dangerous atmosphere.
- d. A written record of air testing results shall be made on the permit form and kept at the work site for the duration of work. Affected employees and/or their representative shall be afforded an opportunity to review and record the testing results.
- e. Testing should be performed without disturbing the space, if possible.
- f. After long breaks (> half hour) such as lunch, complete testing for permit required confined spaces shall be performed again to determine if any atmospheric changes have taken place inside the confined space.
- e. Testing of the oxygen content and for flammability (UEL, LEL) shall be documented with sufficient frequency to ensure conformance with this section.

5.2 VENTILATION

- a. Adequate ventilation will be provided to protect employees from dangerous working conditions resulting from accumulations of hazardous concentrations of flammable vapors, toxic gases, or an oxygen deficient or enriched environment in all buildings, pits, rooms, vaults, or other enclosed areas.
- b. If sufficient general ventilation exists to ensure the removal of all atmospheric hazards, as identified through air monitoring, then the space may be treated as an Enclosed Space and only the requirements under section 5.3 of this procedure shall apply.

Note: Section 5.3 (f) is recommended, but not required.

- c. Note that positive pressure ventilation applied to single entry/exit point may cause potentially contaminated air to come out of the space. Precautions should be taken to prevent workers from being exposed (e.g. run air lines away from area or clear workers from entry point).

5.3 PRE-ENTRY PROCEDURES

- a. Lines which may convey flammable, injurious, or incapacitating substances into the space shall be disconnected, blinded, or blocked off by other positive means to prevent the development of dangerous air contamination and/or oxygen deficiency within the space (Consult Lockout/Tagout Policy & Procedures for specific information). The method used shall prevent inadvertent reconnection or disabling of the line.

Exception: This does not apply to public utility gas distribution systems.

Note: This section does not require blocking of all laterals to sewers or storm drains. Where experience or knowledge of industrial use indicates materials resulting in dangerous air contamination may be dumped into an occupied sewer, all such laterals shall be blocked.

- b. Confined space shall be emptied, flushed, or otherwise purged of flammable, injurious or incapacitating substances to the extent feasible.
- c. If air contamination exists, spaces shall be ventilated for at least 15 minutes prior to entry using the most effective method (e.g. blowing air into or drawing air from the space).
- d. Where interconnected spaces are blinded off as a unit, each space shall be tested and the results recorded, and the most hazardous condition found shall govern procedures to be followed.

- e. A confined space entry permit (Appendix A) will be completed, signed and dated by a member of the Environmental Health & Safety Department or by a qualified individual designated by the Environmental Health & Safety Department. A copy of the confined space entry permit will be forwarded to the Environmental Health & Safety Department and will be kept on file. The original entry permit shall be kept on file by the department using the permit.
- f. An attendant shall be continually present while workers are inside an enclosed or confined space. The attendant may operate the air monitoring equipment.
- g. To the extent feasible, all exits and entries shall be readily accessible.
- h. All tanks, vessels, or other confined spaces will be entered from the side whenever possible.

5.5 SPECIAL PRECAUTIONS

- a. Work involving the use of flame, arc, or spark, or other source of ignition is prohibited within a confined space (or any adjacent space having common walls, floor, or ceiling with the confined space) which contains, or is likely to develop, dangerous air contamination due to flammable and/or explosive substances.
- b. Whenever gases such as nitrogen are used to provide an inert atmosphere for preventing the ignition of flammable gases or vapors, no flame, arc, spark, or other source of ignition shall be permitted unless the oxygen concentration is maintained at less than 20 percent of the concentration which will support combustion.
- c. If the existence of dangerous air contamination and/or an oxygen deficiency is determined by the tests performed, existing ventilation shall be supplemented by the appropriate means.
- d. Whenever oxygen consuming equipment is used, arrangements will be made to ensure sufficient venting for all combustion air and exhaust gases.
- e. Automatic fire suppression systems employing toxic or oxygen displacing gases or total foam flooding shall be deactivated. If it is not feasible to deactivate these systems, then the use of respiratory protective equipment shall be used during entry into and work within such spaces (SCBA or Supplied Air Respirator with Egress bottle only).
- f. Only intrinsically safe lighting and electrical equipment, in accordance with low voltage electrical safety order, shall be used in confined spaces where dangerous air contamination due to flammable and/or explosive substances exists.

- g. Where live electrical work will be performed, the tripod unit will be properly grounded (e.g. welding cable and clamp).

5.6 OPERATING PROCEDURES

5.6.1 Non-Permit Required Confined Space

- a. Employees working in non-permit confined spaces shall wear personal protective equipment appropriate for the hazards expected in the space.
- b. Air testing shall be conducted periodically to monitor the pre-existing atmospheric environment and to detect any atmospheric changes that might occur. All testing data obtained shall be recorded on the confined space entry permit.
- c. If air sampling instruments indicate a developing adverse atmospheric change (e.g. steadily rising hydrogen sulfide or carbon monoxide levels, or steadily increasing or decreasing oxygen concentration), the supervisor will immediately pull all entrants from the confined space and reassess the area for its new hazard.

5.6.2 Permit-Required Confined Space

- a. All procedures described in Section 5.3 and 5.4 shall apply.
- b. An approved safety belt with an attached line shall be used. The free end of the line will be secured outside the entry opening. The line shall be a 900 kg test (2,000 pound) and 11 mm in diameter.

Exception: Where an entry supervisor determines that a safety belt and line would further endanger the life of the employee. Under these circumstances, the harness should remain attached to the employee to facilitate rescue in the event of an emergency.

- c. Where air contaminants persist or begin to appear after ventilating a confined space, continuous air monitoring will be performed. Data will be entered on the confined space entry permit every 15 minutes by the confined space supervisor.
- d. Top Opening

When entry must be made through a top opening, the following requirements also apply:

- i. A safety belt shall be of the harness type that suspends a person in an upright position will be worn by any person entering the space.
- ii. A hoisting device (tripod) or other effective means shall be provided for lifting employees out of the space.

5.7 AFTER HOURS & PRIORITY ENTRIES

- a. Under no circumstances is an employee to enter a permit required confined space at Sonoma State University without following the procedures outlined in this section.
- b. In the event that a permit required confined space must be entered after regular working hours, an attempt will be made to contact one of the authorized confined space entry supervisors listed in Appendix B. If a supervisor is not available, confined space entry may proceed if at least three trained confined space personnel are present and all of the procedures outlined in this document are followed (See Appendix B for current list of trained confined space personnel).

Note: Confined space equipment locations in section 5.9. Contact SSU Police for access to equipment storage areas.

5.8 EMERGENCY & RESCUE PROCEDURES

- a. Should an employee become disabled while in a confined or enclosed space, the attendant shall immediately call the emergency number (911) to summon emergency personnel. It is important to communicate to the dispatchers that a "confined space rescue" is necessary.
- b. Rescue attempts shall be made only by individuals who are trained in confined space rescue procedures and that have the necessary equipment to perform the rescue without endangering the safety of the would-be rescuer.

Note: There are no SSU personnel trained in confined space rescue. Confined space rescue is the responsibility of off campus emergency agencies. However, authorized individuals may provide unlimited non-entry rescue assistance (supplied air, medicine, etc.).

- c. The person attempting the rescue shall be protected by use of a self-contained breathing apparatus (SCBA's) or supplied air respirator (SAR). Ideally, SAR's should be on a pressure line with a minimum length of 25'.
- d. For top openings (e.g. manholes, vaults, etc.), a rescue line shall be attached to the rescuer for placement onto the victim for removal from the space. Rescue lines will be affixed to the tripod.
- e. An additional positive pressure mask may also be lowered into the space to provide safe air for the victim.

5.9 EQUIPMENT AND MATERIALS

The following equipment and materials will be made available to employees and used when appropriate:

Located in the EHS Salazar Equipment Room (1st Floor East, Tech High Shop Riser Room):

- a. Air monitor; GasTech GX-86 four gas (O₂, H₂S, CO, Combustible Gas).
- b. Draeger tubes for various chemicals and gases.

Located in EHS Equipment Shed (at Facilities Warehouse, Laurel Drive):

- c. SCBA (Self Contained Breathing Apparatus).
- d. Harness and life line.
- e. Tripod.
- f. Forced air devices (fans w/ tubes).

Provided as necessary:

- g. Appropriate Fire Extinguisher.
- h. 2-way communication device (Radio).
- i. Chemical resistant protective clothing.
- j. Appropriate eye protection.
- k. Lockout devices.

6.0 EMPLOYEE TRAINING

6.1 Unless otherwise specified, employees entering confined spaces (entrants), confined space entry supervisors, and attendants must have received all of the training outlined below at the specified time interval from the respective organization. Training shall be provided to each affected employee prior to assigned duties involving confined space operations [see 29CFR 1910.146(g) Training.].

- a. First Aid/CPR certification (annual, State of CA). One attendant, on site supervisor, or other individual must be present and trained in CPR whenever the use of respiratory protective equipment is required [8CCR 5159(b)(1)] or when live electrical work is being performed.
- b. Respirator Certification (annual, Environmental Health & Safety).
 - i. Fit Testing
 - ii. Applications of Respirators to Different Conditions
 - iii. Appropriate Cartridge Selection
- c. Self Contained Breathing Apparatus (annual, Environmental Health & Safety).
 - i. Operation
 - ii. Fit Testing
- d. Confined Space Operating and Rescue Procedures (Initial and annual, refresher training, Environmental Health & Safety).
 - i. Duties of entrants, attendants, and entry supervisors
 - ii. Physical & Chemical hazards (H₂S, Flammables, etc.)
 - iii. Air Monitoring
 - iv. Operation of Communication Equipment

7.0 RECORDKEEPING AND LABELING

- a. A confined space entry permit (appendix A) will be completed, signed and dated by a member of Environmental Health & Safety or an individual designated by Environmental Health & Safety in appendix B of this policy. A copy of the confined space entry permit will be forwarded to Environmental Health & Safety and kept on file for a minimum of three years. The original entry permit shall be kept on file by the department to which the permit was issued.
- b. Prior to entry, each confined space shall be identified by location and potential known hazards that may be associated with the space. Permit required confined spaces, when identified, shall be appropriately labeled "Danger - Permit Required Confined Space - Authorized Entrants Only", and be assigned a unique identification number.
 - i. Environmental Health & Safety will maintain records of all confined spaces. Information to include location, description of area, anticipated hazards, and unique identification number.

8.0 REFERENCES

Code of Federal Regulations, Title 29, Part 1910.146 (Permit Required Confined Spaces).

California Code of Regulations, Title 8, Part 1, Subchapter 7, (General Industry Safety Orders) Article 108. Confined Spaces. 8 CCR 5157 et sequitur.

Appendix B

Sonoma State University Confined Space Entry: Authorized Entry Supervisors.

All confined space entry permits issued & air sampling performed by the following Confined Space Entry Supervisors (including after hours entries):

Craig Dawson
Director of EH&S
x2932

Thomas Sargent
EH & S Specialist
x4003

Pending
Building Services Engineer
x2136
Home Phone:

2. All personnel that have received confined space entry training shall be considered authorized attendants.

Appendix C

Standard Language for use in University Contracts that Require Contractor Entry into Confined Spaces at SSU.

"Contractor shall provide all personnel and equipment necessary to comply with confined space entry procedures established in Code of Federal Regulations, Title 29, Part 1910.146 (Permit Required Confined Spaces) and California Code of Regulations, Title 8, Part 1, Subchapter 7 (General Industry Safety Orders), Article 108, Section 5157, Confined Spaces. Contractor shall treat all confined spaces encountered on the SSU campus as permit-required confined spaces unless Contractor's pre-entry procedures indicate otherwise. Contractor shall provide appropriate air monitoring equipment, employee training, permit forms, rescue procedures, personnel, and other means necessary to safely and independently enter confined spaces at Sonoma State University."