

# CONFINED SPACE PROGRAM



CALIFORNIA STATE UNIVERSITY, FRESNO

OFFICE OF

ENVIRONMENTAL HEALTH AND SAFETY

June 2015

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### APPENDIX

CCR Title 8 – Sections 5156-5158

# CONFINED SPACE PROGRAM

## 1.0 SCOPE

The following procedures describe safe operating practices in confined spaces. These may be silos, vats, bins, sewers, pipelines, tanks, boiler compartments, ducts, vaults, and pits; which may lack oxygen or have dangerous air contamination and be of such configuration that it would be difficult to remove a suddenly disabled person.

## 2.0 POLICY

Requirements for Employees Working in Confined Spaces.

### 2.1 Purpose

- A. This policy describes Confined Space Requirements for the California State University, Fresno.
- B. The California Code of Regulations, Title 8, Article 108, sections 5156-5158, shall set the minimal accepted standards used by university employees for work in confined spaces.

### 2.2 Definitions

- A. For the purpose of this policy, individuals working in confined spaces, refer to faculty, staff and students who, in the course of their work, are exposed to dangerous air contamination and/or oxygen deficiency in such spaces as silos, tanks, vats, vessels, boilers, compartments, ducts, sewers, pipelines, vaults, bins, tubes and pits.
- B. A confined space is defined by the concurrent existence of the following conditions.
  - 1. Is large enough and configured so that an employee can bodily enter and perform work.
  - 2. Ready access or egress for the removal of a suddenly disabled employee is difficult because of the location and/or size of the opening(s).
  - 3. Is not designed for continuous occupancy.
- C. A permit space is defined by the existence of one or more of the following conditions.
  - 1. Contains or has the potential to contain a hazardous atmosphere.

2. Contains material that has the potential for engulfing an entrant.
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
4. Contains any other recognized serious safety or health hazard.

### 2.3 Pre-entry Requirements

- A. The following requirements must be completed before entry into the confined space.
  1. Prior to working in a confined space, the job supervisor shall be contacted.
  2. Lines which convey flammable, injurious or incapacitating substances into the space shall be disconnected, blinded, or blocked off by other positive means to prevent development of dangerous air contamination. NOTE: This does not require blocking of all laterals to sewers or storm drains.
  3. The space shall be emptied, flushed or otherwise purged of flammable, injurious or incapacitating substances to the extent feasible.
  4. There must be adequate atmospheric testing performed by a trained employee to identify and minimize any potential hazards.
  5. To the fullest extent feasible, provide a safe entrance and exit. A written record of such testing results shall be made and kept at the work site for duration of the work.
  6. The air within the confined space shall be tested frequently to determine levels of contamination or oxygen deficiency.
  7. If the results are at all abnormal then the confined space must be purged with clean air for a minimum of ten minutes. Positive flow ventilation must be continued throughout the work procedure.
  8. If tests show no danger is present, entry and work may proceed provided the air within the space is tested frequently.
- B. The following requirements must be completed before entry into a permit required confined space:
  1. Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.

2. When the cover is removed, the opening shall be guarded by a rail or another barrier to prevent accidental fall and foreign objects from entering the space.
3. Before entrance, internal atmosphere shall be tested with a calibrated direct reading instrument for the following, in this order: oxygen content; flammable gases and vapors; potential toxic air contaminants.
4. There may be no hazardous atmosphere within the space whenever there is an employee in the space.

#### 2.4 Post-test Requirements

- A. If air testing indicates a hazard exists and supplemental purging or ventilation does not alleviate the hazard, the following additional conditions apply.
  1. No ignition source shall be introduced.
  2. If possible, use side openings rather than the top opening for entry. Side openings are those within 3.5 feet of the bottom.
  3. Appropriate/approved respiratory protection shall be provided and used by all entry employees.
  4. An appropriate/approved safety belt with attached line shall be used by all entry employees. The free end of the line shall be secured outside the entry opening. The line shall be at least 1/2 inch diameter and 2,000 lbs. test. NOTE: Except where it can be shown that a safety belt and attached line would further endanger the life of the employee.
  5. At least one employee shall stand by on the outside of the space keeping in constant visual and/or audio contact with the employee within the confined space and be ready to offer assistance in case of an emergency. Appropriate/approved respiratory equipment shall be available to the standby employee for immediate use.
  6. At least one employee shall be within sight of the standby employee. Entry into the confined space by the standby employee for emergency rescue is permitted only after notification of an outside employee of the emergency condition and planned action.
  7. Protective clothing or devices shall be provided and used as required.
  8. At least one employee trained in First Aid and Cardiopulmonary Resuscitation (CPR) shall be immediately available whenever the respiratory protection equipment is required.

9. Only approved electrical equipment and lighting shall be used in flammable or explosive atmospheres. Air powered equipment shall be used whenever possible.

## 2.5 Communication Requirements

When entry requires respiratory protection or loss of sight contact between employees, an effective means of communication between standby and entry employees shall be provided and used. All affected shall be trained and proficient in the use of the communication system and the system shall be tested prior to each use.

## 2.6 Operating Procedures and Employee Training

Individuals working in confined spaces shall receive written and understandable operating and rescue procedures. Operating procedures shall conform to the applicable CAL/OSHA requirements (CCR Title 8 Sections 5156-5158, Confined Spaces) and shall include provision for the surveillance of the surrounding area to avoid hazards such as drifting vapors from tanks, piping and sewers.

## 2.7 Further Information

To obtain further information, contact the campus Office of Environmental Health & Safety/Risk Management at ext. 8-7422 or the person responsible for safety at Plant Operations at ext. 8-2373.

## 3.0 DEFINITIONS

### 3.1 Confined Space

A space defined by the concurrent existence of the following conditions.

- A. Is large enough for work, but not designated for continuous occupancy.
- B. Existing ventilation is insufficient to remove dangerous air contamination and/or oxygen deficiency which may exist or develop.
- C. Ready access or egress for the removal of a suddenly disabled employee is difficult due to the location and/or size of the opening(s).
- D. Confined spaces may include, but are not limited to, storage tanks, vessels, pits, degreasers, boilers, ducts, sewers, tunnels, vaults and aircraft fuel cells.

### 3.2 Ceiling Level

Maximum airborne concentration of a toxic agent to which an employee may be exposed for a specified period of time.

### 3.3 Dangerous Air Contamination

An atmosphere presenting a threat of causing death, injury, acute illness or disablement due to the presence of flammable and/or explosive, toxic, or otherwise injurious or incapacitating substances.

- A. Dangerous air contamination – due to the flammability of a gas or vapor is defined as an atmosphere containing the gas or vapor at a concentration greater than 20 percent of its lower explosive (lower flammable) limit.
- B. Dangerous air contamination – due to a combustible particulate is defined as a concentration greater than 20 percent of the minimum explosive concentration of the particulate.
- C. Dangerous air contamination - due to the toxicity of a substance is defined as the atmospheric concentration immediately hazardous to life or health.

### 3.4 Hazardous Atmosphere

An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (unaided escape from a permit space), injury or acute illness from one or more of the following:

- A. Flammable gas, vapor or mist in excess of 10% of its Lower Flammable Limit (LFL).
- B. Airborne combustible dust at a concentration that meets or exceeds its LFL. This may be approximated as a condition in which the dust obscures vision at a distance of 5 feet or less.
- C. Atmospheric oxygen concentration below 19.5% or above 23.5%.
- D. Any other condition that is immediately dangerous to life or health.

### 3.5 Oxygen Deficiency

An atmosphere containing oxygen at a concentration of less than nineteen and one half percent (19.5%) by volume.

### 3.6 Lower Explosive Limit

The minimum concentration of a gas or vapor which will ignite if sufficient ignition energy is present.

### 3.7 Minimum Explosive Concentration

The minimum concentration of particulate (dust) suspended in air which can sustain an explosion.

### 3.8 Permissible Exposure Level (PEL)

The maximum 8-hour time weighted average of any airborne contaminant to which an employee can be exposed. PEL's are established by the Occupational Safety and Health Administration (OSHA).

### 3.9 Qualified Person

A person designated by the employer, in writing, as capable by education or specialized training, to recognize and evaluate employee exposure to hazardous substances or other unsafe conditions in a confined space.

## 4.0 RESPONSIBILITIES

### 4.1 Managers

Managers are responsible to:

- A. Ensure that the Office of Environmental Health & Safety/Risk Management is notified of all confined space operations in their area.
- B. Ensure only trained personnel participate in confined space operations.
- C. Provide and maintain the equipment required to work, ventilate, and if required, to monitor confined spaces.
- D. Ensure that required safety procedures including inspections and testing of the confined space are conducted throughout the confined space operation by qualified personnel.
- E. Ensure that all employees in the area are aware of confined space operations, and measures are taken to prevent inadvertent or unplanned entries.
- F. Ensure that all employees are aware of emergency procedures.

### 4.2 The Office of Environmental Health & Safety/Risk Management

The Office of Environmental Health & Safety/Risk Management is responsible to:

- A. Provide overall administration of confined space.

- B. Establish and update requirements for conducting confined space operations.
- C. Maintain/review records of confined space entry operations.

#### 4.3 Employees

All employees are responsible to conduct their work activities in accordance with established Occupational Safety and Health Administration policies and Departmental policies and procedures.

#### 4.4 Plant Operations

Plant Operations is responsible to:

- A. Provide support in blanking off, locking out, and/or disconnecting potential contaminant lines in confined spaces where work is to be performed.
- B. Coordinate with the Office of Environmental Health & Safety/Risk Management in approving lighting, equipment and tools that may be used in confined spaces subject to dangerous air contamination by flammable and/or explosive substances.

### 5.0 GENERAL REQUIREMENTS

#### 5.1 Notification of Entry

Management must notify the Office of Environmental Health & Safety/Risk Management of the intended confined space entry 48 hours in advance. Upon review, if the space is designated a potential confined space, the operation must be monitored prior to any entry. Under no circumstances may any unauthorized (unpermitted) entry be attempted by any personnel.

Note: The monitoring of some routine confined space operation may be designated a responsibility of the using department. In these cases, upon initial notification, the Office of Environmental Health & Safety/Risk Management will review the operation and establish specific written guidelines for monitoring and operating. If any aspect of the operation should change, the Office of Environmental Health & Safety/Risk Management must be notified immediately and new guidelines will be established accordingly. Only persons trained and designated qualified by the Office of Environmental Health & Safety/Risk Management may conduct this monitoring.

## 5.2 Employee Training

All employees involved in confined space operations must be properly trained on the hazards involved, their responsibilities/duties, completion of an entry permit and entry, operating and emergency procedures. Only qualified personnel may conduct atmospheric monitoring. Only trained and medically qualified personnel may wear respiratory protection.

## 5.3 Entry Permits

Entry into a permit space shall be by permit only. This permit is an authorization for entry under defined conditions for a stated purpose and specific time. The qualified person will fill out the permit and assure all portions are completed before any entry into the confined space. Permits are valid for up to one shift only. Permits must be posted at the site during the operation and when finished, returned to the Office of Environmental Health & Safety/Risk Management for revision and filing.

## 5.4 Prevention of Hazardous Conditions

The confined space must be positively prevented from entry of any material or energy that may create a hazardous condition(s). Such lines may be isolated by blanking, double block and bleed, electrical lockout/tagout, and blocking or disconnecting mechanical linkages in such a manner as to prevent inadvertent reconnection.

## 5.5 Sources of Ignition

Work involving the use of flame, arc, spark, or other source of ignition is prohibited within a confined space (or any adjacent space) which contains, or is likely to develop, dangerous air contamination due to flammable and/or explosive substances unless:

- A. An inert atmosphere, using gases such as nitrogen, is used to prevent the ignition and the oxygen concentration is maintained at less than 10% of the concentration which supports combustion.
- B. Sufficiently frequent testing of the oxygen content is performed to ensure that the oxygen remains less than 10% of the concentration which supports combustion.

## 5.6 Ventilation

Adequate combustion air and exhaust gas venting must be provided whenever oxygen-consuming equipment (i.e. salamanders, plumber's torches, or other heating devices) is to be used.

## 6.0 PRE-ENTRY/OPERATING PROCEDURES

### 6.1 Air Monitoring

The air must be monitored to determine whether dangerous air contamination – an atmosphere presenting a potential for death, disablement, injury or acute illness – exists. This may result from one or more of the following causes:

- A. Oxygen level less than 19.5% by volume (oxygen deficient) or greater than 23.5% by volume (oxygen enriched).
- B. A flammable gas, vapor or mist in excess of 10% of its lower explosive limit (lower flammable) limit.
- C. Toxic, corrosive or asphyxiant substance(s) above its permissible exposure or ceiling level.
- D. An airborne combustible particulate in excess of 10% of its minimum explosive concentration.
- E. Any condition or air contaminant defined as immediately dangerous to life or health.

As a minimum, monitoring must include items a, b, and c, in that specific order. Monitoring for any toxic substances that might be reasonably expected to exist or develop must also be performed. All testing must be performed by a qualified person using approved equipment. All equipment must be used and calibrated according to manufacturer's instructions and all results recorded on the Confined Space Entry Permit.

### 6.2 Entry

If results of the monitoring show dangerous air contamination and oxygen deficiency does not exist, then entry may be allowed under the following provisions:

- A. The confined space must be cleaned/purged and continuous positive ventilation must be utilized during the operation. Care must be taken to direct ventilation exhaust air downwind of exterior personnel and away from intake(s) or point(s) of entry.
- B. Atmospheric testing will be conducted with sufficient frequency to ensure that the development of any dangerous air contamination and oxygen deficiency does not occur during the performance of any operation.
- C. Any change in the operation, such as the introduction of a different chemical or change in the quantity used, voids the permit. A new permit may be issued

upon reevaluation of the new operation by the Office of Environmental Health & Safety/Risk Management.

- D. A standby employee, properly trained in confined space operations, must be located outside of the confined space site at all times. They must keep visual contact and summon emergency assistance if necessary.
- E. The confined area must be properly guarded against inadvertent entry of substances or other physical hazards (i.e. vehicles, pedestrians, cars, etc.).
- F. All necessary personal protective equipment needed to protect the employees(s) in the confined space must be utilized.
- G. Only approved explosion proof lighting, equipment and tools may be used when the environment may exceed 10% of the lower explosive level.

### 6.3 Removal of Hazardous Condition

If the results show dangerous air contamination or oxygen deficiency does exist, then the confined space will be ventilated and purged/cleaned/flushed to remove the hazard to the greatest extent feasible. This ventilation must be approved and may need to be statically bonded and explosion proof. When additional atmospheric monitoring has demonstrated no dangerous air contamination and no oxygen deficiency exists or may develop, then entry may be allowed under the provisions of 6.2.

### 6.4 Entry Under Hazardous Conditions

However, if the additional monitoring demonstrates that an atmosphere free of dangerous air contamination or oxygen deficiency cannot be ensured or in emergency situations when the appropriate provisions cannot be implemented, entry may be allowed only under the following provisions (in addition to the applicable provisions of 6.2 and 6.3):

- A. An approved safety belt (at least 1/2 inch diameter and 2000 pounds approved) with an attached line shall be used, with the free end of the line secured outside the entry point. Confined spaces with top and side openings should be entered from the side when possible. When entry must be made through a top opening, the safety belt shall be of a harness type and a hoisting device shall be utilized to lift employees out of the space. The only exception to any safety belt and attached line is when it can be shown its use would further endanger the safety of an employee.
- B. An approved air line respirator or self-contained breathing apparatus (SCBA) shall be worn by all person(s) entering the confined space. Air shall meet the requirements of the Compressed Gas Association of Group D breathing air.

- C. At least one standby employee in a constant, effective means of communication with the entrant shall be outside the confined space at all times, ready to give assistance. At least one additional stand-by employee, who may have other duties, must be within sight or call of the primary stand-by employee. This secondary standby must also be trained in confined space operations.
- D. The primary standby employee shall have a SCBA or approved airline respirator (independent source of breathing air) with an escape bottle. This standby may enter the confined space only in an emergency and only after:
  - 1. Attempting to pull the person out with the safety line.
  - 2. Alerting the secondary stand-by of the intended entry, the existence of an emergency, and issuing instructions to call the Police Department.
  - 3. Wearing appropriate respiratory protection and using necessary safety lines.
- E. At least one person trained in CPR/Basic First Aid shall be on hand at the site.

## 6.5 Contractors

California State University, Fresno is not responsible for the employees of contractors who may enter confined spaces. Contractors are responsible to ensure that they have their own confined space entry program.

## 7.0 EMERGENCY RESCUE PROCEDURES

It is absolutely essential that well planned procedures and the use of proper protective equipment be followed before any attempt at rescue of a disabled employee in a confined space is tried. The past history of rescue attempts have shown a very poor record in following successful rescue procedures. Spontaneous reaction, instead of well planned and executed rescue procedures, has led to numerous unnecessary deaths in confined spaces. The literature and data received has shown that in 19 out of 25 reported cases in which rescue was attempted, the rescuers were injured or killed.

### 7.1 Conditions

Before any rescue attempts are made, the following conditions must be met:

- A. A properly equipped standby employee (see B below) and an additionally trained employee (see C and D below) must be present before any rescue of the disabled employee is attempted.
- B. The standby employee must be equipped with:

1. Properly approved respiratory equipment.
2. A chest or full body harness with a life line attached.
3. All necessary personal protective equipment.

C. The additional employee is required to:

Maintain communication with the standby employee either visually, by voice or with the use of an alarm activated explosion proof communication system if rescue of a disabled employee within a confined space is necessary.

D. An employee trained in First Aid and CPR should be immediately available.

## 7.2 Procedures

If unknown or suspected disabling environment exists, the Hazardous Confined Space Requirements shall be implemented prior to entry of any additional personnel.

A. Send for emergency assistance (911).

B. For employee wearing safety line/harness:

1. Set up hoisting apparatus if top entry was used.
2. Evacuate victim without entry of additional personnel.
3. Administer First Aid or CPR if necessary.
4. Stay with victim until medical personnel arrive.

C. For employee NOT wearing safety line/harness:

1. Send for additional employee who has approved respiratory equipment and safety line/harness.
2. At least one employee shall remain outside at all times to give assistance.
3. Set up hoisting apparatus if top entry was used.
4. Purge confined space with mechanical blower for several minutes.
5. Test for combustibles, O<sub>2</sub> deficiency and toxic materials prior to entry.
6. When no hazard is present as determined by testing, continue rescue procedure.

7. If a hazardous environment exists, the rescuer shall wear approved respiratory equipment, safety line and harness in addition to necessary personal protective equipment.
8. Put safety line/harness on victim.
9. Evacuate victim.
10. Administer First Aid or CPR if necessary.
11. Stay with victim until medical personnel arrive.

At NO time should rescue operations be conducted without appropriate approved respiratory and protective equipment and unless the atmosphere of the Confined Space is KNOWN to be harmless.

## TABLE 1

### HAZARDOUS ATMOSPHERE CATEGORIES

Hazardous atmospheres can be divided into four (4) categories:

A. Flammable; B. Toxic; C. Irritant/Corrosive; D. Asphyxiating

#### A. Flammable Atmospheres

1. Enriched oxygen atmosphere above 25% oxygen.
2. Combustible gases such as acetylene, butane, propane, hydrogen, methane and natural or manufactured gases.
3. By-products of work such as spray paint vapors or cleaning solvents.
4. Chemical reactions that create flammable gases such as hydrogen for dilute sulfuric acid and iron acetylene for calcium carbide and water or percussion induced combustion of acetylene - metal compounds, peroxides and nitrates.
5. Combustible dust concentrations found in handling grain products, nitrated fertilizers and finely ground chemical products.
6. Desorption of chemicals from the inner surfaces of confined spaces as propane or natural gas.

#### B. Toxic Atmospheres

1. Hydrogen chloride and vinyl chloride monomer from PVC production.
2. Hydrogen sulfide from stored decomposed material.
3. Oxides of heavy metals from welding fumes.
4. Cadmium poisoning from torch cutting cadmium plated objects.
5. Hydrogen sulfide from using hydrochloric acid to clean iron sulfide off of heat exchanger walls.
6. Hydrogen sulfide from accidental combination of sodium sulfate and acid dichromate in the tanning process.
7. Toxic solvents such as trichloroethylene, methyl chloroform and dichloromethane.
8. Acrylonitrile which is sometimes used as part of a protective coating for tank interiors.

9. Trichloroethane and dichloroethane which are widely used cleaning solvents.
10. Arsine gas from the combination of aluminum, sodium hydroxide and sodium arsenite.
11. Carbon monoxide from incomplete combustion of wood, coal, gas, oil and gasoline, from microbial decomposition of organic matter in sewers, silos and fermentation tanks.

C. Corrosive Atmospheres

1. Primary irritants such as chlorine, ozone, hydrochloric acid, sulfuric acid, nitrogen dioxide, ammonia and sulfur dioxide.
2. Secondary irritants such as benzene, carbon tetrachloride, ethyl chloride, trichloroethylene and chloropropene. These irritants produce systemic toxic effects as well as surface irritation.

D. Asphyxiating Atmospheres

1. Consumption of oxygen due to welding, heating, cutting and brazing.
2. Consumption of oxygen due to bacterial action such as fermentation or during chemical reactions such as the formation of rust.
3. Consumption of oxygen by the number of people operating in a confined space.
4. Displacement of oxygen by inert gases such as helium, argon or nitrogen.
5. Displacement of oxygen by carbon dioxide as in sewers, storage bins, wells, tunnels, wine vats and grain elevators.
6. Absorption of oxygen by the vessel walls or substances contained like activated carbon.

E. Other Hazards

1. Electrical equipment which would cause injury.
2. Mechanical equipment which would cause injury.
3. Static charge due to mechanical cleaning such as abrasive blasting.
4. Communication problems between the worker inside and the standby person outside due to visual interference, failure of electronic equipment or lack of proper illumination.

5. Entry and exit problems due to space configuration, size and number of openings, barriers within, and the time requirements for exiting and rescue.
6. Physical problems such as heat, cold, humidity, air velocity, noise vibration, scaffolds, surface residues and structural hazards.

TABLE 2  
CHECK LIST

Check list of consideration for entry, working in and exiting from confined spaces, and permit required confined spaces

Items:

- 1. Permit (for permit spaces only)
- 2. Atmosphere Testing
- 3. Monitoring
- 4. Medical Surveillance
- 5. Training of Personnel
- 6. Labeling and Posting
- 7. Preparation:
  - Isolate/lockout/tagout
  - Purge and ventilate
  - Cleaning Processes
  - Requirements for special equipment and tools
- 8. Procedures:
  - Initial plan
  - Standby
  - Communications/observation
  - Rescue
  - Work
- 9. Rescue Equipment
- 10. Safety Equipment and Clothing:
  - Head protection<sup>†</sup>
  - Hearing protection<sup>†</sup>
  - Hand protection<sup>†</sup>
  - Foot protection<sup>†</sup>
  - Body protection<sup>†</sup>
  - Safety belts\*
  - Life lines and harnesses\*
  - Record keeping/exposure\*
  - Respiratory protection\*\*

<sup>†</sup>Depends on job and area

\*Must have

\*\*Decision Rests with qualified person

Table 3

California State University, Fresno

CONFINED SPACE ENTRY PERMIT

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Expires Date/Time: \_\_\_\_\_

Confined Space Location: \_\_\_\_\_

Purpose of Entry: \_\_\_\_\_

POTENTIAL HAZARDS EXPECTED

- OXYGEN DEFICIENCY
FLAMMABLE GASES/VAPORS
TOXIC GASES/VAPORS
MECHANICAL HAZARDS
ELECTRICAL SHOCK
MATERIALS HARMFUL TO SKIN
ENGULFMENT
HEAT STRESS
OTHER: \_\_\_\_\_

EQUIPMENT REQUIRED FOR ENTRY

- Respirator
Type: \_\_\_\_\_
Supplied Air Breathing Apparatus
Protective Clothing
Type: \_\_\_\_\_
Hearing Protection
Eye Protection
Personal Atmosphere Monitor
Communication Equipment
Type: \_\_\_\_\_
Other: \_\_\_\_\_

ELECTRIC EQUIPMENT/TOOLS

- Low Voltage Tools/Lights
Ground-fault Interrupters
Approved for Hazardous Environments

RESCUE EQUIPMENT REQUIRED

- Fire Extinguisher
Harness/Lifeline
Tripod/Retrieval Equipment
Other: \_\_\_\_\_

PREPARATION REQUIRED

- Notify affected departments of service interruption
Isolate supply/return; blanked-double valve; lock & tag
Zero Energy State (Lock out/tag all energy sources)
Cleaned, drained, washed and purged
Ventilation to provide fresh air
Emergency Response Team Available
Employees informed of specific confined space hazards
Procedures reviewed with each employee
Atmospheric Tests in compliance
Attach Hot Work Permit
Notified EH&S/RM Office
Other: \_\_\_\_\_

AUTHORIZED ENTRANTS:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

AUTHORIZED ATTENDANT(S):

\_\_\_\_\_  
\_\_\_\_\_

RESCUE SERVICES

Public Safety Department
Contact by campus telephone: 911

**PERSONAL/AREA CONTINUOUS ATMOSPHERIC MONITORING EQUIPMENT**

Monitoring Equipment Type: \_\_\_\_\_  
Monitoring Equipment Serial Number: \_\_\_\_\_  
Calibrated By: \_\_\_\_\_  
Date Calibrated: \_\_\_\_\_

**PRE-OPENING ATMOSPHERIC TEST EQUIPMENT**

Test Equipment Type: \_\_\_\_\_  
Test Equipment Serial Number: \_\_\_\_\_  
Date Calibrated: \_\_\_\_\_  
Calibrated By: \_\_\_\_\_  
Person Conducting Pre-Opening Testing: \_\_\_\_\_

**ATMOSPHERE TEST RESULTS**

TIME	DISTANCE FROM ENTRANCE	RESULTS				OTHER: _____
		O <sub>2</sub>	C.G.	H <sub>2</sub> S	CO	
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

TEMPERATURE IN CONFINED SPACE: \_\_\_\_\_

ACCEPTABLE ATMOSPHERIC CONDITIONS ARE:

- OXYGEN BETWEEN 19.5% AND 23.5%
- COMBUSTIBLE GAS LESS THAN 10% OF LOWER EXPLOSIVE LIMIT (LEL)
- NO DETECTABLE AMOUNTS OF ANY OTHER ATMOSPHERIC CONTAMINANT

**IF THESE CONDITIONS ARE NOT MET THE SPACE MAY NOT BE ENTERED AT THIS TIME. CONTACT EH&S DEPARTMENT BEFORE PROCEEDING.**

**A confined space entrant may not enter the confined space unless he has reviewed the permit. By signing below the entrant confirms that he has read, reviewed, and understood the work authorized by this permit and the information contained herein. Entrant also confirms that safety instructions and procedures have been received and are understood.**

**CONFINED SPACE SIGN IN LOG**  
(Times must be posted for each Entry and Exit)

ENTRANT	SIGNATURE	ENTRY	EXIT	ENTRY	EXIT	ENTRY	EXIT
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

**CONFINED SPACE ENTRY SUPERVISOR CERTIFICATION**

**AUTHORIZATION: I certify that all required precautions have been taken and necessary equipment is provided for safe entry and work in this confined space.**

**Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

**Time:** \_\_\_\_\_

TABLE 4

## RECOMMENDED RESPIRATORY SELECTION GUIDE

Hazard	Concentration* Less Than or Equal To	Respirator**
Particulate	5 x PEL	Single use respirator***
Particulate	10 x PEL	Any dust respirator***
Particulate	50 x PEL	Full facepiece respirator with high efficiency filter(s) or self-contained breathing apparatus with full facepiece operated in the demand mode.
Particulate	2000 x PEL	Supplied-air respirator with full facepiece operated in any positive pressure mode.
Particulate	Greater than 2000 x PEL	Self-contained breathing apparatus with full facepiece operated in the pressure demand mode or a supplied-air respirator with full facepiece operated in any positive pressure mode with an auxiliary self-contained breathing apparatus.
Known gas or vapor contaminant****	50 x PEL	Chemical cartridge respirator with full facepiece and cartridges approved for the specific contaminant(s) or a full facepiece self-contained breathing apparatus operated in the demand mode.

\* If the concentration forms a flammable atmosphere only the self-contained breathing apparatus with full facepiece operated in the pressure demand mode may be used.

\*\* Any respirator recommended for a higher concentration may be used at a lower concentration.

\*\*\* These respirators may not be used if the toxic material is carcinogenic.

\*\*\*\* If the concentration forms an atmosphere which is immediately dangerous to life, then only the self-contained breathing apparatus operated in the pressure demand mode or the combination supplied air respirator with full facepiece operated in any positive pressure mode with an auxiliary self-contained breathing apparatus may be used.

TABLE 4

## RECOMMENDED RESPIRATORY SELECTION GUIDE

Hazard	Concentration* Less Than or Equal To	Respirator**
Known gas or vapor contaminant***	2000 x PEL	Supplied-air respirator with full facepiece operated in any positive pressure mode.
Known gas or vapor contaminant***	Greater than 2000 x PEL	Self-contained breathing apparatus with full facepiece operated in the pressure demand mode or a combination supplied-air respirator with full facepiece operated in any positive pressure mode with an auxiliary self-contained breathing apparatus.
Combination of particulates and gases or vapors****	50 x PEL	A full facepiece combination respirator approved for dusts and mists and the specific contaminant(s) (gases or vapors).
	1000 x PEL	Powered air-purifying full facepiece combination respirator with high efficiency filter(s) and chemical cartridge approved for the specific gas or vapor.
	2000 x PEL	Supplied-air respirator with full facepiece operated in any positive pressure mode.
	Greater than 2000 x PEL	Self-contained breathing apparatus with a full facepiece operated in the pressure demand mode or a combination supplied-air respirator with full facepiece operated in any positive pressure mode with an auxiliary self-contained breathing apparatus.

\* If the concentration forms a flammable atmosphere only the self-contained breathing apparatus with full facepiece operated in the pressure demand mode may be used.

\*\* Any respirator recommended for a higher concentration may be used at a lower concentration.

\*\*\* These respirators may not be used if the toxic material is carcinogenic.

\*\*\*\* If the concentration forms an atmosphere which is immediately dangerous to life, then only the self-contained breathing apparatus operated in the pressure demand mode or the combination supplied air respirator with full facepiece operated in any positive pressure mode with an auxiliary self-contained breathing apparatus may be used.

TABLE 4

RECOMMENDED RESPIRATORY SELECTION GUIDE

Hazard	Concentration* Less Than or Equal To	Respirator**
Unknown contaminant	Undetermined	Self-contained breathing apparatus with full facepiece operated in the positive pressure mode or a supplied-air respirator with full facepiece operated in any positive pressure mode with an auxiliary self-contained breathing apparatus.
Inert and other atmospheres where the oxygen level is below 17%		Self-contained breathing apparatus with full facepiece operated in the pressure demand mode or a combination supplied-air respirator with full facepiece operated in any positive pressure mode with an auxiliary self-contained breathing apparatus.
Emergency	Unknown	Self-contained breathing apparatus with full facepiece operated in the pressure demand mode or a combination supplied-air respirator with full facepiece operated in any positive pressure mode with an auxiliary self-contained breathing apparatus.

\* If the concentration forms a flammable atmosphere only the self-contained breathing apparatus with full facepiece operated in the pressure demand mode may be used.

\*\* Any respirator recommended for a higher concentration may be used at a lower concentration.

\*\*\* These respirators may not be used if the toxic material is carcinogenic.

\*\*\*\* If the concentration forms an atmosphere which is immediately dangerous to life, then only the self-contained breathing apparatus operated in the pressure demand mode or the combination supplied air respirator with full facepiece operated in any positive pressure mode with an auxiliary self-contained breathing apparatus may be used.

TABLE 5

CONFINED SPACES AT CALIFORNIA STATE  
UNIVERSITY, FRESNO

<u>SPACE</u>	<u>LOCATION</u>	<u>POTENTIAL HAZARDOUS MATERIALS/CONDITIONS</u>
Electrical Vaults	campuswide	electrical hazards, low oxygen, asbestos
Sewage manholes	campuswide	carbon monoxide, low oxygen, drain disposed chemicals, methane
Storm Drain manholes	campuswide	Carbon monoxide, hydrogen sulfide, low oxygen, methane
Water tower	Plant Operations yard	low oxygen, falling hazards
Wine vats	Enology	low oxygen
Roof of Science Bldg.	Science Bldg.	unknown fume, vapor, mist from vents
Vacuum Vessel	West Engineering	low oxygen level, various hazards
Boilers	Plant Operations Yard	heat stress, low oxygen level
Grain Silos	Agricultural Operations	low oxygen level, falling hazard
Water surge tank	Plant Operations	low oxygen level, chemical hazards
Incinerators		low oxygen level
Freezers		low temperature, hazardous chemicals
Cooling tank	Plant Ops yard	low oxygen, chlorine, bromine, "inhibitor"
Domestic water tower	Plant Ops yard	fall, drowning

This list is intended as a guideline. It is not a complete list of confined spaces on campus. If you have a question regarding confined spaces, please call 8-7422.