

**South Carolina
Department of Administration**

General Services Division



Confined Space Entry Program

Office of Prime Responsibility:
Safety, 737-2315

November 17, 1998

Revision 5: July 1, 2015

REVISION 1: Effective August 1, 2003, the following changes are to be made to the November 17, 1998, plan.

SUMMARY OF CHANGES:

“Office of General Services (OGS)” is now the “General Services Division (GSD)” but will simply be referred to as “General Services (GS)”

Contractors hired by GS must meet the same confined space entry requirements as GS employees.

GS has updated its electronic multi-gas monitoring equipment.

Confined space classifications have been clarified. If a space did not meet the OSHA criteria then it was not classified as a confined space. If a space met the OSHA criteria it was classified as either a Non-Permit Confined Space or as a Permit-Required Confined Space (PRCS). Any space that has not been surveyed will be treated as a Permit-Required Confined space until deemed otherwise. A Permit-Required Confined space where all hazards can be controlled prior to entry can be treated as a Non-Permit Confined Space (commonly referred to as PRCS Alternate Procedures).

The process of hazard recognition for confined space entry operations is expanded from pre-entry inspection to also include a continued search throughout the entire entry due to the possibility of changing conditions. Changed conditions require a reassessment where a new hazard condition is introduced that requires immediate evacuation and could make a Non-Permit Confined Space into a Permit-Required Confined Space.

Supervisors should be on site for Permit-Required Confined Space entries. If not available, an on-site Lead Worker or the Attendant is to be designated with the supervisor’s on-site responsibilities.

GS does not have a Rescue Team. Entry Supervisors are to call to ensure Emergency Management Services are able to respond prior to authorizing a Permit-Required Confined Space entry. Attendants, required during Permit-Required Confined Space entries, are not trained to enter the confined space to affect rescue. However, Attendants are to be trained to make a rescue from outside of the confined space, known as retrieval, using retrieval/rescue equipment and they are to be trained in CPR and 1st Aid so they can provide on-the-scene care until Emergency Management Services arrive.

The physical and psychological suitability of employees to perform the required duties in confined spaces should be considered.

REVISION 2: Effective September 12, 2007

Attachment 5, Multi-Gas Monitor Operation, in its entirety was replaced due to use of different instruments for sampling, detection and alarm of hazardous atmospheric conditions during confined space entry. The two monitors, charging units, batteries, calibration equipment and sign-out log are now in the Facilities Management Building Maintenance inventory and kept in their Back Shop’s Tool Storage Room for check out.

General Services transitioned from the American Red Cross to the American Heart Association CPR-1st Aid curriculum. The AHA Heartsaver course is certified every 2 years. This required paragraph 7 of the Confined Space Entry Permit to be updated.

Added Attachment 8, Instructor’s Checklist for Confined Space Hands-On Class

REVISION 3: Effective June 30, 2008

Added warning that cellular telephones and radios are a potential source of ignition inside the confined space should a flammable situation develop. Procedures for notifying the City of Columbia Rescue 1, Special Operations Unit prior to and upon completion of confined space entry were added to the entry permit.

REVISION 4: Effective March 19, 2009

Industrial Scientific M-40 multi-gas monitors replaced our older monitors. New operational instructions are provided. The entry permit form and this program were updated to reference the Safety web page.

SC DEPARTMENT OF ADMINISTRATION GENERAL SERVICES

CONFINED SPACE ENTRY PROGRAM

November 17, 1998

I. **GENERAL INFORMATION**: Confined spaces that have immediate health or safety risks require controlled access through a permit program. Being able to recognize and plan for a proper entry into a confined space can mean preventing an unnecessary injury or fatality. Confined space accidents are completely preventable. When workers are properly trained, adequate supervision given, atmospheric testing conducted and safety equipment provided, confined space entry can be a safe working procedure.

A. According to the National Institute for Occupational Safety and Health (NIOSH) which studied confined space accidents, repair/maintenance was the most common reason and rescue was the second most common reason for entering a confined space. 60 percent of confined space fatalities occurred not to the initial Entrant/victim but rather from untrained and unprotected standby personnel or would-be volunteers who attempted to rescue the incapacitated Entrants. Hazardous atmospheres (oxygen-deficient, toxic or flammable) were involved in 80 percent of the incidents. Additionally, only 6 percent of the victims had received specific confined space entry safety training, and none of the victims' employers used a confined space entry permit system.

B. The standards on confined spaces under the Occupational Safety and Health Act (OSHA) were implemented April 15, 1993, to save over 10,700 injuries and 54 lives nationally each year. These standards have been adopted by the state of South Carolina and apply to the confined spaces located in various facilities owned, operated and/or maintained by the General Services (GS). The original Confined Space program was distributed in July 1994, revised in November 1996, and is superseded by this document.

C. In order to comply with Title 29 of the Code of Federal Regulations (29 CFR) 1910.146 and 1926.21, the GS Confined Space Entry Program will enable GS employees to recognize potential confined spaces, to understand the hazards of confined spaces, and to take appropriate precautions to protect persons working in and around these confined spaces. The purpose of the federal and state standards and the GS Confined Space Entry Program is to prevent accidents, injuries and fatalities in confined spaces. The program implements this accident prevention policy through employee training which will equip employees with the knowledge to eliminate or control the hazards associated with entering, working within and exiting confined spaces.

D. Representatives from Safety and Facilities Management teams conducted site surveys of known and suspected confined spaces in the Fall of 1996 and made a determination as to which entry procedures are required for each. If GS elected not to have its employees enter a space, then an evaluation was not required, and the space was to be locked and posted with a warning sign to prevent entry. See Attachment 2 for the Confined Space Decision-Making Process and Procedural Flowchart, and Attachment 3 for Confined Space Classifications.

II. **POLICY:** Only GS or contracted employees trained and equipped as prescribed by this program are allowed to enter confined spaces. If a new space is created or discovered that is questionably a confined space, it shall be treated as a permit required confined space until determined otherwise. Permit Required Confined Spaces will be posted with an appropriate warning sign and locked, if possible, against unauthorized entry. All designated employees, to include contractors, will be notified of the types of confined spaces and their known associated hazards that are located in facilities owned, operated and/or maintained by GS for which they were hired to perform work. GS Safety or the Contractor will be responsible to train and equip their respective employees in accordance with 29 CFR 1910.146/1926.21.

III. **CONFINED SPACE HAZARDS:** There are many hazards that can be found in confined spaces. Therefore, careful planning is required before anyone tries to enter into a confined space. All the hazards that can affect the safety and health of Entrants must be determined and addressed through the evaluation process. Hazards in confined spaces can generally be grouped into the following:

A. **Atmospheric Hazards:** (See definition - Hazardous Atmosphere.) Accidental leaks or spills, oxidation (rusting metals or decomposing organic materials), or by-products produced within a confined space from mechanical operations (welding, painting, cleaning with acids or solvents, scraping, or sandblasting) can give off toxic vapors and fumes. Toxic gases and vapors may displace oxygen such as when using carbon dioxide to fight a fire. They can also be inhaled or absorbed through the skin then incapacitate the body's ability to maintain respiration. Further, repeated or prolonged exposures to some toxic gases and vapors can cause long-term physical damage to the body. While airborne dust and particle concentrations may be easy to spot with the naked eye, oxygen and other gases can be colorless and/or odorless and in concentrations that can only be detected with a reliable instrument. Of all confined space hazards, atmospheric hazards are the most common and are often undetectable.

B. **Physical Hazard:** After the atmospheric hazards have been identified in a confined space, physical hazards must be identified. Physical hazards may be grinding or welding equipment, agitators, steam or steam fittings, mulching equipment, drive shafts, gears or other moving equipment that can burn, maim, or crush. Uneven or wet surfaces (rain, ground seepage, spills, leaks), pipe fittings, or heights over 6 feet may also pose a slip, trip and fall hazard.

C. **Engulfment Hazard:** (See definition for Permit Required Confined Space.) Loose materials such as crushed stone, fertilizer, sawdust, etc. are often stored in containers such as silos. The stored material may contain air pockets that can collapse under the weight of an employee. The stored material then can cover the employee's airway or compress the upper chest to the point of suffocation.

D. **Corrosive Hazard:** Chemicals such as acids, solvents and cleaning solutions can cause serious irritation or burns to the skin, mucous membranes or eyes. Fumes from these chemicals can also irritate the respiratory system and can cause gastrointestinal distress.

E. **Biological Hazard:** Molds, mildews and spores frequently found in dark, damp spaces can irritate the respiratory system. Bacteria and viruses, found in applications such

as sewage treatment, can also threaten the body with a variety of diseases. Additionally, bird and animal feces can present a serious health hazard for humans.

F. Medical Suitability: The physical and psychological suitability of employees to perform the required duties in confined spaces should be considered. A variety of stresses such as thermal extremes (hot or cold), vertigo, claustrophobia, etc. are associated with confined space environments. A licensed health care professional may evaluate or the Supervisor may observe during field activities that an employee is not suited for confined space work.

G. Other Hazards: Poor visibility, inadequate lighting and insecure footing; rodents, snakes, spiders and insects; sudden changes in weather, i.e., rain and wind, are hazards to the Entrants in confined spaces.

IV. ATMOSPHERIC TESTING: All Entrants and Attendants for confined space entry operations must know how to use a gas monitor. Experts consider the battery-powered, direct-reading and continuous monitoring instrument to be the most practical device for checking a confined space atmosphere. Depending on the instrument, an employee can monitor for a single gas or simultaneously for two to five gases (see Attachment 5 for operation of the multi-gas monitor used by GS). If actual and potentially hazardous substances have been identified, then substance-specific sensors should be used because they read the actual concentration levels. If actual or potentially hazardous substances are not identified then broad based sensors may have to be used which have the disadvantage of only warning that the threshold for a class of chemicals has been exceeded.

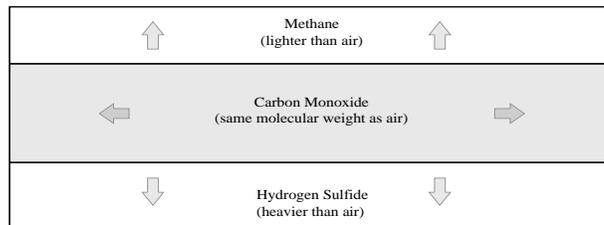
A. Initial Test: It must be assumed that every confined space has an unknown hazardous atmosphere. *Under no circumstances* should anyone ever enter, or even stick their head into a confined space for a “quick look.” The initial atmospheric test will be conducted from OUTSIDE of the confined space. This initial test will determine whether or not an employee may enter the confined space, what type of protective equipment is necessary, and/or the duration of worker exposure.

1. Safety will regularly calibrate the multi-gas monitor, as recommended by the manufacturer.

2. Turn on the multi-gas monitor in known fresh air.

3. If possible, do not open the entrance access to the confined space in order to test the atmosphere, i.e., insert a probe through a weep hole or small entry port into the confined space. Opening the access may result in violent reactions between the internal and external atmospheres, or dilute the internal atmosphere giving a false (safe) reading.

4. Atmospheric testing should include a representative sampling of the total atmosphere. Take air samples at the top, middle and bottom within the confined space since gases have different densities (some gases are lighter than air, some gases are heavier than air, and other gases have the same weight as air and some gases may hide in pockets due to reduced ventilation). Use a flexible hose for descents into vertical confined spaces or a rigid probe to test the atmosphere in horizontal situations like a tunnel.



B. Regular Testing: No matter what type of instrument is selected, regular monitoring should be performed during all confined space operations. Even if a gas is not present or is at a particular level upon initial testing, the concentration, combustibility, and/or toxicity may change unexpectedly. Battery-powered monitors should be left on for continuous monitoring to take advantage of built-in alarms. If detector tubes are being used, sampling should be conducted at frequent intervals, i.e., at a minimum of every 30 minutes.

C. Test Equipment (see definition): A number of instruments are available to detect toxic and combustible gases, and levels of oxygen. GS uses a multi-gas detector (see Attachment 5).

V. **PROCEDURES FOR ENTERING A CONFINED SPACE**: Which entry procedures are required is determined by a site inspection for each individual entry. A space that is not as a confined space usually requires no special entry procedures. See Attachment 2 for the Confined Space Decision-Making Process and Procedural flowchart. See Attachment 3 for how each identified space is classified.

A. Permit-Required Confined Spaces (PRCS) Procedures:

1. PRCS Entry Permit: Before any GS employee enters a PRCS, the designated Entry Supervisor must complete and sign a PRCS Entry Permit (see Attachment 4). A qualified and designated supervisor must conduct a hazard assessment of the PRCS in order to complete the PRCS Entry Permit. The PRCS Entry Permit provides a written notice of the hazards within the PRCS, controls established for those hazards, personal protective equipment required, and any restrictions upon intended operations in the confined space. The permit should also include cleaning, purging and ventilation requirements, safe work practices, and who and how to summon for rescue and medical services.

a. For situations requiring “hot work,” such as welding, a notation must be added or a hot work permit (see GS Cutting and Welding Program) must be attached to the PRCS Entry Permit detailing the scope and duration of the hot work. Cutting and welding in a confined space introduces additional hazards, i.e., toxic fumes and open flame that make a Non-Permit Confined Space into a Permit-Required Confined Space.

b. To ensure everyone understands their responsibilities, the hazards found in a particular PRCS, controls required, and the consequences of exposure to each hazard, the Entry Supervisor should conduct a site inspection immediately before entry.

c. Canceling of Permits:

(1) When work inside the PRCS is completed, the Entry Supervisor is to cancel the permit.

(2) Anytime the Entry Supervisor or Safety has any reason to believe the measures being taken under the PRCS Entry Permit do not adequately protect the Entrants, the Entrants will be directed to leave the PRCS and the PRCS will be reviewed. Examples requiring review: Unauthorized entry, hazard detected not covered or prohibited by the permit, an injury or near miss occurs during entry, a change in configuration or use of the PRCS, and employee complaints about the permit's effectiveness.

(3) Problems are to be noted on or attached to the permit so that changes can be made as required.

(4) The canceled entry permit is to be retained on file by Safety for at least one (1) calendar year from the closure date.

d. The duration of the Entry Permit should only last long enough for the job to be completed. If the permit extends more than one shift, i.e., the job may take several days, a week or more to accomplish, ...

(1) Each new shift must be briefed and accounted for.

(2) Procedures must specify how to close and secure the PRCS at the end of day. Also, next day start up procedures must include initial atmospheric testing and verification of isolation and lockout-tagout procedures.

2. Isolation or Lockout -Tagout (LOTO) Procedures: Before entering a confined space, utilities and mechanical equipment serving that space should be isolated and disconnected. Only authorized employees are allowed to use LOTO procedures (see GS LOTO Program).

a. Pipes and steam lines should be blind flanged in the "Off" position and locked out with a padlock.

b. Main breakers to electrical service in the PRCS should be thrown to the "Off" position and locked out at the breaker panel. To be sure the power supply to the equipment has been interrupted, all On-Off switches should be tested.

c. Hydraulic lines serving the PRCS should be blocked and bled to prevent unanticipated movement of the equipment.

d. Drive mechanisms, gears and belts to all mechanical equipment should be physically disconnected before entry into the PRCS.

3. Participants: **UNDER NO CIRCUMSTANCES SHOULD AN EMPLOYEE BE INVOLVED IN A PRCS OPERATION WITHOUT PROPER TRAINING, PERMIT (AUTHORIZATION), AND THE REQUIRED EQUIPMENT.** Every worker involved in PRCS entry operations must fully understand their duties before ever working in a PRCS. OSHA requires the following participants to be trained and certified in hazard recognition, PRCS communications, personal protective equipment, and self-rescue/evacuation.

a. ENTRY SUPERVISOR: (See definition.) Individuals authorizing entry into a PRCS must have a complete understanding of what is inside the PRCS as well as its hazards. The Entry Supervisor must:

(1) Know the hazards of the PRCS and their effects, precautionary measures and personal protective equipment, and the job to be performed. These must be fully explained to all participants in the written Entry Permit (see Attachment 4).

(2) Designate authorized Entrants and Attendants on the Entry Permit.

(3) Stipulate on the Entry Permit and verify that all tests have been conducted, that all procedures and equipment are in place, that rescue services are available (on-call or on-site) and the means to summon them are operable. Note: If an off-site rescue service indicates, for any reason, that it would be unable to respond to a rescue summons, entry shall not be authorized unless an adequate alternative rescue service is arranged.

(4) Brief each designated Entrant prior to entry on information from the PRCS Entry Permit.

(5) Ensure unauthorized individuals are removed and kept away from the PRCS during entry operations.

(6) After all of the above has been completed, endorse the Entry Permit and make it available to each designated Entrant prior to entry, i.e., post it at the PRCS entrance for the duration of entry.

(7) Determine when and to whom responsibility for entry operations is transferred, i.e., the Attendant or a Lead Worker.

(8) Terminate the entry when:

(a) Entry operations covered by the permit are completed.

(b) A condition not allowed by the permit arises in or near the PRCS.

b. ENTRANT: (See definition for Authorized Entrant.) Entrants must determine the following from the Entry Supervisor and/or the Entry Permit:

(1) What hazards are contained in the PRCS.

(2) The signs and symptoms of exposure to those hazards.

(3) What personal protective equipment is required and how to use it. Each Entrant shall use a full body harness attached to a mechanical retrieval system to facilitate retrieval/non-entry rescue when the PRCS is more than 5 feet deep.

(4) What means of communication is to be used and how to use it. If an Attendant is required, Entrants must keep the Attendant aware of their activities.

(5) What operations are planned and/or allowed.

(6) When to evacuate the PRCS, i.e., self-rescue.

(a) Attendant orders evacuation or an evacuation alarm is activated.

(b) Entrant recognizes a prohibited condition or a warning sign of exposure to a dangerous situation.

c. ATTENDANT: (See definition.) All Entrants in a PRCS must be observed by at least one Attendant located immediately outside of the PRCS. An Attendant must remain on duty for the entire time the Entrants are inside of the PRCS. Specifically, the Attendant:

(1) Is responsible to maintain an accurate account of all Entrants (by name) that are inside the PRCS. This requirement may be met by inserting a reference on the Entry Permit and attaching a roster.

(2) Is responsible to maintain Material Safety Data Sheets (MSDS) for substances to which the Entrants may be exposed. The MSDS will be provided to the medical facility treating any exposed Entrant.

(3) Must know and be able to recognize actual and potential hazards related to the PRCS operations. This includes monitoring both inside and outside of the PRCS to determine if there is a danger to the Entrants.

(4) Must be able to communicate with every Entrant in the PRCS in order to determine their status and order evacuation if necessary.

(5) Must order all Entrants to evacuate the PRCS when there is an emergency (see definition) or the Attendant must leave. Examples:

(a) Conditions occur which are not allowed by the Entry Permit.

(b) Behavioral changes in the Entrants.

(c) An uncontrolled hazard develops in the PRCS or a condition outside of the PRCS could endanger the Entrants.

(6) Must keep unauthorized persons from entering the area by instructing them to leave. The Entrants and Entry Supervisor must be made aware of the presence of unauthorized persons.

(7) Must summon and coordinate rescue efforts. Should an unsafe condition or an emergency arise, such as an Entrant becoming incapacitated, the Attendant:

(a) Must order all Entrants to evacuate the PRCS. The first priority is the safety of all individuals.

(b) Should summon rescue if Entrants are unable to self-rescue.

(c) May effect retrieval from outside of the PRCS (non-entry rescue) by operating the retrieval system. Attendants will be trained in 1st Aid and CPR, and should provide emergency care as required. Attendants should understand that not all retrievals should be attempted or are possible, i.e., line entanglements are common and Entrants with head or spinal injuries should not be moved depending upon life-threatening situations.

(d) Must NOT ENTER the PRCS to affect a rescue unless they have been properly trained and equipped as a Rescuer and relieved by another authorized Attendant. (GS does not have a Rescue Team nor does it conduct rescue training.) More than 60% of all confined space fatalities occur because an Attendant or

an unauthorized person rushed into the hazardous environment without proper protective equipment.

d. RESCUE: When practical, retrieval (non-entry rescue) is required by the Attendant and/or Rescue Service. Rescue services may be provided by either an on-site and/or off-site responders.

(1) On-site rescue teams have the advantage of being immediately available and intimately familiar with the facility. Currently there is no rescue team trained and certified within GS. Therefore, rescue must be affected by a local Rescue Service, i.e., the City of Columbia or Richland County Fire Departments.

(2) The Entry Supervisor will identify and ensure a Rescue Service is either on-site or available to respond as necessary. If the planned off-site Rescue Service indicates, for any reason, that it would be unable to respond to a rescue summons, entry shall not be authorized.

(3) Attendants will be currently certified in 1st Aid/CPR.

4. Equipment for PRCS Entry: It is essential that each Entrant be properly equipped for a PRCS entry. All tools and equipment required to complete tasks in a PRCS must be gathered and checked for good working order before entry.

a. Entrance Barriers: When entrance covers are removed, the opening will be promptly guarded to protect Entrants from pedestrian, vehicle and other external hazards. Open man-holes, hatch entrances and other unmarked entrances to the PRCS should be protected against unauthorized entry by a railing, temporary cover or temporary barricade to prevent an accidental fall through the opening and to protect the Entrants from the accidental dropping of foreign objects into the PRCS.

b. Respiratory Protection:

(1) If in emergencies where a dangerous atmosphere has developed, the first choice for controlling any atmospheric hazard is to turn off any supply to a leak and use forced-air ventilation (see Attachment 6).

(2) **NO GS EMPLOYEE IS TO ENTER A PRCS REQUIRING RESPIRATORY PROTECTION**, i.e., forced-air ventilation is not practical or successful in bringing the hazardous atmosphere within prescribed limits.

(a) During an emergency rescue situation, the Rescue Service should be informed of the hazardous atmosphere and provided any information as to the hazard and its source.

(b) The Rescue Service should thoroughly analyze the hazard, select and provide their own proper respiratory equipment, i.e., supplied air respirator (SAR) or self-contained breathing apparatus.

c. Personal Protective Equipment (PPE): The Entry Supervisor is responsible for assessing the confined space for hazards and providing control measures to include PPE (see GS PPE Policy). Confined spaces often present situations requiring the use of head, eye, hearing, body, hand and/or foot protection. Most situations require the combined use of several types of PPE to provide maximum protection for the worker. A wide variety of PPE is available and should be worn when entering a PRCS. **NO OGS EMPLOYEE SHALL BE DENIED APPROPRIATE SAFETY EQUIPMENT**. It is the supervisor's responsibility to ensure appropriate safety items are available and are properly used, stowed and maintained.

(1) Confined spaces commonly reverberate and amplify even small sounds so the Entrants may need to wear ear plugs and/or ear muffs to protect their hearing when operating machinery or equipment in a confined space.

(2) Many of the GS confined spaces are pits and vertical shafts which present a possible falling object hazard. Entrants to this type of PRCS shall wear hard hats designed to provide top impact protection. As most of our confined spaces are crowded with utility lines, hard hats are recommended to be worn in any PRCS to provide protection from bumping into stationary objects.

(3) If a contaminant in the PRCS is known to be a skin irritant, then the Entrant shall wear protective clothing and gloves.

NOTE: In hot environments, especially when workers must wear “non-breathing” protective clothing, heat stress can become an additional hazard in a confined space. Appropriate work breaks, air conditioning, and/or body-cooling systems can be used to prevent heat related health problems.

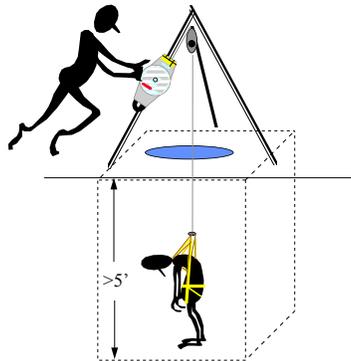
d. Communications Equipment:

(1) When working inside a PRCS, the Entrants must be able to communicate amongst themselves and with the Attendant outside.

(2) The Attendant must have reliable communications to immediately summon for an emergency rescue. Such equipment may be a cellular telephone or a phone within 25 feet of the PRCS access, or a portable radio where the Attendant is in contact with the Facilities Management EMFS Computer Control Room. NOTE: Lines of communication, especially battery operated devices, should be checked prior to entry operations to ensure they are in good working order, and that the range and reception is adequate.

e. Rescue Retrieval Equipment: Rescue should begin as soon as the rescuer (Attendant) becomes aware that rescue is necessary. It is nearly impossible for an average person to pull someone out of a deep manhole without a mechanical advantage. If a PRCS is over 5 feet deep then a mechanical extraction system is required by OSHA. Confined spaces over 50 feet deep require a powered retrieval system with an emergency manual backup mode and a torque-limiter (avoids placing high forces on a victim that snagged on an obstruction).

A mechanical retrieval device is required if the PRCS is over 5' deep



The rescue retrieval system, available from the Maintenance Team, consists of:

(1) Two personnel hoists (winches with a brake and 50' of steel cable each).

(2) A materials winch (used to raise and lower tools and equipment so the Entrant is never tempted to disconnect from their lifeline).

(3) A tripod with locking legs to reduce the opportunity for collapse from lateral movement. This 7' tripod typically can be used for a 3' or smaller openings. Davits (floor/wall/truck mounted) should be used instead of a tripod when the confined space opening for vertical entry is greater than 3 feet.

(4) A full body harness with a back D-ring worn by each

Entrant.

NOTE: The rescue retrieval system has a maximum capacity of 300 pounds. Even though there are three winches, this means that normally only one winch will be in operation at any time.

f. Lighting: Entrants must be able to see well enough to work safely and to exit the space in an emergency.

g. Other Equipment: Employees should be equipped with whatever is necessary for safe entry and egress from the PRCS, i.e., a ladder.

5. Emergency Evacuation: THE DEVELOPMENT OF A HAZARDOUS ATMOSPHERE OR ANY HAZARDOUS CONDITION IN OR IN THE VICINITY OF THE CONFINED SPACE, OR A MULTI-GAS MONITOR WARNING OR FAILURE IS AN EMERGENCY SITUATION REQUIRING ALL ENTRANTS TO ***IMMEDIATELY EVACUATE*** THE CONFINED SPACE. After the emergency evacuation, an Entry Supervisor will:

a. Evaluate the space to determine how the hazardous atmosphere or condition developed.

b. Implement measures to protect Entrants from the hazardous atmosphere or condition before any subsequent entry takes place.

B. Alternate Permit Required Confined Space Procedures (PRCS- Alt): When all hazards within a PRCS, except for a hazardous atmosphere, can be controlled from outside of the confined space, OSHA allows the use of an alternate entry procedure where the atmospheric hazard is controlled/made safe by ventilation.

CAUTION: Because conditions in any space can change which could make permit procedures required, all spaces must be properly evaluated prior to and continuously during each entry.

1. Prior to Entry: The employer (Entry Supervisor) must:

a. Demonstrate (see definition) that the **ONLY** hazard posed by the PRCS is an actual or potentially hazardous atmosphere.

b. Demonstrate that forced air ventilation (see definition) alone will maintain the PRCS safe for entry.

(1) The Entry Supervisor or a designated tester must make the initial atmospheric testing within the PRCS. The monitoring data will be documented (see Attachment 3 PRCS Entry Permit). NOTE: If entry into the PRCS is required to obtain the data or to eliminate hazards then full PRCS procedures will be used. If testing and inspection during this entry demonstrate that the hazards have been eliminated, the

PRCS may be reclassified for PRCS-Alt procedures for as long as the hazards remain eliminated.

(2) Entry records for the previous year must be consulted to determine any hazardous conditions or problems that occurred within that PRCS.

(3) Mechanical ventilation systems, where applicable, shall be set at 100 percent outside air.

(4) Where possible, open additional access doors, ports, or panels to increase air circulation.

(5) If the tests indicate the atmosphere inside the PRCS is unsafe, before any employee is permitted to enter the PRCS, it shall be ventilated, i.e., portable blowers, until the hazardous atmosphere is removed. After a suitable period of ventilating, repeat the atmospheric test. Entry may not begin until testing has demonstrated that the hazardous atmosphere has been controlled. Ventilation shall be continued so as to prevent the hazardous atmosphere from recurring as long as an employee is in the PRCS.

(a) The air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space. The forced air ventilation may be directed to ventilate the immediate areas where an employee will be present.

(6) If the tests indicate the atmosphere inside the PRCS is safe, the Entrant may go in and stay inside the PRCS as long as no other hazardous condition develops and the atmosphere remains safe.

CAUTION: Control of atmospheric hazards through forced air ventilation does not mean the hazard has been eliminated. This means that ALT-PRCS PROCEDURES CAN NOT AUTOMATICALLY BE USED FOR EACH PLANNED ENTRY. Every time before any employee is to enter a PRCS, the internal atmosphere must be tested and the confined space examined to the fullest extent possible from outside of the confined space to determine internal hazards. ***The ONLY time Alt-PRCS procedures can be used is when all internal hazards except for the atmosphere can be controlled from outside of the PRCS, and the atmosphere can be controlled by forced air/mechanical ventilation alone to bring the internal atmosphere within allowed limits.***

c. Verify through a written certification that the space is safe for entry and the pre-entry measures have been taken (see first portion of Attachment 3 PRCS Entry Permit). This certification shall be made before entry and shall be made available to each employee entering the PRCS.

2. Entry Procedures:

a. Atmospheric Testing: The Entrants must carry atmospheric test equipment inside the PRCS. Periodic testing is required during entry to assure that ventilation is preventing the accumulation of a hazardous atmosphere; continuous monitoring is recommended. Even though continuous mechanical ventilation may not be required to create and maintain a safe atmosphere inside the PRCS, continuous monitoring of the internal atmosphere is mandatory to ensure continued safe concentrations. Documentation of atmospheric sampling should be conducted at frequent intervals, i.e., at a minimum of every 30 minutes.

b. Emergency Evacuation: THE DEVELOPMENT OF A HAZARDOUS ATMOSPHERE OR ANY HAZARDOUS CONDITION IN OR IN THE VICINITY OF THE CONFINED SPACE, OR A MULTI-GAS MONITOR WARNING OR FAILURE IS AN EMERGENCY SITUATION REQUIRING ALL ENTRANTS TO *IMMEDIATELY EVACUATE* THE CONFINED SPACE.

(1) An Entry Supervisor will evaluate the space to determine how the hazardous atmosphere or condition developed.

(2) Measures shall be implemented to protect Entrants from the hazardous atmosphere or condition before any subsequent entry takes place.

VI. TRAINING:

A. PRCS Training:

1. Before employees are first assigned duties associated with permit required confined space work, whenever there is a change in PRCS operations that presents a hazard for which the employee is not prepared, the employee must be trained.

2. Whenever the Entry Supervisor or someone from the Safety Office has reason to believe there are severe deviations or a number of deviations from required procedures, the employee must receive remedial training.

3. Training must be certified by the Safety Office by documenting the date of training, the employee's name, and have the employee's signature, test score, and the trainer's initials on the attendance sheet or electronic equivalent.

B. Respirator Training (reference 29 CFR 1910.134 Respiratory Protection): Employees designated to wear respirators must first receive the required medical clearance, training and be properly fitted with an appropriate respirator.

C. Rescue Training:

1. Safety Support will familiarize the rescue service with GS confined spaces so they may develop appropriate rescue plans and practice rescue operations from a simulated or actual confined space. It is recommended for the rescue team to plan and practice a simulated rescue operation annually from at least one actual GS PRCS.

2. Each member of the rescue service will be trained in 1st Aid and CPR with at least one member holding current certification.

ATTACHMENTS:

1. Definitions
2. Confined Space Process
3. GS Confined Space Classifications
4. Permit Required Confined Space Entry Permit
5. Multi-gas Monitor Operation
6. Atmospheric Purge Chart
7. Contractor Operations
8. Instructor's Checklist –Confined Space Hands-On Class

Attachment 1

DEFINITIONS

Acceptable Entry Conditions: The conditions that must exist in a permit required confined space to allow entry and ensure employees can safely enter into and work inside the space.

Attendant: A designated person stationed outside the permit required confined space that maintains constant communication with all confined space entrants, warns them of hazardous conditions to include emergency evacuation, and conducts outside/non-entry extraction actions, as required. This person shall be trained in all permit required confined space procedures, and 1st Aid/CPR.

Authorized Entrant: An employee authorized by the employer to enter a permit required confined space.

Confined Space: A space which is large enough for a worker to bodily enter and perform assigned work. The space must also have limited or restricted means for entry or exit, i.e., the person must bend over or crawl or climb into/out of the space. Additionally, the space is not designed for continuous employee occupancy. All three factors must exist simultaneously to be a confined space. The determination of whether a space has limited or restricted entry means the configuration or other characteristics of the space would interfere with an entrant's ability to escape or be rescued in an emergency situation. Examples of confined spaces: Tanks, vessels, manholes, underground vaults, tunnels, boilers, and pits. Spaces large enough to walk into, with clear visibility from end to end, and good ventilation are generally not classified as a confined space.

1. Access by simply reaching in, i.e., into a cabinet or control panel, is not considered bodily entry relative to confined spaces unless the space can contain the whole body.

2. Stairs or ladders will be considered a limited or restricted means of egress when they interfere with the entrant's ability to exit or be rescued from the space in a hazardous situation.

3. The presence of a door does not in itself mean that the space is not a confined space. A door leading to a space that has pipes, conduits, ducts, or equipment or materials that an employee would be required to crawl or squeeze over, under or around in order to escape has a limited or restricted means of exit.

4. Similarly, if an employee has to crawl to gain access, i.e., the door or portal is too small to allow an employee to walk through upright and unimpeded, it will be considered a limited or restricted means of exit.

5. The distance (time) an employee must travel in a space, such as a tunnel, to reach a point of safety can also mean the space has a limited means of exit.

Demonstrate: To prove by actual performance or knowledge, or to provide conclusive data that supports the methodology. Example: To pass a written test, or show use of

proper procedures. Example: The use of Alternate Permit Required Confined Space procedures requires the *demonstration*, i.e., with supporting air sample data, that the only hazard posed by the confined space is an actual or potential atmosphere that forced air alone will maintain safe for entry.

Emergency: Any occurrence or event internal or external to the confined space that could endanger entrants to include failure of hazard control or monitoring equipment.

Entry: The point where any part of the entrant's body breaks the plane of an opening into a permit required confined space.

Entry Permit: A written document provided and signed by the Entry Supervisor that controls entry for authorized entrants into a permit required confined space (see Attachment 3).

Entry Supervisor: The person designated by the employer responsible for determining if acceptable entry conditions exist at a permit required confined space. This person plans, authorizes, monitors and terminates entry operations as required.

Explosive Limits: When certain proportions of combustible vapors are mixed with air and a source of ignition is present, an explosion can occur. This explosive range includes all concentrations where a flash will occur or a flame will travel if the mixture is ignited.

1. Lower Explosive Limit (LEL): The lowest percentage concentration of the explosive range at which an air-fuel mixture will ignite. Below this limit the mixture is too lean to burn.

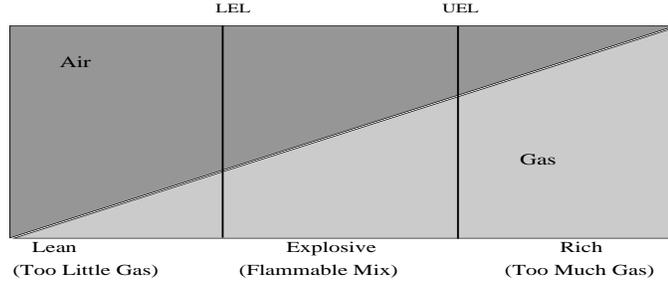
2. Upper Explosive Limit (UEL): The highest percentage concentration of the explosive range where the air-fuel mixture can still be ignited. Above this concentration the mixture is too rich to burn.

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

1. Flammable gas, vapor or mist in excess of 10 percent of its lower flammable limit (LFL). A safe for entry atmospheric reading would be 50 percent of the LFL.

A. Combustible Gases: Leaking gases can produce an extremely combustible atmosphere and can be set off by even the slightest ignition. In order for combustion to occur there must be fuel (gas vapor), oxygen (to support combustion) and a source of heat or ignition. The gas-to-air mixture or ratio determines whether the gas will burn or not. An atmosphere becomes flammable when the ratio of oxygen to combustible material in the air is neither too rich nor too lean for combustion to occur. NOTE: When dangerous atmospheres are attributable to flammable and/or explosive substances, lighting and electrical equipment shall be Class 1, Division 1 rated per the National Electrical Code and no ignition sources shall be introduced into

the PRCS.



- 1) Lean: There is not enough oxygen in the gas-air mixture to burn.
 - 2) Explosive: Just the right amount of air and gas exist to form a flammable/explosive mixture.
 - 3) Rich: There is too much oxygen in the gas-air mixture to burn.
 - 4) Combustible: A material with a flash point at or above 100⁰F. (Flash point is the minimum temperature at which an ignition source can cause vapors from a combustible material to ignite.)
 - 5) Flammable: A material with a flash point below 100⁰F.
2. Airborne combustible dust at a concentration that meets or exceeds its LFL (obscures vision at 5 feet or less).

3. Oxygen concentration below 19.5 percent (deficiency) or above 23.5 percent (enrichment). A safe for entry atmospheric reading would be an oxygen level between 19.5 and 23.5 percent.

A. Oxygen Deficiency: Normal ambient air has a 20.8% concentration of oxygen. When this concentration gets below 19.5%, the human body is deprived of its requirement, i.e., asphyxiation occurs. Oxygen consumption results from combustion of flammable substances, chemical reactions, or from respiration. Displacement occurs when another gas moves the oxygen out of the way. Individuals react differently and at varying rates depending on their health, amount of their activity, amount of exposure, and the number of people involved. Because of a lack of ventilation in confined spaces, oxygen deficiency is perhaps the most common atmospheric hazard. Typically individuals react as follows:

% OXYGEN	PHYSIOLOGICAL EFFECT
19.5-16	No visible effect
16-12	Faster breathing and heartbeat; impaired thinking, attention and coordination
14-10	Faulty judgment, poor muscle coordination, rapid fatigue; intermittent breathing
10-6	Nausea, vomiting; may not be able to move or move vigorously; unconsciousness and possible death
<6	Death in minutes

B. Oxygen Enrichment: When the oxygen concentration gets above 23.5% there is a significant increase in the likelihood and severity of a flash fire or explosion.

4. Concentration of any substance in an employee exposure in excess of its dose or 8-hour time weighted average permissible exposure limit (PEL); reference Material Safety Data Sheet, or Subpart G or Z of 29 CFR 1910. A safe for entry atmospheric reading would be 50 percent of the PEL.

5. Any atmospheric condition that is immediately dangerous to life or health, i.e., Toxic Gases. A toxic gas is a substance in gaseous form that is poisonous usually resulting from a manufacturing process, stored products or certain operations such as cleaning with chemicals

or welding. Effects on individuals vary depending on their age, sex, and weight, overall state of health, amount of activity, and amount of exposure/degree of toxicity.

A. Carbon Monoxide (CO): A colorless, odorless, tasteless and non-irritating poisonous gas generated by the incomplete combustion of common fuels when there is not enough oxygen mixed with the fuel (“rich” mixture). CO is often released due to improperly vented or malfunctioning combustion appliances such as gas or oil burning furnaces, stoves, hot water heaters, and by internal combustion engines. CO poisoning may occur suddenly. The Environmental Protection Agency states a person should not breath 9 ppm (parts per million) of CO or over for any 8 hour period, or 200 ppm or over at any one time.

CO	
PPM	PHYSIOLOGICAL EFFECT
200 ppm - 3 Hrs or 600 ppm - 1 Hr	Headache and discomfort (Life threatening after time indicated)
1000 ppm - 1 Hr or 500 ppm - 30 Mins	Heart pounds, dull headache, dizziness, flashes before the eyes, ringing in the ears, nausea and convulsions; death within 2 Hrs
1500 ppm - 1 Hr	Above signals within 20 minutes; death within 1 Hr
4000 ppm	Rapid collapse, unconsciousness and death within a few minutes

B. Hydrogen Sulfide (H₂S): A colorless gas that smells like rotten eggs. However, the gas desensitizes the nose so the smell disappears quickly after breathing only a small quantity of the gas. H₂S is often found in sewers, and around sewage treatment and petrochemical operations. H₂S is also flammable and can be explosive in high quantities.

H ₂ S	
PPM	PHYSIOLOGICAL EFFECT
18-25 ppm	Eye irritation
75-150 ppm for several hours	Slight eye, respiratory irritation
170-300 ppm - 1 Hr	Nausea, stomach distress, eye irritation, belching, coughing, headache and blistering of lips
400-600 ppm for 1/2-1 Hr	Unconsciousness and death
1000 ppm	Death in minutes

C. Aromatic Hydrocarbons (i.e., Benzene, Toluene, Xylene):

1) Benzene: A colorless, flammable, volatile liquid with a rather pleasant aromatic odor. Chronic poisoning may occur after breathing relatively small amounts over a short period of time. First sign is exhilaration followed by sleepiness, dizziness, vomiting, trembling, hallucinations, delirium and unconsciousness. Benzene is a suspected carcinogen.

2) Toluene: A colorless, flammable liquid, a strong aromatic odor warns of high concentrations. It produces extreme fatigue, mental confusion, exhilaration, nausea, headache and dizziness.

3) Xylene: A solvent mixture that resembles benzene.

D. Ammonia (NH₃): A strong irritant that can produce sudden death from bronchial spasms. Small amounts may be inhaled without severe irritation and are quickly metabolized in the respiratory tract. Can be explosive when the contents of a tank or refrigeration system are released into an open flame.

NH ₃	
PPM	PHYSIOLOGICAL EFFECT
30-500 ppm for ½-1 Hr	Eye and throat irritation
400 ppm	Throat irritation
2500-6000 ppm for ½ Hr	Dangerous to life
5000-10,000 ppm	Fatal

<u>SUBSTANCE</u>	<u>THRESHOLD LIMIT VALUE (PPM)</u>	<u>SHORT TERM EXPOSURE LIMIT (PPM)</u>	<u>OSHA PERMISSIBLE EXPOSURE LIMIT (PPM)</u>
Carbon Monoxide	25	-	50
Hydrogen Sulfide	10	15	10
Sulfur Dioxide	2	5	5
Ammonia	25	35	50
Benzene	10	5	1
Toluene	50	150	200
Xylene	100	150	100

Hot Work Permit: The employer’s written authorization to perform operations capable of providing a source of ignition, i.e., welding, cutting, burning, and heating. Note: Maintenance work requiring welding or open flame, where toxic metal fumes such as cadmium, chromium or lead may be involved, shall only be done with sufficient local exhaust and/or with appropriate respiratory protection in accordance with (see) the GS Welding Program. Solvents and vapors must be cleared before welding or the use of open flame is permitted.

Immediately Dangerous to Life or Health (IDLH): Any condition that poses an acute (immediate) threat to life or irreversible adverse health effects or that would interfere with an individual’s ability to escape unaided (self-rescue) from a space, the permit required confined space “serious safety and health hazard” classification is “triggered.” Example: The mere presence of water in a confined space such as a manhole is not by itself IDLH. However, when there is a sufficient quantity to endanger the entrant’s life or hinder escape, or if the water conceals another hazard, like a trip and fall hazard, the confined space should be classified as a permit required confined space.

Isolation: The process of removing a permit required confined space from service by completely protecting against the release of hazardous energies and materials into the space by means of Lockout/Tagout, blanking/blinding, misaligning or removing sections of lines, pipes or ducts, etc.

Non-Permit Required Confined Space: A confined space that does not contain any hazard capable of causing death or serious physical harm.

Permit Required Confined Space: A confined space that has a potential to contain a hazardous atmosphere, contains a material that has the potential to engulf an entrant, has an internal configuration such that could trap or asphyxiate an entrant (due to inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section), or contains any other recognized serious safety or health hazard.

Retrieval System: The equipment used for non-entry rescue of persons from a permit required confined space. This equipment includes a full body harness (a series of adjustable leg, body, and shoulder straps) with a back D-ring connected to a lifeline and an anchor used as a fall protection system which distributes the impact of a fall over a

large area of the body. Also included is a mechanical raising and lowering device with a brake that can be used for normal positioning but is required if the permit required confined space is over 5 feet deep. The hoisting and lowering unit is normally attached to a tripod. However, tripods are not appropriate for some confined spaces which may require davits and/or brackets specially designed for the work space.

Test Equipment (Gas Monitor): The hazards that an entrant may encounter must be identified and evaluated prior to entry, and continuously monitored during entry and rescue operations. Various atmospheric sampling instruments are available to test and monitor changing levels of oxygen, and flammable/combustible and toxic gases. The monitor is a proactive tool. It alerts workers about existing atmospheric hazards in the confined space that are undetectable by human senses. Otherwise, these hazardous atmospheric conditions could overwhelm workers in the confined space. In confined space entry, no other equipment is more important than the gas monitor.

1. Single Gas Monitor: Used to test the internal atmosphere for oxygen deficiency; sensors may be changed or other monitors will have to be used for other sampling purposes.
2. Multiple Gas Monitor: Usually configured with sensors to simultaneously test the internal atmosphere for oxygen content, flammable gases and vapors, and potential toxic air contaminants. GS uses this type of instrument.
3. Alarm Only Devices: Provide an alarm when concentrations for the gas to be detected reach a predetermined level. These devices do not provide “real time” readings and, therefore, are not acceptable for initial (pre-entry) or periodic atmospheric testing.

Ventilation: When the atmosphere in a space has been contaminated, continuous clean air is introduced/forced into a space with the purpose of decreasing the concentration of the air contaminant to the degree that there no longer is a hazard to the worker. Effectiveness is determined by the number of times the air in the space is changed; often measured in cubic feet per minute.

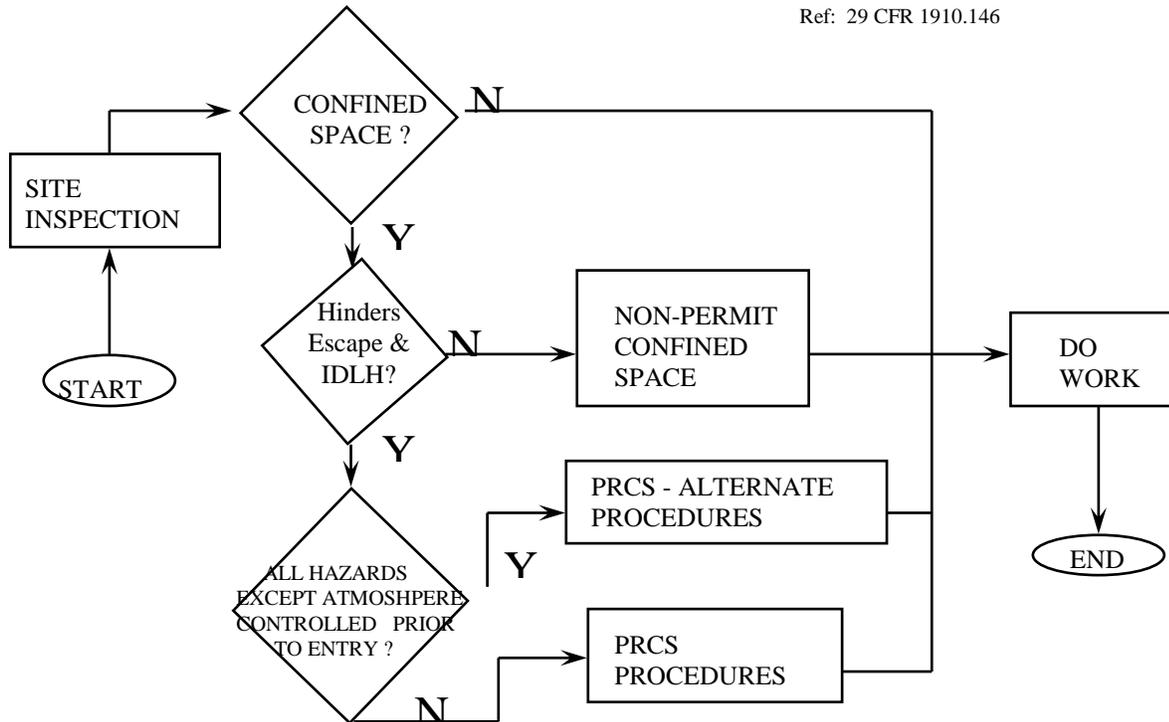
1. Forced Air Ventilation: A mechanical system forces air into a space and/or exhausts air from that space. The supplied air ventilation for the space must not cause ventilation imbalances that would create hazards in the work area from which the supply air is taken. Also, the exhaust discharge of contaminants from the space to adjacent areas must not endanger the employees of other work areas.
2. Natural Ventilation: Air enters a space through openings such as doors, windows, portals, etc. resulting in a circulation.

CONFINED SPACE PROCESS

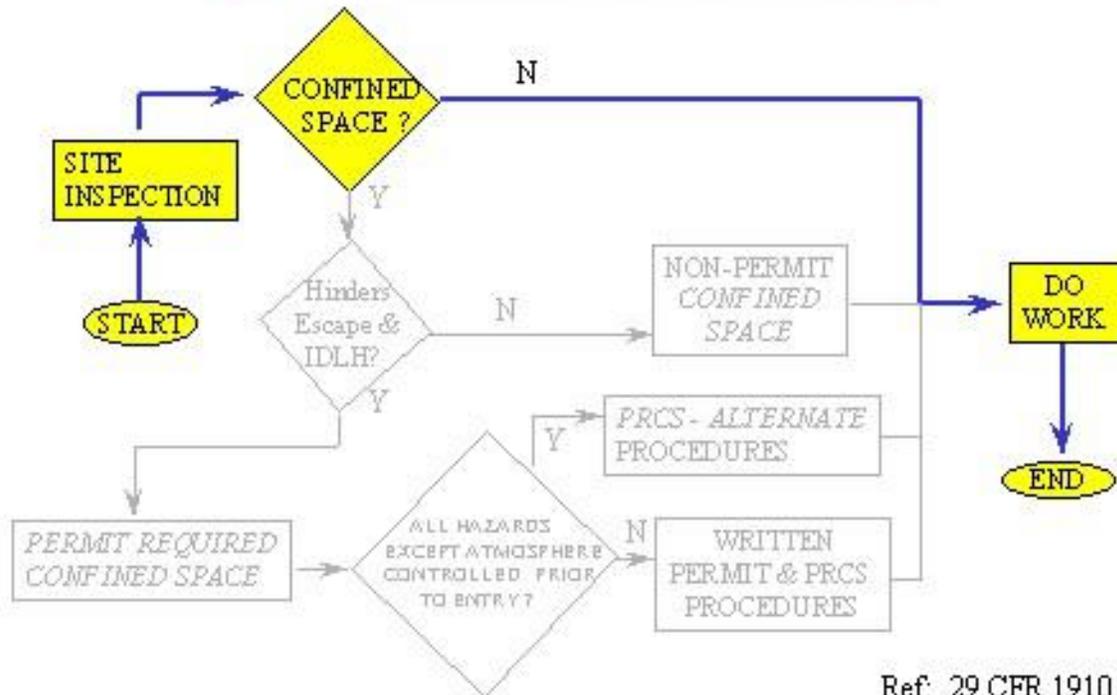
The following flowchart describes the confined space process and delineates specific actions based on it's classification as:

- 1) Not a Confined Space
- 2) A Permit Required Confined Space
- 3) A Permit Required Confined Space where Alternate Procedures are Allowed

CONFINED SPACE PROCESS - FLOWCHART

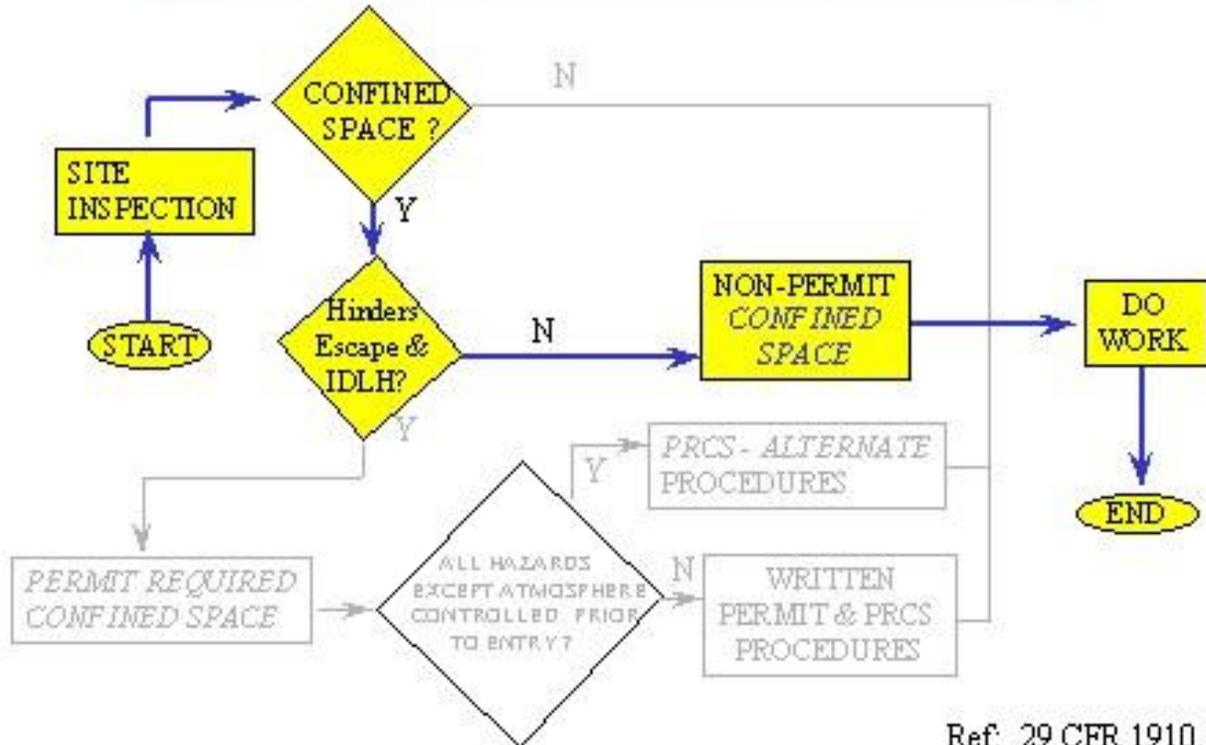


CONFINED SPACE PROCESS (NOT A CONFINED SPACE)



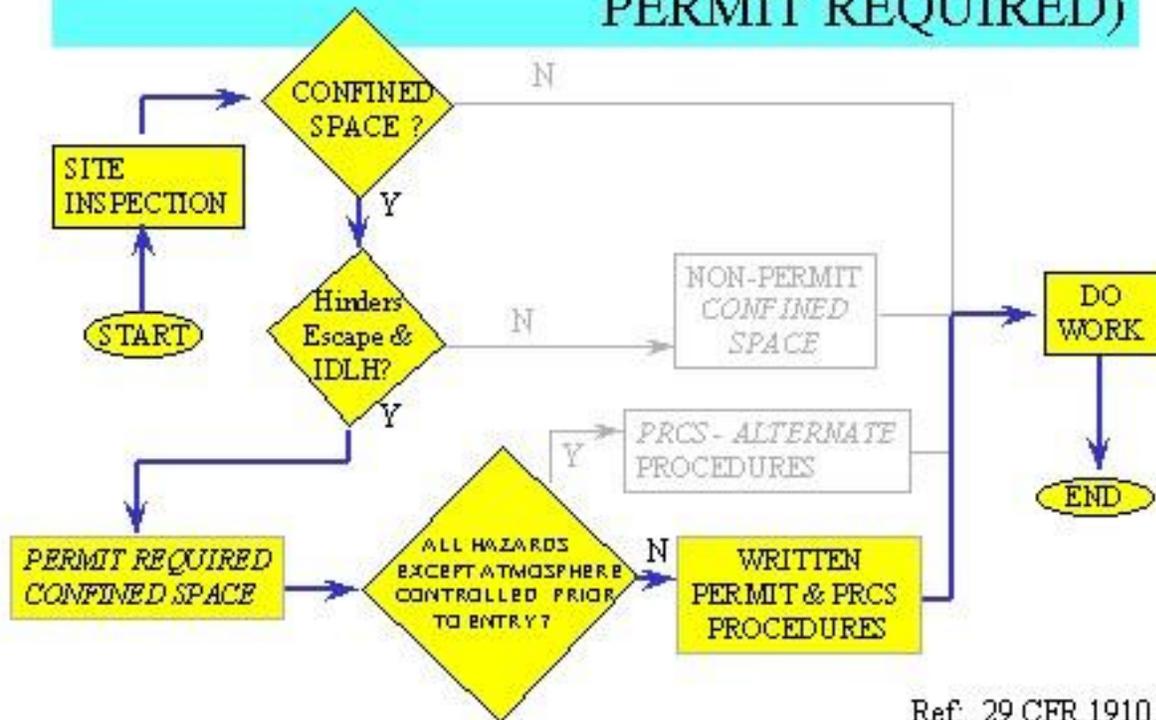
Ref: 29 CFR 1910.146

CONFINED SPACE PROCESS (CONFINED SPACE - NO PERMIT)



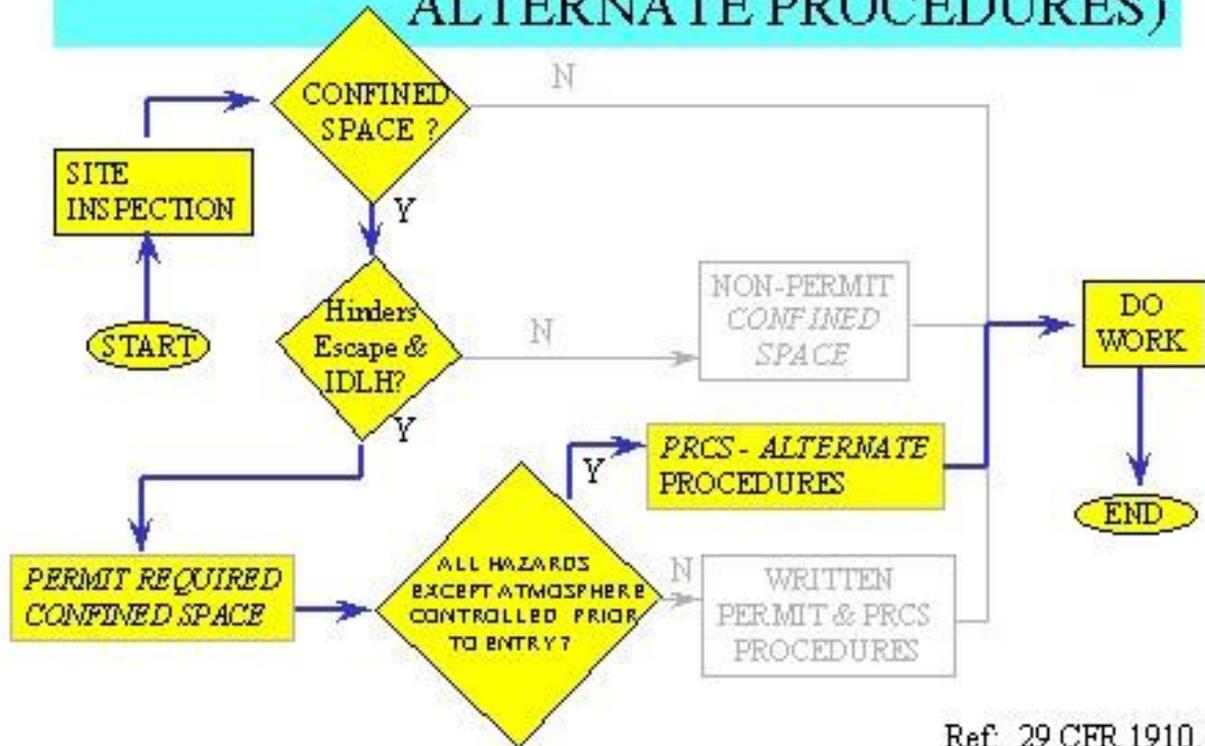
Ref: 29 CFR 1910.146

CONFINED SPACE PROCESS (PERMIT REQUIRED CONFINED SPACE - PERMIT REQUIRED)



Ref: 29 CFR 1910.146

CONFINED SPACE PROCESS (PERMIT REQUIRED CONFINED SPACE - ALTERNATE PROCEDURES)



Ref: 29 CFR 1910.146

Attachment 3

CONFINED SPACE CLASSIFICATIONS

This list classifies the known spaces that exist in facilities owned, operated and/or maintained by General Services. The classifications are:

- 1) Use Permit Required Confined Space Procedures
- 2) Use Alternate-PRCS Procedures
- 3) Confined Space (Do Not Use PRCS or Alt-PRCS Procedures)
- 4) Not a Confined Space

The known confined space locations and their classifications are available from the Safety web page, Policy & Programs

<http://www.gs.sc.gov/business/safety/GS-safety-polproc.phtm>

Scroll to Confined Spaces and select:
(listed alphabetically by building name)

Confined Spaces A-E

or

Confined Spaces F-Z

Attachment 4

**PERMIT REQUIRED CONFINED SPACE
ENTRY PERMIT**

The Entry Supervisor is required to fill in specific information in the attached form, brief all participants involved in the Permit Required Confined Space entry, provide a copy of this form for the site and file the closed entry permit in the Confined Space Book collocated with the gas monitor storage in the Facilities Management Shop Building's Equipment Tool Storage Room. The completed permit is to be kept on file for at least one year's reference.

Blank permits are available from the Safety web page, Policy & Programs

<http://www.gs.sc.gov/business/safety/GS-safety-polproc.phtm>

Scroll to Confined Spaces and select:

Confined Spaces Entry Permit (Form)

Attachment 5

MULTI-GAS MONITOR OPERATIONS

Instructions on how to use the available multi-gas continuous reading electronic monitors are available from the Safety web page, Policy & Programs

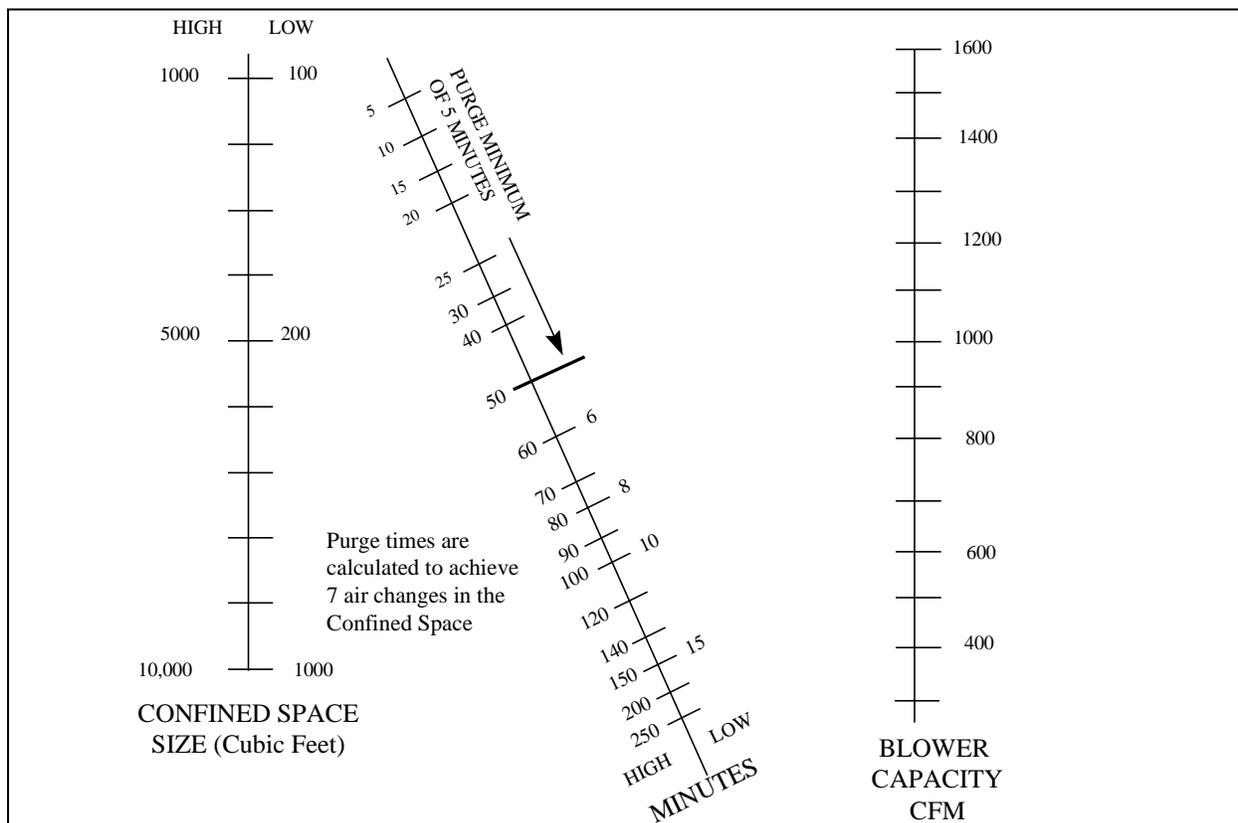
<http://www.gs.sc.gov/business/safety/GS-safety-polproc.phtm>

Scroll to Confined Spaces and select:

M-40 Gas Monitor – How to Use

Two gas monitors are available and are stored in the Facilities Management Shop Building's Equipment and Tool Storage Room. See the Shop Manager or your Supervisor to check out equipment.

ATMOSPHERIC PURGE CHART



HOW TO USE PURGE CHART

1. Place one end of a straight edge on the Confined Space Cubic Feet scale (on left). Be sure to select the proper size scale, High or Low depending on the size of the confined space.
2. Place the other end of the straight edge on the Blower Capacity scale (on right).
3. Read the required Purge Time from the diagonal scale. Be sure to read the proper scale, High or Low volume blower capacity.

NOTE: If 2 or more blowers are used, add their capacities.

NOTE: If toxic/combustible gases or low oxygen is encountered, increases purge times by 50%.

PURGE EXAMPLES:

1. Using a 750 CFM blower for a 6,000 CuFt confined space, it will take 60 minutes to purge. A 1570 CFM blower will take 27 minutes for the same space.
2. Using a 750 CFM blower for a 600 CuFt confined space, it will take 6 minutes to purge. A 1570 CFM blower will take 5 minutes for the same space.

CONTRACTOR OPERATIONS

The most effective way to ensure safe contractor operations is to use a qualification and selection process, then to coordinate any joint operations, and monitor contractor operations.

A. **CONTRACTOR QUALIFICATION PROCESS:** Potential contractors must be told that the work space contains confined space hazards and that GS has a Confined Space Program with which they must comply. The qualification process should establish the competence of the contractor for confined space work prior to allowing the contractor to bid on any work. Several key elements should be obtained from the contractor and reviewed by the Safety Office Unit before any work begins:

1. Overall safety program.
2. Confined Space procedures to include:
 - a. Confined Space Permit program.
 - b. Confined Space Rescue procedures.
 - c. Hot work procedures, if job required.
 - d. Confined Space safety equipment list to include inspection, calibration and maintenance record procedures (actual records should be made available upon request after selection).
3. A list of trained entrants, attendants, entry supervisors, and rescue, as applicable. Confined space training records should also be available for these individuals along with any associated (respirator, welding, etc.) training/certification records required by the job.
4. A list of (no more than 6) organizations where the contractor has conducted confined space operations within the last 3 years. Contact information should be provided so these references can be checked.
5. OSHA 300 log for the last 3 years and reports on any significant accidents relating to confined space operations.
6. A statement indicating that the contractor has never been cited by SC LLR or federal OSHA or other safety compliance agencies for any confined space safety violation. If the contractor has been cited within the last 3 years, a copy of the citation and a statement from the contractor explaining the corrective actions they have implemented must be provided.
7. A statement from the contractor that all of the above is true and correct.

B. **CONTRACTOR SELECTION:** Once a qualified contractor has been selected, an agreement will be formalized. In this agreement it should be made clear that the contractor:

1. Must adhere to the GS Confined Space Program even if they are more restrictive than SC OSHA standards.

2. Is required to handle safety issues involving the contractor's own employees. This includes providing them with necessary safety equipment, supplies and training.

3. Must coordinate joint-entry operations involving GS and contractor employees.

C. GS-Safety Office Unit will provide the following information to the contractor after selection:

1. Confined Space Program.

2. Specific entry procedures, Material Safety Data Sheets for hazardous chemicals, and Lockout/Tagout procedures, if any, for the confined space. (Known atmospheric and physical hazards, and job requirements are to be included in the Request For Proposal).

3. A statement signed by the contractor stating the contractor has received and understands the above information.

D. PLANNING: Effective planning will minimize the amount (number and duration) of exposure to and eliminate, or at least mitigate, confined space hazards. At the beginning of the project, a brief meeting between appropriate GS and contractor personnel should be conducted to clarify that all essential information has been exchanged and that everyone is clear about their roles and responsibilities. This is especially important if the project will involve joint operations.

1. The contractor shall provide a project supervisor, safety manager and entry supervisor.

2. GS will provide a representative from the Safety Office Unit, an area supervisor (responsible for the work site) and an entry supervisor (if there is to be a joint operation).

E. MONITORING:

1. On the first day, the GS area supervisor should inspect the job site with the contractor and discuss safety issues.

2. The GS area supervisor should frequently visit the job site and/or the contract supervisor to monitor the job's progress, however, the contractor will determine timing for actual site visits. Observations should include checking for atmospheric testing, ventilation, isolation/LOTO, hazard control, communications, personal protective equipment, and lighting. Discrepancies should be addressed with the contractor.

3. The contractor should notify the GS area supervisor or Safety Office of any unplanned hazards or problems while working in the confined space. If a problem does arise, GS should immediately stop the job. Before work progresses, the problem must first be analyzed and corrected.

F. WORK COMPLETION: After the job is finished, the contractor should review safety issues with the GS area supervisor and Safety Office. Any difficulties should be documented and kept on file in the Safety Office Unit.

CONFINED SPACE HANDS-ON CLASS **INSTRUCTOR'S CHECKLIST**

Registration Notice to Employees and Supervisors (Reminder Email on Monday prior to class)

PPE: Hard Hat, Safety Glasses, Gloves, Safety Footwear, Hearing Protection, Safety Vest, and Flashlight

SIGN-IN ROSTER

ENTRY PERMIT (FOR TRAINING PURPOSES)

- Expiration Dates For CPR/1st AID

HANDOUT (includes JSA & Diagram site, i.e., Section 3L of McEachern Parking Facility)

BRIEFING: Location – FM Bldg Maintenance Break Room, Forsythe Bldg

Instructor (acts as FM Bldg. Maintenance Supervisor) briefs entry team:

- This is a Training Exercise but an Actual Entry Simulating a Permit Required Situation
- Training Is Terminated for Any Real Emergency
- Review Permit In Its Entirety
 - o Training Requirements
 - o JSA & Site Diagram
- Ask if there are any Questions (and answer)
- Provide copy of Permit to Job Site Supervisor who makes Entrant/Attendant assignments

OBTAIN EQUIPMENT:

- From: 921 Main St., Room 107 - Safety's LOTO Kit
- From FM Bldg. Maintenance Wood Shop Tool Storage Room (see Kurt Patrick or FM Bldg Maintenance Area Supervisor; have employees load equipment into one of their vehicles for transport to (McEachern 3L) confined space site):
 - Two Multi-Gas Monitors
 - Permit Required Confined Space Rescue System
 - Tripod
 - Two Personnel Winches
 - Materials Winch
 - Two Full Body Harnesses
 - Manhole Cover Lift Bar
- Employees should bring own PPE

TRAVEL TO SITE

EQUIPMENT SETUP:

- If class consists (mostly) of New Employees: Instructor should demonstrate equipment setup and operation showing common errors, then tear down and let employees setup and operate.
- Refresher Class: Instructor should allow the team to setup without instruction then critique at key milestones with positive feedback and correction, as required)
 - Traffic Control (positioning of barricades, vehicles and Attendant)
 - Gas Monitor (normal operation, maintenance and malfunctions)
 - LOTO (Both Entrants are to apply hasp, locks and tags according to equipment's LOTO instructions)
 - Rescue System (proper setup and pre-use inspection; automatic and manual modes for personnel retrieval winch; proper donning of full body harness; see ENTRY scenarios)

ENTRY: After Entrants Are inside the space, provide the following scenarios for proper response. Instructor critiques rescue with positive feedback and correction as required.

Examples:

- Describe some emergency event outside of the confined space but nearby, i.e., a car's gas tank started leaking a large amount of gasoline that is flowing toward the confined space.
 - Response: Attendant(s) order evacuation and Entrants Self-Rescue
- Pinch off air sampling tube to make the gas monitor go into alarm
 - Response: Attendant(s) order evacuation and Entrants Self-Rescue
- If LOTO was not applied or not applied correctly (i.e., system being worked on has LOTO but adjacent system was not), describe a loud bang with a bright flash, i.e., an electrocution, and one Entrant collapses.
 - Response: Other entrant does Self-Rescue. Attendant simulates call to 9-1-1. Other Attendant affects rescue from Outside then provides first aid/CPR, as required.
- Both Entrants have collapsed
 - Response: Attendant simulates call to 9-1-1. Attendant affects rescue of first entrant from Outside then provides first aid/CPR, as required. Other Attendant affects rescue of second entrant from Outside then provides first aid/CPR, as required

TERMINATION:

- Job site supervisor/Lead Worker turns in completed permit to instructor who critiques overall training session (group discussion).
- Pack up and return equipment to proper storage locations.
- Document training in Learning Management System