

Environmental Health & Safety

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I. PURPOSE

To provide protocols that ensure safe conditions exist when conducting activities in confined spaces located on the premises of Buffalo State College (BSC). This program was created to conform with the Occupational Safety and Health Administration's (OSHA) Permit-Required Confined Spaces (PRCS) Standard, Title 29, Code of Federal Regulations 1910.146.

II. SCOPE

This policy identifies the programmatic requirements and protocols that shall be followed at BSC to ensure safe conditions exist in confined spaces and work is performed safely in accordance with the OSHA Permit-Required Confined Spaces Standard, Title 29, Code of Federal Regulations 1910.146.

The Environmental Health and Safety (EH&S) Office along with Supervisors in Campus Services and Computing and Technology Services will be responsible for ensuring BSC and contract maintenance and service personnel comply with the requirements of this program. A copy of the OSHA 29 CFR 1910.146 Permit Required Confined Space Entry Standard is available at the EH&S office for review.

III. APPLICABILITY AND RESPONSIBILITIES

Adherence to this policy and procedure is mandatory for all BSC employees and Contract Personnel. BSC supervisors and employees failing to follow this program are subject to disciplinary actions and/or dismissal.

3.1 BSC Employee Responsibilities for PRCS Entries by In-House Personnel

All BSC Employees shall:

- a) Not enter any Permit Required Confined Space (PRCS) unless specifically authorized by a properly trained entry supervisor and only in full accordance with this program and the OSHA Standard;
- b) Attend and complete any scheduled training required by his/her supervisor and this program; and
- c) When selected as an entrant, attendant, or entry supervisor, perform those duties as outlined in this program.

3.2 BSC Employee Responsibilities for Contracted Services

All BSC employees, who hire contractors that must work in confined spaces or administer contracts with such contractors, are responsible for informing contractors of the locations of these spaces and any known actual or potential hazards. When new spaces are created, a hazard evaluation is conducted, the space is classified, and, if appropriate, posted and added to the inventory. If conditions change within a confined space that previously was not considered permit-required confined space, the space is re-evaluated to determine its classification.

The BSC employee cognizant for the contracted work will:

- a) Inform the contractor that the workplace contains permit spaces and that permit space entry is allowed only in accordance with a permit space entry program meeting the requirements of 29 CFR 1910.146. The entry protocol will be the responsibility of the contractor.
- b) Apprise the contractor of the elements, including the hazards identified with the space that make the space in a question a permit space.
- c) Ensure the contractor is aware that they are responsible for securing and coordinating emergency response rescue services of their personnel, should it be needed.
- d) Apprise the contractor of any precautions or procedures that BSC has implemented for the protection of employees in or near permit spaces where the contractor personnel will be working.
- e) Coordinate entry operations with the contractor, when both Buffalo State College personnel and contractor personnel will be working in or near permit spaces per the requirements of this program.
- f) Debrief the contractor at the conclusion of the entry operations regarding any hazards confronted or created in permit spaces during entry operations.

IV. HAZARDS ASSOCIATED WITH CONFINED SPACES

Confined spaces at BSC potentially have health and/or physical hazards. Specific health and physical hazards associated with confined spaces are discussed below.

4.1 Health (Atmospheric) Hazards

Hazardous atmospheres are a major concern when entering confined spaces. In order for entry to be safe, breathable air must be free from harmful chemicals and have more than 19.5% oxygen (outdoor air should have roughly 21%). If there is not enough oxygen present or if chemicals are present, a hazardous atmosphere may exist. Hazardous atmospheres that may be present within a confined space can be divided into four (4) categories: ***flammable and explosive, toxic, irritating and/or corrosive and asphyxiating***.

- a) *Flammable Atmospheres*: There are a number of potential sources for the atmosphere in a confined space to become explosive or flammable. BSC may not have all (or any) of the following types of explosive or flammable atmospheres within the facility's designated confined spaces. Nonetheless, the following workspace atmospheric hazards are discussed in the event of a condition upset or modification.
 - * Confined spaces that contain chemicals, which are explosive or volatile such as Gasoline or Diesel Fuel, have the potential for explosive vapors.
 - * A confined space that has an oxygen level above 23.5% makes it an oxygen enriched atmosphere. In oxygen-enriched atmospheres, the potential for explosion increases when other explosive chemicals are present. This may be caused by chemical reactions involving an oxidizing

agent. Oxidizers, by their nature, give off oxygen during chemical reactions.

- * Often when chemicals are stored in tanks, the walls will absorb some of the chemicals. After the tank has been emptied, the chemicals will permeate out of the walls in a process called **desorption**. This desorption may create sufficient vapors in the space to have an explosive atmosphere. Steel tanks, such as gasoline and propane tanks, will often display this desorption trait.
- * Solvents used to remove petroleum sludge in a tank are often explosive. The vapors given off by this product can lead to an explosive atmosphere if not controlled. It is important to ensure that the space is properly ventilated to avoid this problem.
- * When powdered chemicals or grains are loaded or unloaded, high quantities of dust may be generated. If the dust is combustible and uncontrolled, it may explode by conflagration. It is essential to use proper loading/unloading measures to reduce the dust levels.
- * Some confined spaces may contain pyrophoric material that will ignite explosive vapor in the presence of air. A qualified person should consider the potential for the presence of pyrophorics prior to ventilation.

Potentially explosive atmospheres must be monitored with extreme care using intrinsically safe instruments. Such instruments do not introduce an ignition source and will not cause an explosion in explosive atmospheres.

Before any work is conducted in a confined space, the area must be ventilated. The ventilation source must be reliable and ventilation must be constant throughout the work process. It is important to provide enough ventilation to work in the space safely and to prevent the outside area from accumulating explosive vapors. In addition, all ignition sources must be eliminated prior to and during work in these types of atmospheres. Bonding and grounding should be used to eliminate static electricity. Non-sparking tools, such as those made from beryllium, must be used. All electrical equipment must be grounded to prevent sparking and arcing. Extra care must be used if hot work is to occur in the confined space. Only properly trained and experienced personnel will be allowed to perform hot work in confined spaces.

b) *Toxic Atmospheres:* Toxic (poisonous) atmospheres may be produced by products that are solids, liquids or gases. These chemicals, in addition to the chemicals found on soiled rags and clothing, may cause toxic atmospheres to develop in enclosed spaces. Circumstances which may produce a toxic atmosphere are:

- * The product stored in the container is a toxic material.
- * Organic materials such as sewage give off Hydrogen Sulfide when they decompose. Hydrogen sulfide (H₂S) is a colorless gas with an odor of Sulfur. H₂S is highly toxic and small quantities can cause severe illness or death.

- * The removal of sludge from tanks is a common practice. Often the sludge is volatile. Volatile means that the product releases vapors readily. The actual process of cleaning out the sludge can cause an increase in toxic vapors in the confined space.
- * Welding or cutting processes give off metal fumes. These metal fumes may be toxic and can build up inside a confined space.
- * Chemicals used in confined spaces will often have their own hazardous characteristics. These characteristics are often magnified in a confined space. The use of cleaning products for cleaning can result in a toxic atmosphere.

Care must be taken to fully identify the contents of a confined space. Additionally, the products to be used in the space must be identified to ensure that they can be safely used. Complete atmospheric testing must be completed prior to entry. Never rely on your sense of smell as the sole detection device of toxic atmospheres. Carbon monoxide, among other gases, is toxic, colorless, and odorless and will not be detected by the human senses.

- c) *Irritant (Corrosive) Atmosphere:* Irritants are classified into two groups - **primary** and **secondary** irritants. Material Safety Data Sheets (MSDS) of materials found at the BSC EH&S office should be consulted for irritating or corrosive effects prior to any entry.
- * Primary irritants cause violent surface-irritating effects on skin tissue and the respiratory tract without causing other bodily health effects (systemic toxic effects). Selection of proper personal protective equipment will prevent exposure to these products. *Examples of primary irritants are Chlorine, Sulfuric acid, Hydrofluoric acid, Ozone, Ammonia, Sulfur dioxide, and Nitrogen dioxide.*
 - * Secondary irritants cause systemic toxic effects as well as surface irritation. These products will cause long-term health effects if personal protective equipment and clothing is not worn. *Examples of secondary irritants include Carbon tetrachloride, Benzene, Trichloroethane, Trichloroethylene, and Ethyl chloride.* Prolonged exposure to irritating atmospheres may cause damage to the respiratory system and other vital organs. Proper selection and use of personal protective clothing will reduce exposure to these products.
- d) *Asphyxiating Atmosphere:* Oxygen constitutes approximately 21% of normal air. If oxygen levels drop below **19.5%**, the atmosphere is considered to be oxygen-deficient or asphyxiating. In this environment, normal body functions begin to shut down. At an oxygen level of less than 16%, death will occur. The reduction of oxygen within a confined space may be the result of either consumption or displacement.
- * *Oxygen consumption:* Consumption of oxygen may occur when welding, heating or cutting procedures take place in a confined space. Bacterial action in the decomposition or fermentation of organic matter and the rusting of metal will consume all oxygen present. The breathing process of workers within the confined space may also deplete the oxygen supply.

The more people working within a confined space, the faster the oxygen is consumed.

- * *Oxygen Displacement:* Displacement of oxygen by another gas in a confined space may be accomplished naturally or by physically feeding another gas into the space. Displacement of oxygen may take place naturally in sewers, storage bins, wells, and tunnels. This displacement is caused by the presence of other gases like Hydrogen Sulfide and Carbon Monoxide. Gases such as Nitrogen, Argon, and Helium are sometimes used as inerting gases. An inerting gas is used to displace a explosive atmosphere with a non-explosive atmosphere. Extreme care must be followed when using these "non-toxic", colorless, and odorless gases. Gases with these properties are very dangerous asphyxiates and monitoring of the O₂ content of a confined space must be conducted continuously when they are in use.

4.2 Physical Hazards

The physical dangers within a confined space range from hazards associated with equipment within the space to physiological health hazards from heat and noise. The following section describes some of the hazards associated with working within a typical confined space. BSC has a variety of confined spaces throughout the campus. Each has been evaluated for physical dangers unique to that space.

- a) *Mechanical Hazards:* Mechanical and electrical equipment are the cause of numerous injuries in confined spaces. All electrical and mechanical machinery must be disconnected and/or locked out from their power source. Piping must be blanked and/or disconnected and valves must be locked in the closed position. All pipes must be inspected for leakage before entry can be made (for example: inspecting pipes leading into the confined space, or using a flashlight to examine interior pipes from the outside). These procedures will prevent the entry of dangerous chemicals or vapors within the confined space while work is taking place. Properly locked-out and tagged-out machinery will prevent other personnel in the area from activating the electrical or mechanical process within the confined space. Lockout/Tagout procedures shall be followed to whenever equipment must be rendered inoperable to render the equipment or system into a safe de-energized condition.
- b) *Communication Problems:* The configurations of confined spaces may make it very difficult for the attendant outside the confined space to keep visual contact with workers inside. If communication is lost, the worker inside will not be able to notify the attendant of an injury. Communication shall be maintained at all times. An alternate system must be established in the event that hand and arm signals or normal voice cannot be used. Intrinsically safe radios, alarms, etc shall be used where explosive atmospheres may occur.
- c) *Noise:* Noise within a confined space makes communication difficult and increases the risk of hearing loss. Machinery outside of the confined space or activities inside the confined space, for example, sandblasting or jack hammering, will cause vibration and noise at high decibels. Hearing protection must be used to prevent permanent hearing loss. At the same time, a communication system must be maintained between the workers inside the space and the attendant.

- d) Stress: There are two types of thermal stress - **hot** and **cold**. Workers may be subjected to very warm temperatures within a confined space. This heat is caused by the use of personal protective clothing and/or the product and location of the space. Heat stress can be reduced by proper ventilation, frequent rest periods and drinking ample water. Similar dangers exist in a cold environment. When the body temperature decreases, a worker is susceptible to frostbite and hypothermia. Frequent breaks to warm up and donning the proper clothing will help prevent cold stress. At BSC, during the cleaning process and ventilation of the confined space(s) with outside ambient air, care should be given to location of the intake so as to not introduce further contaminants (Carbon monoxide for example) into the atmosphere. In addition, due to weather conditions - air temperature in the work space(s) should be evaluated as determined in the most recent ACGIH Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- e) Vibration: Work within a confined space that requires pneumatic tools, e.g., chippers or jackhammers, may cause vibration injuries to the hands and fingers. Specially designed gloves are to be worn to minimize the vibration to the hands and arms.
- f) Slips and Falls: Very often the interior of a confined space is not flat. There are sumps, baffles, scaffolding and surface residues, or sludges, which can lead to slips, trips, or falls. Proper foot protection, proper foot ware selection with proper traction, and careful movement in the space will help to prevent injury. During the cleaning, re-lining and inspection of tanks at BSC, surfaces may be (or become) wet and slippery— often personal protective equipment such as boots/gloves or suits may increase slips, trips, or falls.

V. EVALUATION OF THE BSC WORKPLACE AND IDENTIFIED PRCS

5.1 Evaluation of the BSC Workplace

BSC has evaluated the workplace and determined that Permit-Required Confined Spaces (PRCS) do exist.

Evaluation of new areas or re-evaluation of existing areas will be performed by the Director of EH&S, or their designee, and Campus Services supervisors.

5.2 Identified PRCS

The following is a listing of permit-required confined spaces on campus:

- a) All pits and manhole chambers, including **but not limited to** sewer manholes, storm receivers/catchbasins, filter media chambers, and electrical service chambers, where the breathing zone during work will be recessed below the plane formed by the outer rim of the entry/egress portal;
- b) Heating, ventilation, exhaust, and air conditioning handling units, structures and systems;
- c) Crawl spaces under trailers or other structures;

- d) Aboveground and underground storage tanks;
- e) Boilers units.

The EH&S Director or their designee may waive or exclude specific structures listed above from the permit requirement, based on documented information on the environmental setting within such structures. However, the EH&S Director or designee shall be contacted and approval obtained prior to entry into the excluded structure.

VI. PREVENTION OF UNAUTHORIZED ENTRY INTO PRCS

6.1 Notification of Hazards

Exposed or potentially exposed employees will be notified of PRCS using the following methods:

- a) Posting of danger signs at PRCS, where feasible. Signs will state "DANGER – PERMIT REQUIRED CONFINED SPACE. DO NOT ENTER."
- b) PRCS training will be provided for new employees prior to exposure and annual refresher training will be provided to all exposed or potentially exposed employees. Training will include the location of PRCS and their specific hazards as well as training in non-entry rescue and applicable first aid procedures.

6.2 Administrative and Engineered Controls

Only employees properly trained and authorized for entry by BSC EH&S Director may enter PRCS's. PRCS's will be protected from unauthorized entry, where feasible, by specialized equipment under management's control and/or posting of signs in the area.

VII. TRAINING REQUIREMENTS AND DUTIES OF QUALIFIED PERSONNEL

7.1 Training

Designated BSC employees shall be properly trained in confined space entry requirements and each trained employee shall be provided with a copy of BSC Confined Space Inventory during training.

Only properly trained, qualified employees may be authorized as entrant, attendant, entry supervisor, or non-entry rescue team members. The training will establish proficiency in the duties required by this program so that the employee acquires the understanding, knowledge, and skill necessary for the safe performance of his/her duties. Proper training for entrants, attendants, and entry supervisors shall be documented and shall include descriptions of the potential consequences – injury and illness up to and including death – of entering a confined space and not following required procedures.

Training must be completed before the employee is assigned duties under this program, before there is a change in assigned duties and, whenever a supervisor has reason to believe that there are deviations from permit space entry procedures or inadequacies in the employee's knowledge or use of this program.

Supervisors will certify that this training has been accomplished. The certification will contain the employee's name, signature, or initials of the trainers, and the dates of training.

7.2 Duties of Qualified Personnel

Qualified, designated BSC personnel shall:

- a) Evaluate the work place and identify PRCS;
- b) Inform potentially affected employees of the existence, location of, and the danger posed by the permit space by posting danger signs and by informing all BSC employees who may enter confined spaces of confined space locations during training;
- c) Determine if employees will or will not enter permit required space. If not, take effective measures to prevent employees from entering the permit required spaces accidentally;
- d) Provide and document training for entrants, attendants and entry supervisors;
- e) Designate the appropriate supervisor(s) as entry supervisor(s);
- f) Provide all specified equipment required for entry in a permit required confined space as outlined in this and OSHA 1910.146 at no cost to the employees, maintain the equipment properly, and ensure that employees use the equipment properly;
- g) If necessary, reclassify a non-permit confined space as a permit space when there are changes in use or configuration.

7.3 Duties of Entrant, Attendant, and Supervisor

7.3.1 Duties of the Entrant

- a) Know the hazards that may be faced, including the mode, signs or symptoms, and consequences of the exposure;
- b) Properly use equipment as required;
- c) Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to alert entrants of the need to evacuate the space;
- d) Alert the attendant whenever the entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or detects a prohibited condition; and
- e) Exit from the permit space as quickly as possible whenever:

- * An order to evacuate is given by the attendant or the entry supervisor, or an evacuation alarm is activated; or

- * The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or detects a prohibited condition.

7.3.2 Duties of Attendant

- a) Know the hazards that may be faced during entry, including the mode, signs or symptoms, and consequences of the exposure;
- b) Be aware of possible behavioral affects of hazard exposure;
- c) Continuously maintain an accurate count and identity of authorized entrants;
- d) Remain outside the permit space during entry operations until relieved by another attendant;
- e) Communicate with entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate;
- f) Monitor activities inside and outside space to determine if safe for entrants to remain in space and orders evacuation when necessary;
- g) Summon rescue and emergency services when assistance for emergency exit from permit space is necessary;
- h) Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:
 - * Warn them to stay away or exit immediately if they have entered; and
 - * Inform the entrants and entry supervisor if unauthorized persons enter the permit space;
- i) Perform non-entry rescues as specified by company procedure; and
- j) Perform no duties that might interfere with their primary duty to monitor and protect authorized entrants.

7.3.3 Duties of Entry Supervisor

- a) Know the hazards that may be faced during entry, including the mode, signs or symptoms, and consequences of the exposure;
- b) Verify that acceptable conditions for entry exist before endorsing the permit and allowing entry to begin;
- c) Terminate the entry and cancel the permit when entry operations are complete or a prohibited condition arises;
- d) Verify that rescue services are available and the means for summoning them are operable;

- e) Remove unauthorized individuals who enter or who attempt to enter the permit space; and
- f) Verify at appropriate intervals, that acceptable entry conditions are maintained.

VIII. PRCs ENTRY AND RESCUE PROCEDURES

All permit required confined spaces will be identified and evaluated by EH&S or a third party specializing in confined spaces and approved by EH&S in conjunction with Campus Services supervisors. Exposed employees will be informed of such spaces through posting with warning signs or other equally effective means, such as facility maps or training.

Only trained and qualified employees will be authorized as permit space entrants, attendants, or entry supervisors.

No employee shall enter a permit space without having a properly completed entry permit signed by an entry supervisor.

8.1 Permit-Required Pre-Entry Actions

- a) Entrants will obtain an entry permit in accordance with Section XI from their entry supervisor prior to entry of the space.
- b) The entrant will accomplish all pre-permit actions required for entering the space, such as atmospheric testing, hazard control/elimination actions, have all required equipment on hand, provide for attendant and rescue services, etc.
- c) Complete all applicable items on the permit.
- d) The entry will be authorized and only an authorized entry supervisor will sign the permit. If any item on the permit is checked as "NO" (meaning not yet completed or available), the permit will not be signed.
- e) After permit approval, entry may proceed. A copy of the entry permit will be placed outside the confined space until appropriate personnel have canceled the permit.
- f) The entry supervisor upon completion of the work will cancel permits, or when any prohibited condition arises. Permits cannot just be let to expire. Cancelled permits must be kept for the annual review.
- g) BSC employees will not enter any spaces identified as PRCs unless the identified hazards can be mitigated.

8.2 Testing and Monitoring

- a) Test the space as necessary to determine if acceptable entry conditions exist before beginning entry operations. Initial testing of the atmosphere must be done from outside the confined space prior to any entry. If

isolation of the space is infeasible because the space is large or part of a continuous system (such as a sewer), entry conditions will be continuously monitored where entrants are working.

- b) Test or monitor the permit space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations.
- c) When testing for atmospheric hazards, test for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors. Parameters for non-hazardous atmospheres are:
 - * Oxygen between 19.5 and 23.5 percent;
 - * Flammability less than ten percent of the Lower Flammability Limit (LFL);
 - * Toxicity less than the permissible exposure limit (PEL).
- d) An authorized attendant must be present and monitoring the entry at all times. The attendant shall not be assigned any other duties that may interfere with his attendant duties.
- e) Equipment required for PRCS entry includes that equipment required for testing and monitoring; ventilating, communications between the entrant and attendant, and for summoning rescue; personal protection; lighting; barriers/shields for openings; means of ingress and egress; and any other equipment necessary for safe entry and rescue.

8.3 Rescue and Emergency Services

8.3.1 Non-Entry Rescue

- a) Non-entry rescue is the preferred method for rescue of personnel from a permit-required space. *Employees will not enter a permit space for rescue unless the identified hazards have been mitigated.*
- b) To facilitate non-entry rescue, a retrieval system with approved equipment shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase overall risk of entry or would not be of value to any rescue. Retrieval system requirements are:
 - * Each entrant shall use a chest or full body harness with a retrieval line attached at the center of the back near shoulder level, or other appropriate point;
 - * The other end of the retrieval line shall be attached to a mechanical device such as a tripod with a mechanical winch or fixed point outside of the permit space enabling immediate use. A mechanical device will be used to retrieve personnel from vertical type permit spaces more than 5 feet deep;

- * If an injured entrant is exposed to any substance with a required MSDS or similar document, that MSDS or document will be made available to the medical facility treating the entrant;
- * If rescue should become necessary, the attendant will: Notify and summon University Police at 878-6333;
- * Attempt to retrieve the entrant from the space using **non-entry** rescue procedures to the extent possible by the circumstances;
- * If entrant(s) are successfully retrieved from the space, provide first aid to the best of your ability; and
- * Monitor the situation and be ready to give rescuers information on how many victims and their status, what hazards, chemical types, concentrations, etc. are present.

8.3.2 Entry Rescue

- a) *Entry by college personnel for entry rescue in PRCS is prohibited under all circumstances.*
- b) A third party employer contracted to do applicable work within the space will enter these spaces and it will be their responsibility to provide entry rescue services.
- c) BSC employees shall share all information available on the confined space to be entered including but not limited to the requirement for entry rescue from the space.
- d) The Buffalo Fire Department can be contacted in the event that a rescue is necessary.
- e) Assigned rescue duties shall be performed and authorized entrants shall be properly trained;
- f) At least one member of the rescue team will hold current certification in first aid and cardiopulmonary resuscitation (CPR);
- g) Each rescue team member will practice making permit space rescues at least once every 12 months, by means of simulated rescue operations and in spaces representative of the types of permit spaces from which rescue is to be performed.

IX ALTERNATE ENTRY PROCEDURES

Alternate entry procedures may be used when the **only** hazard is an actual or potential hazardous atmosphere. If alternate entry procedures are used, no permits are needed, no attendant or supervisor is required, and rescue provisions need not be used. Training and a written certification are required. Heat is NOT considered to be a defined hazard.

9.1 Conditions (Prerequisites) for Use of Alternate Entry Procedures

The following must be met in order to use the procedure in Section 9.2:

- a) The only hazard posed by permit space is an actual or potential hazardous atmosphere;
- b) Continuous forced air ventilation alone is sufficient to maintain safe permit space;
- c) Monitoring and inspection data that supports above demonstrations have been developed and documented;
- d) If initial entry is necessary to obtain above data, it shall be performed in accordance with entry requirements in Section VIII of this policy; and
- e) Documented determinations and supporting data shall be made available to entrants.

9.2 Alternate Entry Procedure

- a) Any condition making it unsafe to remove an entrance cover shall be eliminated before removing the cover. When entrance covers are removed, the opening shall be promptly and effectively guarded.
- b) Before entry, the internal atmosphere shall be tested with a calibrated direct-reading instrument, for the following conditions in the order given:
 - * Oxygen content: 19.5-23.5%;
 - * Flammable gases and vapors: $\leq 10\%$ of LEL (Lower Explosive Limit); and
 - * Potential toxic air contaminants: $< \text{PEL}$ (Permissible Exposure Limit).
- c) There shall be no hazardous atmosphere within the space whenever any employee is inside the space.
- d) Continuous forced air ventilation shall be used as follows:
 - * Entry not permitted until hazardous atmosphere is eliminated;
 - * Ventilation shall be directed to immediate areas where employees are or will be present and will continue until all employees have left the space; and
 - * Air supply shall be from a clean source and may not increase hazards in the space.
- e) Atmosphere within the space shall be periodically tested as necessary to ensure that ventilation is adequate. If hazardous atmosphere is detected during entry:
 - * Each employee shall leave the space immediately;

- * The space shall be evaluated to determine how the hazardous atmosphere developed; and
 - * Measures shall be taken to protect employees from the hazardous atmosphere before any subsequent entry.
- f) The entry supervisor will verify that the space is safe for entry and that all of the above requirements have been met. Such verification will be in writing to include the date, locations of the space, and the signature of the person providing the certification, and shall be made available to each employee before entry.

X. PERMIT SPACE RECLASSIFICATION

A permit space may be reclassified as a non-permit required space:

- a) If there are no actual or potential atmospheric hazards and if all hazards within the permit space are eliminated without entry, space may be reclassified for as long as the non-atmospheric hazards remain eliminated.
- b) Hazards may be eliminated by such actions as purging or inerting tank/vessels of contaminants, emptying material from hoppers/bins, use of campus lockout/tagout procedures for electrical or mechanical hazards.

CAUTION: *The control of atmospheric hazards through forced air ventilation does not constitute elimination of that hazard (it only controls the hazard; the preceding Alternate Entry Procedures in Section 9 must be used in such cases).*

- b) If entry is required to eliminate hazards, it shall be performed according to regulations and the space may be reclassified for as long as the hazards remain eliminated.
- c) Entry supervisors shall certify in writing that all hazards in permit space have been eliminated and make this document available to each entrant.
- d) If hazards arise in declassified permit space, employee (s) shall immediately exit and the employer shall determine whether to reclassify the space.

CAUTION: *A combination of reclassification procedures and alternate entry procedures (e.g. using lockout/tagout to eliminate a physical hazard, the continuous forced air to control an atmospheric hazard) **may not** be used together. Situations as such must be entered under the permit program.*

XI. FILLING OUT THE WRITTEN PERMIT

The permit form must be in a standardized format for each entry. The following information shall be included in the written permit:

- a) The permit space to be entered.
- b) The purpose of the entry.

- c) The date and the authorized duration of the entry permit.
- d) The authorized entrants within the permit space, by name or by such other means.
- e) The personnel, by name, currently serving as attendants.
- f) The individual, by name currently serving as entry supervisor, with the space for signature and initials.
- g) The hazards of the permit space to be entered.
- h) The measure used to isolate the permit space and to eliminate or control the permit space hazards before entry.
- i) The acceptable entry conditions.
- j) The results of initial and periodic tests, with the names or initials of the testers and when the tests were done.
- k) The rescue and emergency services that can be summoned and the means for summoning them.
- l) The communications procedures used by authorized entrants and attendants to maintain contact during the entry.
- m) Equipment (such as personal protective equipment, testing, communications, alarm system, and rescue equipment) to be provided for compliance with this section.
- n) Any other information whose inclusion is necessary in order to ensure employee safety.

XII. PROGRAM REVIEW AND RECORDS

12.1 Program Review

The EH&S Director or their designated representative shall perform a thorough review of this program is conducted on an annual basis and ensure any necessary modifications are promptly incorporated. The Permit Space Program shall be reviewed and revised by the EH&S Director or their designee within one (1) year of each entry where cancelled permits are used to ensure employees are protected from permit space hazards. A single review covering all entries in the preceding year may be conducted.

12.2 Records

Copies of all training documentation shall be forwarded to the EH&S Office within 30 days of completion, receipt of training certifications, etc. In addition, documentation of all environmental and atmospheric testing as applicable to

the confined space entry permit system is also maintained as part of this program.

The EH&S Office will keep on file for at least one year, copies of:

- a) All entry, including cancelled permits;
- b) Training of authorized entrants, attendants, supervisors, and;
- c) Any documentation of non-compliance with permit and other health and safety issues in order to facilitate the review of the confined space program.

XIII. DEFINITIONS

Confined Space – A space that:

- a) Is large enough and so configured that an employee can bodily enter and perform assigned work; **and**
- b) Has limited or restricted means for entry or exit; **and**
- c) Is not designed for continuous employee occupancy.

Permit Required Confined Space (PRCS) – A confined space that:

- a) Contains or has a potential to contain a hazardous atmosphere; **or**
- b) Contains a material that has the potentials for engulfing an entrant; **or**
- c) 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**
- d) Contains any other recognized serious safety or health hazard.

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

Acute exposures - Exposures, which occur for relatively short periods of time, generally minutes to 1-2 days. Concentrations of toxic air contaminants are high relative to their protection criteria. In addition to inhalation, airborne substances might directly contact the skin, or liquids and sludges may be splashed on the skin or into the eyes, leading to toxic effects.

Atmosphere - Refers to the air within a confined space. It should be clean, breathable air with enough oxygen for personnel to be able to enter the area, work and breathe.

Attendant - An individual stationed outside the permit-required confined space who is trained as required by this program and who monitors the authorized entrants inside the permit-required confined space and performs all attendant's duties assigned in the Buffalo State College Confined Space Entry Program.

Authorized Entrant - An employee who is trained as required by this program and is authorized by Buffalo State College to enter a permit-required confined space.

Ceiling Level - The maximum airborne concentration of a toxic agent to which an employee may be exposed for a specified period of time, usually 15 minutes. At no time must the exposure level exceed the ceiling concentration as listed in 29 CFR Part 1910 Sub Part Z.

Combustible Dust - A dust capable of undergoing combustion or burning when subjected to a source of ignition.

Contaminant - Any organic or inorganic substance, dust, fume, mist, vapor, or gas, the presence of which in air can be harmful to human beings.

Entry – The action by which a person passes through an opening into a permit required confined space. Entry is considered to occur as soon as any part of the entrant's body breaks the plane of an opening into the space. **NOTABLE EXCEPTION:** With the approval of the Department Supervisor, you may reach into a space, and not bodily enter (say to adjust a valve), and do so without an entry permit being required as long as there is NO risk of falling into or otherwise entering the permit space.

Entry Permit – The written or printed document provided by Buffalo State College to allow and control entry into a permit space.

Entry Supervisor – The person responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry.

Hazardous Atmosphere – An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness from one or more of the following conditions:

- a) Flammable gas, vapor, or mist in excess of 10% of its lower flammable limit (LFL);
- b) Airborne combustible dust present 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 concentration of any substance for which a dose or permissible exposure limit (PEL) is published in OSHA standards; **or**
- d) Any other atmospheric condition that is immediately dangerous to life or health.

Hot Work - Any work involving burning, welding, soldering, cutting or similar fire-producing operations. As well as work which produces a source of ignition such as drilling, abrasive blasting and space heating. Permits for **Hot Work** must be obtained in accordance with Buffalo State College's safety and health programs.

Immediately Dangerous to Life or Health (IDLH) - Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects, or that would interfere with an individual's ability to escape unaided from a permit space.

Inerting - Displacement of the atmosphere by a non-reactive gas (such as Nitrogen) to such an extent that the resulting atmosphere is non-combustible. *Inerting an atmosphere produces an IDLH oxygen-deficient atmosphere.*

Irritant - Any substance that will induce a local inflammatory reaction on immediate, prolonged, or repeated contact with living tissue.

Isolation - A process whereby the confined space is removed from service and completely protected against the inadvertent release of material by the following: blanking off (skillet-type metal blank between flanges), misalignment of sections of all lines and pipes, a double block and bleed system, electrical lock-out of all sources of power, and blocking or disconnecting all mechanical linkages.

Lower Explosive Limit (LEL) - The minimum concentration of a combustible gas or vapor in air (usually expressed in percent by volume at sea level), which will ignite if an ignition source (sufficient ignition energy) is present.

Non-Permit Confined Space – A confined space that does not contain, or with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

Oxygen Deficiency - Refers to an atmosphere with a partial pressure of oxygen (PO₂) less than 132 mm Hg. Normal air at sea level contains approximately 21% oxygen at a PO₂ of 160 mm Hg. At an altitude of 5,280 feet, normal air contains approximately 21% O₂ at a PO₂ of 132 mm Hg. *An oxygen-deficient atmosphere is one with less than 19.5% Oxygen.*

Oxygen-Enriched Atmosphere - Any oxygen concentration greater than 25% (PO₂ – 190mm Hg) at normal atmospheric pressure. *An oxygen-enriched atmosphere is one with greater than 23.5% Oxygen.*

Permissible Exposure Limit (PEL) - The maximum Eight-Hour, Time-Weighted Average of any airborne contaminant to which an employee may be exposed. At no time must the exposure level exceed the Ceiling concentration for that contaminant as listed in 29 CFR Part 1910 Subpart Z.

Prohibited Condition – Any condition in a permit space that is not allowed by the permit during the time when entry is authorized.

Purging - The method by which gases, vapors, or other airborne impurities are displaced from a confined space. For example, an atmosphere may be purged of a hazardous airborne contaminant by forced ventilation - followed by atmospheric or environmental testing to ensure effectiveness.

Testing – The process by which the hazards are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.