



Permit Required Confined Space

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OBJECTIVE: Berea College shall evaluate the workplace to determine if any spaces are permit required confined spaces. If the workplace is found to contain permit spaces Berea College shall inform exposed employees by posting danger signs or by any other effective means of the existence and location of permit required spaces.

In accordance with all state and federal regulations, Berea College will provide all training and equipment necessary for safe entry and exit of any and all permit required confined spaces for employees whose work is regulated by section 1910.146 of the Code of Federal Regulations; vol. 29.

Confined spaces, by nature, increase the likelihood of an oxygen deficiency or the accumulation of air contaminants (dusts, gases, and vapors) that might be toxic or explosive. Confined spaces also restrict rescue efforts and often result in the death of poorly prepared or trained rescuers.

A confined space shall be entered only after adequate safety precautions have been taken and authorized personnel have issued a confined space entry permit. The primary objective is to ensure that the space is safe for entry by using appropriate control measures (i.e., install adequate safeguards to identify changing conditions and have proper planning and forethought so rescues are never needed).

Federal and State Definitions of a Permit Required Confined Space:

Kentucky defines a confined space as: "... a space having the following characteristics:

- 1. Limited means of exit or entry,**
- 2. Ventilation of the space is lacking or inadequate allowing for the potential accumulation of toxic air contaminants, flammable or explosive agents, and/or depletion of oxygen."**

Definitions:

Acceptable Entry Conditions: means the conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can enter into and work within the space

Attendant: any individual who is specially trained to work in confined spaces. This individual must be trained to recognize all potential hazards associated with the area of interest. In addition, this individual shall be trained and knowledgeable in the use and techniques of all equipment used for entry such as air monitoring devices, respirators, tripods and lift equipment...etc.

Authorized entrant: means an employee who is authorized by the employer to enter a permit space

Blanking or binding: means the absolute closure of a pipe, line or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line or duct with no leakage beyond the plate.

Double block and Bleed: means the closure of a line, duct or pipe by closing and locking or tagging two in- line valves and by opening and locking or tagging a drain or vent valve in the line between two closed valves.

Confined Space:

Federal OSHA General Industry Definition - ... a space that:

1. Is large enough and so configured that an employee can bodily enter and perform assigned work; and
2. Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers vaults, and pits or spaces that might have limited means of entry); and
3. Is not designed for continuous human occupancy.

Emergency: any occurrence or event internal or external to the permit space that could endanger entrants.

Engulfment: The surrounding and effective capture of a person by liquid or finely divided (flammable) substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

Entry:

Entry permit:

Entry supervisor: the authorized individual who oversees the entry after determining that conditions are acceptable for entry. The Entry Supervisor shall make a personal inspection of the entry site before issuing the permit to determine whether adequate safety precautions have been taken.

Hazardous atmosphere:

Hot Work permit:

Immediately dangerous to life or health (IDLH):

Inerting:

Isolation:

Line breaking:

Non – Permit confined space

Oxygen deficient atmosphere

Oxygen enriched atmosphere

Permit – Required confined space program

Permit system:

Prohibited condition:

Rescue service:

Retrieval system: means the equipment (including a retrieval line, chest or full body harness, wristlets, if appropriate, and a lifting device or anchor)

Testing: means the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

HAZARD IDENTIFICATION

All suspected "permit required confined spaces" will be assessed and tested for any and all hazards listed under this plan. These areas shall be inspected and monitored at a minimum of once per year. The procedure(s) for assessment and testing will follow recommendations outlined in the Code of Federal Regulations [29 CFR 1910.146]; paragraph "d", Appendix (A), as well as use and application of the questionnaire: Selected Hazard Inventory Considerations found under appendix #___ of this plan. All confined spaces, which have been determined to be "permit-required", will be posted with the following wording;

Danger
Permit-Required Confined Space
Do Not Enter!

All employees, whose work may require entry into a "permit-required confined space", will be trained on the following elements of this program:

1. The location of the space
2. Associated hazards of the space
3. Use of test equipment
4. Use of emergency rescue equipment
5. Permit documentation procedures for entry and exit
6. Relevant standard operating procedures covered under Element # 9 of this plan, which may be specific to the work at hand.

Other procedures that might introduced new hazards into the confined space as a result of the work operations being conducted shall be considered and reviewed before the Entry Permit is signed. In some instances, the work being conducted in the confined space may result in the space being reclassified as "permit-required" or if already classified as such, may introduce hazards which the entrant or attendant have not properly prepared for.

Hazards:

It is hereby recognized that any of the areas identified in this program could have the potential for any of the following hazards:

1. Hazardous Atmosphere
 - < 19.5% O₂
 - > 23.5% O₂
 - > 10.0% LEL
 - > Acute PEL/TLV/MSDS
(Atmospheric health hazards have to be acute - not chronic)
 - Combustible dusts that meets or exceeds its lower flammable limits*
2. Mechanical Hazards
3. Potential for engulfment of entrant
4. Dangerous configuration hazard
5. Heat/Cold (Thermal Extremes)
6. Other safety or health hazards *that are dangerous to life and health*

Each entry shall address and assess each of the above hazards and shall ensure that proper testing and safeguards have been employed before entering the space. All results shall be documented.

HAZARD CONTROL vs. HAZARD ELIMINATION

Whenever possible, all hazards should be eliminated. When a hazard(s) can be eliminated, then the permit required confined space could be reclassified as a "non-permit" required space for the duration of the entry activity (see Appendix -----). After the permit has expired, the confined space will automatically be reclassified as "permit required". The permit required confined space may be reclassified as many times as needed in the future, but only after the potential hazards have been assessed and determined to have been "*eliminated*" for each entry.

If elimination of the hazard is not possible, it must be controlled. When the hazard is only controlled such as when ventilating an area is necessary to maintain acceptable atmospheric conditions, then the confined space remains classified as permit required and an "entry permit" must be filled out and signed by all appropriate individuals before entry is allowed. Since the hazards can vary from one situation to the next, it is imperative that the proper controls be maintained and monitored for each confined space and work operation be examined and approved before entering the space. Failure to implement proper controls can result in an injury or fatality.

ENTRY PERMIT SYSTEM

CONFINED SPACE OPERATION PROCEDURES

apply to entry into and work within a Permit Required Confined Space. Once the initial tests are completed and determined to be within acceptable limits, and the entrant authorizer has reviewed these results, inspected the work area and signed the permit work may proceed utilizing the following precautions:

- (a) One employee (authorized attendant) will remain outside of the space to be available in case of emergency. This individual must be in direct communication with the other worker(s) in the confined space, as well as have the capability to reach emergency response personnel.**
- (b) A portable blower will be used to provide a continuous supply of fresh air while personnel are working in the confined space, taking care to ensure that the expelled exhaust does not reenter the work atmosphere.**
- (c) Make subsequent tests for flammability, oxygen deficiency, and/or toxicity at intervals frequent enough to ensure safe atmospheres during the time personnel are in such a space. (Despite a purge, enough toxic substance may remain in pores and scale to recreate a hazardous atmosphere.)**
- (d) Rescue equipment will be set up that will provide a quick means of entry and exit from the space when possible. If possible the authorized entrant will enter confined spaces from a side opening, rather than the top access.**
- (e) No sources of ignition, including smoking or welding, will be introduced into the confined space until a hot work permit is obtained.**
- (f) Authorized entrants must wear protective clothing and gloves when working in spaces that may contain corrosive substances that could be absorbed through the skin during accidental contact.**
- (g) Head, eye, and face, hearing and foot protection must be worn, if necessary.**
- (h) If an exception to these procedures must be made, EH&S should be consulted to ensure adequate safety precautions are taken and appropriate safety equipment is used.**
- (i) When the operation is finished, the entry permit will be completed, signed, returned to the supervisor and filed in the department's safety records. One copy to EH&S.**

Mandatory elements of the "Entry Permit System" are identified below: (See Appendix #1 for permit)

- Identification of the space to be entered**
- Purpose of the entry**
- Date and authorized duration of the entry**
- Description of the hazards identified with the space (see element #1)**

- **Measures taken to isolate the space and manage the hazards**
- **Acceptable entry conditions**
- **Initial and periodic test results, including name and initials of the tested and when test where conducted**
- **Communication procedures**
- **Special equipment required**
- **Identity of authorized entrant and attendant**
- **Rescue and emergency services which can be summoned and the means for summoning them**
- **Any additional permits required - such as a "hot work permit" for welding**
- **Other relevant information**
- **Entry supervisor's signature**
- **Cancellation of permit after entry**

All "Entry Supervisors" and or any other individual who is authorized to review and sign an entry permit must be trained in all aspects of "permit-required confined space entry". These individuals must possess thorough knowledge for the recognition; evaluation and control of potential hazards associated with confined spaces.

An entry permit must be filled out for each entry operation. In addition, the permit must specify the time of duration. Upon completion of the entry operations, the entry permit must be cancelled and kept on file for a minimum of one year. The cancelled permits shall be used in the annual review of the overall program as needed to make necessary changes.

SPECIAL EQUIPMENT

Berea College currently owns and utilizes the following safety equipment as part of this program:

- (a) Air Monitoring Instrument – (2) PhD lite (see Appendix #2 for calibration procedures)
- (b) Forced air ventilation fans and flex duct
- (c) Lights
- (d) Tripod
- (e) Full body harness

EMPLOYEE DESIGNATION

Employees who play an active role in the entry of a confined space must be specifically designated. All employees who are designated in this program shall complete an Entry Permit. Entry *in to any classified space* without a permit is forbidden. These employees include:

Authorized Entrant - any individual who is specially trained to work in confined spaces. This individual must be trained to recognize all potential hazards associated with the area of interest. In addition, this individual shall be trained and knowledgeable in the use and techniques of all equipment used for entry such as air monitoring devices, respirators, tripods and lift equipment...etc

Attendants - an individual stationed outside the confined space that monitors the entrants' activities and implements rescue procedures or plan if necessary. The attendant is required to be stationed outside of the space for the duration of the entry. The attendant must be able to identify all authorized entrants and should be familiar with all "tracking" procedures, which have been instituted by Berea College. Attendants should also be aware of any and all external hazards that may pose risk or harm to the entrant when unaware of outside activities. This individual shall be trained and knowledgeable in the use and techniques of all equipment used for entry such as air monitoring devices, respirators, tripods and lift equipment...etc

Entry Supervisor - the authorized individual who oversees the entry after determining that conditions are acceptable for entry. The Entry Supervisor shall make a personal inspection of the entry site before issuing the permit to determine whether adequate safety precautions have been taken. He or she must:

1. Verify that the permit is complete prior to entry of the confined space. Verify that all personnel are trained and authorized for the task, and that they understand the task.
2. Verify that necessary pre-entry safeguards are in place. Ensure that all entry personnel are equipped with fullbody harness and lifelines as required, and ensure that lifting devices are available.
3. Verify that the rescue team is available if needed.
4. Verify that means of summoning the rescue team or emergency help is operable.
5. Terminate the operation upon recognition of a condition that is not permitted.
6. When work is complete, the entry supervisor shall inspect the confined space to ensure that all persons and equipment have been removed before certifying that the job has been completed.

TESTING AND MONITORING:

All permit required confined spaces shall be inspected and tested for the following:

1. Temperature (too hot or too cold) shall be adjusted appropriately.
2. All filling and discharging equipment shall be locked out prior to entry. (All pipes and lines shall be disconnected and offset, or have a blind flange installed to prevent any liquid or gas from entering the confined space.) All steam lines entering vessels will be valved off, and valves will be locked in the closed position and any pressure relieved or bled.
3. All mechanical, electrical, hydraulic, and pneumatic equipment (e.g., agitators, augers, conveyors, mixers) within the area shall be locked out and tagged, blocked-off, or prevented from operating by appropriate means or methods.
4. The entry supervisor and authorized persons entering the confined space will check to be sure that no material is suspended overhead or on sides. No personnel are allowed to work below the top of material in a bin, or underneath a caked, crusted bridgeover condition even if it appears stable.
5. Entry portals shall be large enough to permit safe entry and exit of a person using a safety harness and a lifeline and/or wearing a self-contained breathing apparatus (SCBA) or an airline combination unit with egress bottle. Entry into spaces that do not comply with this provision is prohibited.
6. Rescue equipment shall be maintained for quick and easy access and inspected at least monthly to ensure readiness in an emergency situation. All rescue team members will be trained thoroughly in use of all rescue equipment (see Appendix ___).
7. The rescue team leader shall be advised that entry is occurring. The rescue team will practice at least annually. *All members* must be currently certified in CPR and first aid.
8. Prior to entry, the atmosphere of the confined space shall be tested or otherwise evaluated, by an authorized person, with a recently calibrated instrument known to be functioning properly. If a change in the atmosphere is possible while work is being done, additional monitoring is required. (Continuous monitoring is recommended at all times employees are in the space.) All test results shall be recorded.
9. A hazardous atmosphere involves one or more of the following conditions. Unless the monitoring equipment allows for simultaneous readings, these conditions shall be evaluated in the order presented. (I.e., first test for percent by volume of oxygen).
10. An oxygen deficiency exists when test results indicate less than 19.5% oxygen.
11. An oxygen-enriched atmosphere exists when test results indicate greater than 23.5% by volume.
12. Flammable gases or vapor concentration must be less than 10% of the lower explosive limit. **PERSONNEL MUST NOT ENTER AN EXPLOSIVE ATMOSPHERE UNDER ANY CONDITION.**
13. Toxic gases or vapors must be less than the OSHA permissible exposure limit (PEL), the ACGIH threshold limit value (TLV), or other management-specified limits for hydrogen sulfide, carbon monoxide, carbon dioxide, and any other toxic gases or vapors that might be present
14. When there is an airborne combustible dust in the space, visibility must never be less than five (5) feet.
15. Any atmospheric condition recognized as immediately dangerous to life or health (IDLH).

COORDINATING OTHER EMPLOYER'S ENTRIES:

All Berea College employees, vendors, contractors, or other entities employed or otherwise contracted by Berea College who's work involves confined space entry must adhere to all elements of this program.

PERMITS - All regular full-time or part-time Berea College employees must obtain an entry permit from their direct supervisor before entering a permit required confined space. This permit must be kept on site at the area portal where entry operations are being conducted. This permit must be kept on file for the duration of the entry at the Dept. of Public Safety or by a designated individual in the department performing the entry as long as Public Safety has been informed of the entry operations activities (as necessary to assist in possible rescue). It is the responsibility of the direct supervisor to assure that the permit is properly completed and that all employees participating in the entry are properly trained. All questions concerning permit certification should be directed to the *Dept. of Environmental Health and Safety at ext. 3350*

TRAINING - All regular full-time or part-time Berea College employees must be trained in confined space entry before proceeding with entry. All training must be current and up-to-date (within the fiscal year). All training should be planned and coordinated with the Dept. of Environmental *Health and Safety* (ext. 3350/3246).

EMERGENCY RESPONSE PROCEDURES

In the event that emergency services are needed, the attendant shall summons the Berea Rescue Squad/Berea Fire Department. This should be coordinated with or through the Department of Public Safety. The attendant should be prepared to give the following information: location of confined space, nature of activity, condition of victim and facility. After rescue services have been summoned, the attendant shall watch for emergency vehicle(s) as long as he/she does not have to leave the immediate vicinity of the confined space area. The attendant shall not enter the confined space to assist in rescue.

TRAINING AND INFORMATION

Training: section 1910.146 (g) (2)

Training for entry of a permit required confined space will be given as follows;

1. Before the employees are first assigned duties under this section.
2. Before there is a change in assigned duties.
3. Whenever there is a change in permit space operations that present a hazard about which an employee has not previously been trained.

Proficiency of Training: section 1910.146 (g) (3)

Training shall establish employee proficiency in the duties required by this section and shall introduce new or revised procedures, as necessary, for compliance with this section.

Berea College shall retain all training records of completed employee training. These records shall be kept in duplicate at the Department of Environmental Health and Safety and the employees respective department.

Records of Training: section 1910.146 (g) (4)

All training records shall contain the following information;

1. Employee's name
2. Signature or initials of the trainer(s)
3. Dates of training

These records shall be made available to all Berea College employees and other authorized individuals.

Training under this section of the plan must cover the following:

- (a) Hazard recognition
- (b) Atmospheric testing equipment and methods
- (c) Placement of ventilation equipment
- (d) Lockout-tagout methods and procedures
- (e) Line isolation, breaking and blanking
- (f) Rescue procedures including first aid and CPR
- (g) Operation and use of communications equipment
- (h) Selection and use of personal protective equipment including self contained breathing apparatus
- (i) Selection and arrangement of barricades
- (j) Method of completing the entry permit
- (k) For general training in confined space entry, the use of video programs is recommended. Videos, however, cannot be used as the only training source: They must be used as supplemental information. Videos shall be previewed by management to ensure information is correct, accurate, and can be used as a supplemental training source.
- (l) Confined Space Entry Trainers for Berea College include: as well as other individuals chosen for their specific areas of expertise.
- (m) Management will identify all potential confined space entry areas. These areas are specifically listed by exact location in appendix #3. All employees who work may involve these areas must be educated on the known hazards associated and identified with these areas as well as other potential hazards that may be encountered.
- (n) All employees of Berea College who are involved in the Confined Space Entry Program will go through confined space entry training. Other individuals who have any contact with confined spaces will be identified and subject to training.
- (o) Confined Space Entry Trainers, when possible, will go through all equipment manufactures' training for each piece of equipment. Equipment manufactures' representatives also will train on-site individuals associated with the equipment used in their specific confined spaces. Otherwise, professional trainers holding certification in areas of expertise will provide training.
- (p) All Berea College employees involved with confined space entry will be trained in use of personal protective equipment (e.g., respirators, gloves, and eye protection...). Entry permits will list all approved equipment and confined space entrants, attendants, and entry supervisors.
- (q) All rescue team members will have proper training and be identified for each facility designated for each shift. For off-site selection of rescue teams, the employer shall assure the proficiency of the team and that it possesses the necessary training requirements.
- (r) In-house rescue teams will receive expert training for their specific needs.
- (s) All in-house rescue team members will receive CPR and first aid training.
- (t) All in-house rescue team members will receive training in rescue equipment.
- (u) Rescue procedures shall be explained to the confined space entry team and attached to the entry permits.
- (v) **NOTE:** As of current, Berea College does not utilize in-house rescue. The rescue team which is recognized and utilized for this program is the Berea Rescue Squad
- (w) Individuals who could be exposed to hazardous chemicals (such as ammonia, carbon dioxide, carbon monoxide, chlorine, and hydrogen sulfide) will be trained in potential dangers and appropriate emergency responses. Material Safety Data Sheets, if appropriate, will be part of this training and, when relevant, attached to the permit.

CONFINED SPACE ENTRY - EVALUATION FORM

Entry Date: _____ Entry Time: _____

Entry team Supervisor's Name: _____ Entry team Attendant's Name _____

Location of Work to be performed: _____

Reason for Entering Confined Space: _____

POTENTIAL HAZARDS

___ Corrosive Materials ___ Toxic Materials ___ Heat or Cold ___ Slip, Trip, Falls
___ Mechanical ___ Flammable Materials ___ Lack of Oxygen ___ Water
___ Live Energy Source ___ Inert Gases ___ Engulfment ___ Steam ___

Entrapment

___ Other hazards (list) _____

ATMOSPHERIC TESTING

Equipment Calibration Type and S/N Date Time Calibrated By
_____/_____/_____/_____/_____
_____/_____/_____/_____/_____

Atmospheric Testing Location: _____ By: _____ Date: _____

___ % Oxygen (19.5-23.5) ___ %LEL (<10%LEL) ___ Contaminant Concentration ___ Exposure (PEL,TLV) Time _____

___ % Oxygen (19.5-23.5) ___ %LEL (<10%LEL) ___ Contaminant Concentration ___ Exposure (PEL,TLV) Time _____

___ % Oxygen (19.5-23.5) ___ %LEL (<10%LEL) ___ Contaminant Concentration ___ Exposure (PEL,TLV) Time _____

___ % Oxygen (19.5-23.5) ___ %LEL (<10%LEL) ___ Contaminant Concentration ___ Exposure (PEL,TLV) Time _____

Atmospheric Testing Results Indicate: ___ Atmosphere is NOT Hazardous ___ Atmosphere is Hazardous

Hazard can be eliminated ___ Hazard Cannot be Eliminated ___ Space Occupied-Evacuation Initiated Time: _____ (Cancel Permit)

Team Supervisors signature: _____ Date: _____

Attendants signature: _____ Date: _____

Confined Space Entry Permit

Date and Time Issued: _____

Date and Time Expires: _____

Job site/Space I.D.: _____ **Entry Supervisor:** _____

Entrants: _____

Attendants: _____

Equipment to be worked on: _____

Work to be performed (purpose of entry): _____

Stand-by personnel: _____

The following acceptable entry conditions must exist before entry shall be made

1. Hazardous Atmosphere

> 19.5% O₂

< 23.5% O₂

< 10.0% LEL

< Acute PEL/TLV/MSDS

(atmospheric health hazards have to be acute - not chronic)

Combustible dusts that meets or exceeds its lower flammable limits

2. Control of all mechanical Hazards

3. Control of potential for engulfment of entrant

4. Heat/Cold (Thermal Extremes)

5. Control of any other safety or health hazards *that are dangerous to life and health*

Prior to entry, the atmosphere of the confined space shall be tested or otherwise evaluated, by an authorized person, with a recently calibrated instrument known to be functioning properly. If a change in the atmosphere is possible while work is being done, additional monitoring is required. (Continuous monitoring is recommended at all times employees are in the space.) All test results shall be recorded.

1. Atmospheric Checks: Time _____

Oxygen _____%

Explosive _____%L.F.L.

Toxic _____PPM

2. Tester's signature: _____

3. Source isolation (No Entry): N/A Yes No **4. Ventilation Modification:** N/A Yes No

Pumps or lines blinded, () () ()

Mechanical () () ()

disconnected, or blocked () () ()

Natural Ventilation only () () ()

5. Atmospheric check after isolation and Ventilation:

Oxygen _____% >19.5%
Explosive _____% L.F.L <10%
Toxic _____PPM <10 PPM H(2)S
Time _____
Testers signature: _____

6. Communication procedures: _____

7. Rescue procedures: _____

8. Entry, standby, and back up persons:
Successfully completed required training? Yes () No()
Is it current? Yes () No()

9. List all know hazards of the the space

10. Equipment:	N/A	Yes	No
(a) Direct reading gas monitor -tested	()	()	()
(b) Safety harnesses and lifelines	()	()	()
(c) for entry and standby persons	()	()	()
(d) Hoisting equipment	()	()	()
(e) Powered communications	()	()	()
(f) SCBA's for entry and standby	()	()	()
(g) persons	()	()	()
(h) Protective Clothing	()	()	()
(i) All electric equipment listed Class I, Division I, Group D and Non-sparking tools	()	()	()

11. Periodic atmospheric tests:

Oxygen	___%	Time ___	Oxygen	___%	Time ___
Oxygen	___%	Time ___	Oxygen	___%	Time ___
Explosive	___%	Time ___	Explosive	___%	Time ___
Explosive	___%	Time ___	Explosive	___%	Time ___
Toxic	___%	Time ___	Toxic	___%	Time ___
Toxic	___%	Time ___	Toxic	___%	Time ___

12.REQUIREMENTS COMPLETED	<u>DATE</u>	<u>TIME</u>	<u>BY</u>
Lock Out/Tag Out Energized Equipment	___	___	___
Lines(s) Broken-Capped-Blank	___	___	___
Purge-Flush and Vent	___	___	___
Ventilation	___	___	___
Secure Area (Post and Flag)	___	___	___
Breathing Apparatus	___	___	___
Resuscitator - Inhalator	___	___	___
Standby Safety Personnel	___	___	___
Full Body harness w/"D" ring	___	___	___
Emergency Escape Retrieval Equipment	___	___	___
Lifelines	___	___	___
Fire Extinguishers	___	___	___
Lighting (Explosion Proof)	___	___	___
Protective Clothing	___	___	___
Respirator(s) (Air Purifying)	___	___	___
Burning and Welding Permit	___	___	___

We have reviewed the work authorized by this permit and the information contained here-in. Written instructions and safety procedures have been received and are understood. Entry cannot be approved if any squares are marked in the "No" column. This permit is not valid unless all appropriate items are completed.

Permit Prepared By: (Supervisor) _____

Approved By: (Unit Supervisor) _____

Reviewed By (Cs Operations Personnel) :

(printed name)

(signature)

This permit to be kept at job site. Return job site copy to Safety Office following job completion.

Copies: *White Original* (Safety Office)/ *Yellow* (Unit Supervisor)/ *Hard*(Job site)

APPENDIX # 1C – Permit Entry System :Confined Space Reclassification Certification Form

Date Issued: _____ **Time**_____

Date reclassification Expires: _____ **Time**_____

Job site/Space I.D.: _____ **Job Supervisor**_____

Equipment to be worked on: _____

Work to be performed (purpose of entry): _____

Method of space recertification _____

Signature of person making the determination _____

Prepared By: (Supervisor) _____

Approved By: (Unit Supervisor) _____

Reviewed By (Cs Operations Personnel) :

(printed name)

(signature)

This copy to be kept at job site. Return job site copy to Safety Office following job completion.

Copies: White Original (Safety Office) /Yellow (Unit Supervisor)/ Hard(Job site)

APPENDIX #2 - Calibration and use of the PhD lite gas monitor

I. Auto Calibration

1. Turn the PhD lite on by pressing the *mode* button once; take the PhD lite to fresh air environment.
2. Once in a fresh air environment , press the *mode* button three times within two seconds to start the auto calibration, the display will read "Auto Cal Mode"
3. Press the *mode* button within the five-second-time interval given to activate the calibration.
4. **Span Calibration** After the fresh air calibration the display will read "Auto Span Cal". Press the *mode* button within the five-second-time interval to activate the Span Calibration.
5. The display will read "Apply Gas".
6. Attach the regulator to the to the calibration gas container, be sure that the valve is closed.
7. Attach the calibration adapter to the PhD lite then connect the adapter to the cylinder with a piece of tubing provided in the kit.
8. Open the valve to let the gas flow.
9. The PhD lite will display "Multi Cal Gas Detected".
10. The PhD lite will take a reading and recalibrate the sensors.
11. Once the calibration is complete the PhD lite will display "Begin SHUT DOWN Please Wait", and then the PhD shuts down.

Permit required confined spaces that have been identified by Berea College for the development of this document regulating entry activities include;

1. Steam pits

Facilities Management:

location:

- 1. Infant/Toddler Center Furnace Pit**
- 2. Seabury center air handlers**
- 3. Science Building air handling units**
- 4. Library air handling units**
- 5. Boone Tavern air handling unit**
- 6. Old flower shop crawl space**

Identification of Areas Cont.

Utilities:

Location (Campus Locations)

- 1. All Sanitary Sewers**
- 2. Utility pits: Electric**

Farms:

Location: Hunt Acres:

- 1. Grain elevators**
- 2. Silos**

Location: Dead Horse Knob

- 1. Silo**

APPENDIX #4A – Entry Procedures: Sewer Entry

Workplace: Sewers

Potential Hazards:

- Engulfment
- Presence of Toxic Gases equal to or more than 10 ppm hydrogen sulfide measured as an 8 hr time weighted average
- Presence of Explosive/Flammable gases
- Oxygen deficiency: concentration of atmospheric oxygen equal to or less than 19.5%

Acceptable Entry Conditions:

1. Hazardous Atmosphere

> 19.5% O₂

< 23.5% O₂

< 10.0% LEL

< Acute PEL/TLV/MSDS

(atmospheric health hazards have to be acute - not chronic)

Combustible dusts that meets or exceeds its lower flammable limits

Prior to entry, the atmosphere of the confined space shall be tested or otherwise evaluated, by an authorized person, with a recently calibrated instrument known to be functioning properly. If a change in the atmosphere is possible while work is being done, additional monitoring is required. (Continuous monitoring is recommended at all times employees are in the space.) All test results shall be recorded.

A hazardous atmosphere involves one or more of the following conditions. Unless the monitoring equipment allows for simultaneous readings, these conditions shall be evaluated in the order presented. (I.e., first test for percent by volume of oxygen).

An oxygen deficiency exists when test results indicate less than 19.5% oxygen.

2. An oxygen-enriched atmosphere is existing when test results indicate greater than 23.5% by volume.

3. Flammable gases or vapor concentration must be less than 10% of the lower explosive limit.

PERSONNEL MUST NOT ENTER AN EXPLOSIVE ATMOSPHERE UNDER ANY CONDITION.

4. Toxic gases or vapors must be less than the OSHA permissible exposure limit (PEL), the ACGIH threshold limit value (TLV), or other management-specified limits for hydrogensulfide, carbon monoxide, carbon dioxide, and any other toxic gases or vapors that might be present.

5. When there is an airborne combustible dust in the space, visibility must never be less than five (5) feet.

6. Any atmospheric condition recognized as immediately dangerous to life or health (IDLH).

2. Control of potential for engulfment of entrant

3. Heat/Cold (Thermal Extremes)

4. Control of any other safety or health hazards *that are dangerous to life and health*

APPENDIX #4B – Entry Procedures: Air Handlers

Workplace: Air Handlers

Potential Hazards:

- Electrical
- Mechanical

Acceptable Entry Conditions:

1. Hazardous Atmosphere

- > 19.5% O₂
- < 23.5% O₂
- < 10.0% LEL
- < Acute PEL/TLV/MSDS

(atmospheric health hazards have to be acute - not chronic)

Combustible dusts that meets or exceeds its lower flammable limits

Prior to entry, the atmosphere of the confined space shall be tested or otherwise evaluated, by an authorized person, with a recently calibrated instrument known to be functioning properly. If a change in the atmosphere is possible while work is being done, additional monitoring is required. (Continuous monitoring is recommended at all times employees are in the space.) All test results shall be recorded.

A hazardous atmosphere involves one or more of the following conditions. Unless the monitoring equipment allows for simultaneous readings, these conditions shall be evaluated in the order presented. (I.e., first test for percent by volume of oxygen).

An oxygen deficiency exists when test results indicate less than 19.5% oxygen.

2. An oxygen-enriched atmosphere is existing when test results indicate greater than 23.5% by volume.

3. Flammable gases or vapor concentration must be less than 10% of the lower explosive limit.

PERSONNEL MUST NOT ENTER AN EXPLOSIVE ATMOSPHERE UNDER ANY CONDITION.

4. Toxic gases or vapors must be less than the OSHA permissible exposure limit (PEL), the ACGIH threshold limit value (TLV), or other management-specified limits for hydrogen sulfide, carbon monoxide, carbon dioxide, and any other toxic gases or vapors that might be present.

5. When there is an airborne combustible dust in the space, visibility must never be less than five (5) feet.

6. Any atmospheric condition recognized as immediately dangerous to life or health (IDLH).

2. Control of all mechanical Hazards

3. Heat/Cold (Thermal Extremes)

4. Control of any other safety or health hazards *that are dangerous to life and health*

APPENDIX #4C – Entry Procedures: Crawl Spaces

Workplace: Crawl Spaces

Potential Hazards:

- (x) Electrical
- (y) Steam

Acceptable Entry Conditions:

1. Hazardous Atmosphere

- > 19.5% O₂

< 23.5% O₂

< 10.0% LEL

< Acute PEL/TLV/MSDS

(atmospheric health hazards have to be acute - not chronic)

Combustible dusts that meets or exceeds its lower flammable limit

2. Control of all mechanical Hazards

- **Steam lines should be blanked out or turned off**

3. Control of potential for engulfment of entrant

4. Heat/Cold (Thermal Extremes)

5. Control of any other safety or health hazards *that are dangerous to life and health*

APPENDIX #4D – Entry Procedures: Utilities Pits

Workplace: Utilities Pits

Potential Hazards:

- Presence of Toxic Gases equal to or more than 10 ppm hydrogen sulfide measured as an 8 hr time weighted average
- Presence of Explosive/Flammable gases
- Oxygen deficiency: concentration of atmospheric oxygen equal to or less than 19.5%

Acceptable Entry Conditions

1. Hazardous Atmosphere

> 19.5% O₂

< 23.5% O₂

< 10.0% LEL

< Acute PEL/TLV/MSDS

(atmospheric health hazards have to be acute - not chronic)

Combustible dusts that meets or exceeds its lower flammable limits

Prior to entry, the atmosphere of the confined space shall be tested or otherwise evaluated, by an authorized person, with a recently calibrated instrument known to be functioning properly. If a change in the atmosphere is possible while work is being done, additional monitoring is required. (Continuous monitoring is recommended at all times employees are in the space.) All test results shall be recorded.

A hazardous atmosphere involves one or more of the following conditions. Unless the monitoring equipment allows for simultaneous readings, these conditions shall be evaluated in the order presented. (I.e., first test for percent by volume of oxygen).

An oxygen deficiency exists when test results indicate less than 19.5% oxygen.

(z) An oxygen-enriched atmosphere is existing when test results indicate greater than 23.5% by volume.

(aa) Flammable gases or vapor concentration must be less than 10% of the lower explosive limit. **PERSONNEL MUST NOT ENTER AN EXPLOSIVE ATMOSPHERE UNDER ANY CONDITION.**

(bb) Toxic gases or vapors must be less than the OSHA permissible exposure limit (PEL), the ACGIH threshold limit value (TLV), or other management-specified limits for hydrogensulfide, carbon monoxide, carbon dioxide, and any other toxic gases or vapors that might be present.

(cc) When there is an airborne combustible dust in the space, visibility must never be less than five (5) feet.

(dd) Any atmospheric condition recognized as immediately dangerous to life or health (IDLH).

2. Control of all mechanical Hazards

3. Control of potential for engulfment of entrant

4. Heat/Cold (Thermal Extremes)

5. Control of any other safety or health hazards *that are dangerous to life and health*

APPENDIX #4E – Entry Procedures: Grain Bins

Workplace: Grain Bins & Elevators

Potential Hazards:

- **Oxygen deficiency: concentration of atmospheric oxygen equal to or less than 19.5%**
- **Engulfment by material**

Acceptable Entry Conditions:

1. Hazardous Atmosphere

> 19.5% O₂

< 23.5% O₂

< 10.0% LEL

< Acute PEL/TLV/MSDS

(atmospheric health hazards have to be acute - not chronic)

Combustible dusts that meets or exceeds its lower flammable limits

Prior to entry, the atmosphere of the confined space shall be tested or otherwise evaluated, by an authorized person, with a recently calibrated instrument known to be functioning properly. If a change in the atmosphere is possible while work is being done, additional monitoring is required. (Continuous monitoring is recommended at all times employees are in the space.) All test results shall be recorded.

A hazardous atmosphere involves one or more of the following conditions. Unless the monitoring equipment allows for simultaneous readings, these conditions shall be evaluated in the order presented. (I.e., first test for percent by volume of oxygen).

An oxygen deficiency exists when test results indicate less than 19.5% oxygen.

2. An oxygen-enriched atmosphere is existing when test results indicate greater than 23.5% by volume.

3. Flammable gases or vapor concentration must be less than 10% of the lower explosive limit.

PERSONNEL MUST NOT ENTER AN EXPLOSIVE ATMOSPHERE UNDER ANY CONDITION.

4. Toxic gases or vapors must be less than the OSHA permissible exposure limit (PEL), the ACGIH threshold limit value (TLV), or other management-specified limits for hydrogen sulfide, carbon monoxide, carbon dioxide, and any other toxic gases or vapors that might be present.

5. When there is an airborne combustible dust in the space, visibility must never be less than five (5) feet.

6. Any atmospheric condition recognized as immediately dangerous to life or health (IDLH).

- **Control of all mechanical Hazards**
- **Control of potential for engulfment of entrant**
- **Heat/Cold (Thermal Extremes)**
- **Control of any other safety or health hazards *that are dangerous to life and health***

APPENDIX #4F – Entry Procedures: Water Main Pit

Workplace: Water Main Pit

Potential Hazards:

- Atmospheric
- Potential Oxygen deficiency: concentration of atmospheric oxygen equal to or less than 19.5%

Acceptable Entry Conditions:

1. Hazardous Atmosphere

> 19.5% O₂

< 23.5% O₂

< 10.0% LEL

< Acute PEL/TLV/MSDS

(Atmospheric health hazards have to be acute - not chronic)

Combustible dusts that meets or exceeds its lower flammable limits

Prior to entry, the atmosphere of the confined space shall be tested or otherwise evaluated, by an authorized person, with a recently calibrated instrument known to be functioning properly. If a change in the atmosphere is possible while work is being done, additional monitoring is required. (Continuous monitoring is recommended at all times employees are in the space.) All test results shall be recorded.

A hazardous atmosphere involves one or more of the following conditions. Unless the monitoring equipment allows for simultaneous readings, these conditions shall be evaluated in the order presented. (I.e., first test for percent by volume of oxygen).

An oxygen deficiency exists when test results indicate less than 19.5% oxygen.

2. An oxygen-enriched atmosphere is existing when test results indicate greater than 23.5% by volume.

3. Flammable gases or vapor concentration must be less than 10% of the lower explosive limit.

PERSONNEL MUST NOT ENTER AN EXPLOSIVE ATMOSPHERE UNDER ANY CONDITION.

4. Toxic gases or vapors must be less than the OSHA permissible exposure limit (PEL), the ACGIH threshold limit value (TLV), or other management-specified limits for hydrogen sulfide, carbon monoxide, carbon dioxide, and any other toxic gases or vapors that might be present.

5. When there is an airborne combustible dust in the space, visibility must never be less than five (5) feet.

6. Any atmospheric condition recognized as immediately dangerous to life or health (IDLH).

- Control of all mechanical Hazards
- Control of potential for engulfment of entrant
- Heat/Cold (Thermal Extremes)
- Control of any other safety or health hazards *that are dangerous to life and health*

APPENDIX #4G– Entry Procedures: Storm water Runoff pits

Workplace: Storm Water Run off pits

Potential Hazards:

- Atmospheric
- Potential Oxygen deficiency: concentration of atmospheric oxygen equal to or less than 19.5%
- Configuration

Acceptable Entry Conditions:

1. Hazardous Atmosphere

> 19.5% O₂

< 23.5% O₂

< 10.0% LEL

< Acute PEL/TLV/MSDS

(Atmospheric health hazards have to be acute - not chronic)

Combustible dusts that meets or exceeds its lower flammable limits

Prior to entry, the atmosphere of the confined space shall be tested or otherwise evaluated, by an authorized person, with a recently calibrated instrument known to be functioning properly. If a change in the atmosphere is possible while work is being done, additional monitoring is required. (Continuous monitoring is recommended at all times employees are in the space.) All test results shall be recorded.

A hazardous atmosphere involves one or more of the following conditions. Unless the monitoring equipment allows for simultaneous readings, these conditions shall be evaluated in the order presented. (I.e., first test for percent by volume of oxygen).

An oxygen deficiency exists when test results indicate less than 19.5% oxygen.

2. An oxygen-enriched atmosphere is existing when test results indicate greater than 23.5% by volume.

3. Flammable gases or vapor concentration must be less than 10% of the lower explosive limit.

PERSONNEL MUST NOT ENTER AN EXPLOSIVE ATMOSPHERE UNDER ANY CONDITION.

4. Toxic gases or vapors must be less than the OSHA permissible exposure limit (PEL), the ACGIH threshold limit value (TLV), or other management-specified limits for hydrogensulfide, carbon monoxide, carbon dioxide, and any other toxic gases or vapors that might be present.

5. When there is an airborne combustible dust in the space, visibility must never be less than five (5) feet.

6. Any atmospheric condition recognized as immediately dangerous to life or health (IDLH).

- Control of all mechanical Hazards
- Control of potential for engulfment of entrant
- Heat/Cold (Thermal Extremes)
- Control of any other safety or health hazards *that are dangerous to life and health*

APPENDIX #5: CONTRACTOR ENTRY

When a contractor is expected to perform work in a confined space, EHS will inform the contractor if the space is considered a permit required confined space. The contractor will be advised of the elements that make the space a permit required confined space and the associated hazards. The contractor will also be advised of any safety provisions that may be in the area, including these written procedures. The contractor will be required to contact an entry authorizer at the completion of the entry to debrief with an authorizer on any hazards confronted or created during the entry.

to be followed if an employee is injured while working in a confined space.

1. On CAMPUS the authorized attendant shall call Customer Service and give details as to the nature of the hazard, location, injuries, and other problems.
2. Customer Service shall immediately:
 - * Notify the local Fire department.
 - * Notify Environmental Health and Safety.
 - * Notify the Entry Supervisor/Authorizer.
4. If the work in the Confined Space is not on the main campus then arrangements will need to be made for rescue and this information will be included on the permit.

PRE-ENTRY PROCEDURES

to be implemented before entry into a permit required confined space:

1. No one shall enter a permit required confined space without having the proper annual training and obtaining a signed permit from an entry authorizer.
 2. **OBTAIN ENTRY PERMIT:** The entry permit is designed to ensure that a checklist of necessary precautions is taken before entry is made. Copies of the permit form are kept in the Facilities Services Tool Room or are available through EH&S. The following items are included on the OSU confined space entry permit forms. (Appendix A)
 1. Dates, location, job description, and entry supervisor/authorizer signature.
 2. Date and time of instrument test.
 3. The requirement to block and bleed all pipes and lines carrying hazardous material.
 4. Additional approval if welding is to be performed.
 5. Recording of periodic atmospheric tests.
 6. Obtain the following items before entry.
 - (a) Entry permit form
 - (b) Air monitoring equipment
 - (c) Ventilation equipment and power supply
 - (d) Arrange for authorized attendant and communication equipment.
 - (e) Barricades, if needed
 - (f) Rescue Equipment
 - (g) Perform the initial monitoring evaluation.
 1. Determine potential hazards in the confined space atmosphere.
 2. Test, with the appropriate device or method to determine whether dangerous air contamination and/or oxygen deficiency exists. (EH&S may be contacted to assist with the test.)
 3. Record readings on the entry permit form.
- If unacceptable readings and/or alarms are activated during any monitoring tests, it is an indication that the atmosphere is contaminated and unsafe for employee entry. **DO NOT**

ENTER THE SPACE-contact EH&S. The source of the contamination will be investigated and eliminated before any work is performed.

4. Purging and ventilation.

- 1. The space shall be emptied, flushed, or purged of flammable, injurious, or incapacitating substance with fresh air to the extent feasible.**
- 2. Venting with fresh air will continue as long as employee is working in the confined space.**
- 3. The air shall be monitored continuously to ensure that the development of dangerous air contamination and/or oxygen deficiency does not occur during the performance of any operation.**