

VERSION 1.0

JULY 1, 2018



UNC CHARLOTTE

*Environmental Health and Safety*

# CONFINED SPACE ENTRY PROGRAM

UNC CHARLOTTE  
9201 UNIVERSITY CITY BLVD. CHARLOTTE, NC 28223

# Table of Contents

<b>I. Purpose .....</b>	<b>3</b>
<b>II. Scope.....</b>	<b>3</b>
<b>III. Definitions .....</b>	<b>3</b>
<b>IV. Program Responsibilities.....</b>	<b>7</b>
<b>V. Potential Hazards.....</b>	<b>9</b>
<b>VI. General Requirements.....</b>	<b>12</b>
<b>VII. Training .....</b>	<b>12</b>
<b>VIII. Rescue and Emergency Services .....</b>	<b>13</b>
<b>IX. Permit Required Confined Spaces.....</b>	<b>14</b>
<b>APPENDIX A – Summary of Confined Space Entry Permits .....</b>	<b>19</b>
<b>APPENDIX B – Entry Permit Content Requirements .....</b>	<b>20</b>
<b>APPENDIX C – Confined Space Field Insepction Form .....</b>	<b>21</b>
<b>APPENDIX D – Atmospheric Testing Procedures.....</b>	<b>24</b>

## **I. Purpose**

The purpose of the UNC Charlotte Confined Space Program is to define procedures that ensure workers safe entry into confined spaces to perform routine tasks associated with their employment. This procedure is designed to provide the minimum safety requirements in accordance with the Occupational Safety and Health Administration's (OSHA) Confined Space Standard, 1910.146.

## **II. Scope**

This standard applies to any operation that requires employees, inspectors, or contractors to enter and/or work inside any permit-required confined space. Examples include manholes, sewers, sumps, vaults, vats, pits, tunnels, tanks, or similar confined spaces.

The OSHA Confined Space definition:

- A. A space that is large enough and so configured that an employee can bodily enter and perform assigned work
- B. A space that has limited means for entry or exit
- C. A space that is not designed for continuous employee occupancy.

No confined space shall be entered until adequate precautions have been taken to ensure the safety of the entrant(s) and their work environment.

The OSHA Permit Required Confined Space (entry by permit only) means a confined space that has one or more of the following characteristics:

- A. Contains or has the potential to contain a hazardous atmosphere
- B. Contains a material that has the potential for engulfing an entrant
- 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
- D. Contains any other recognized serious safety or health hazard.

See Section IX for more information on Permit Required Confined Spaces.

## **III. Definitions**

- A. Acceptable Entry Conditions

The conditions that must exist in a permit space to allow employees to enter and work within the space.

B. Attendant

An individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties.

C. Authorized Entrant

An employee who is authorized by the employer to enter a permit space.

D. Blanking or Blinding

The absolute closure of a pipe, line or duct by the fastening of a solid plate that completely covers the bore and is capable of withstanding the maximum pressure with no leakage.

E. Bump Testing

Functional (bump) testing, a means of verifying by using a known concentration of test gas to ensure acceptable performance of sensors and monitor before use.

F. Confined Space

A space that:

1. Is large enough that an employee can bodily enter and perform assigned work
2. Has limited means for entry or exit
3. Is not designed for continuous employee occupancy

G. Double Block and Bleed

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 the two closed valves.

H. Emergency

Any occurrence (including any failure of hazard control or monitoring equipment) or events internal or external to the permit space which could endanger entrants.

I. Engulfment

The surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance.

#### J. Entry

The action by which a person passes through an opening into a permit- required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

#### K. Entry Permit (permit)

The written or printed document that is provided by the employer to allow and control entry into a permit space.

#### L. Entry Supervisor

The person responsible (such as the employer, foreman, or crew chief) 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 as required by this standard.

#### M. Hazardous Atmosphere

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

1. A flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit LFL
2. An airborne combustible dust at a concentration that meets or exceeds its LFL; (This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet or less)
3. An atmospheric oxygen concentration below 19.5 percent or above 23.5 percent
4. Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in 29 CFR 1910 Subpart Z- Toxic and Hazardous Substances, which could result in employee exposure in excess of its dose or permissible exposure limit
5. Any other atmospheric condition that is immediately dangerous to life or health

#### N. Hot Work Permit

The employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

O. Immediately Dangerous to Life or Health (IDLH)

Any condition which 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.

P. Inerting

The displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible. (Note: This procedure produces an IDLH oxygen-deficient atmosphere).

Q. Isolation

The process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

R. Line Breaking

The intentional opening of a pipe, line or duct that is or has been carrying flammable, corrosive or toxic materials, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

S. 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.

T. Oxygen Deficient Atmosphere

An atmosphere containing less than 19.5 percent oxygen by volume.

U. Oxygen Enriched Atmosphere

An atmosphere containing more than 23.5 percent oxygen by volume.

V. Permit-required Confined Space (Permit Space)

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

1. Contains or has the potential to contain a hazardous atmosphere
2. Contains a material that has the potential for engulfing an entrant

3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section
4. Contains any other recognized serious safety or health hazard

W. Permit-required Confined Space Program (Permit Space Program)

The employer's overall program for controlling, and, where appropriate, for protecting employees from, permit space hazards and for regulating employee entry into permit spaces.

X. Permit System

The employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

Y. Prohibited Condition

Any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

Z. Rescue Service

The personnel designated to rescue employees from permit spaces.

AA. Retrieval System

The equipment (including a retrieval line, chest or full body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

BB. Testing

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.

#### **IV. Program Responsibilities**

A. Environmental Health and Safety Office (EHS)

1. Serves as primary resource and contact on confined space issues.
2. Maintains, revises, and distributes this program to appropriate campus departments.
3. Assists in the evaluation and identification of confined spaces.

4. Oversees field calibration of atmospheric monitoring equipment used for confined space entry work.
5. Performs any additional specialty air monitoring or testing.
6. Develops and assists with conducting confined space training.

B. Entry Supervisors

1. Should be the supervisor or team leader of the department.
2. Recognizes hazards that may be faced during entry and determines if acceptable entry conditions are present at a permit space where entry is planned.
3. Verifies the permit information to ensure all tests and requirements are in place.
4. Signs permit and allows entry into space.
5. Terminates the entry and cancels permit when appropriate.
6. Verifies rescue services are available and communication system is functioning.
7. Removes unauthorized entrants.

C. Entry Attendants

1. Receive confined space training to safely observe and support entrants from outside of confined spaces.
2. Prevent entry by unauthorized personnel.
3. Understand the hazards or potential hazards of confined spaces and is aware of possible behavioral effects of hazard exposure.
4. Inform authorized entrant(s) to evacuate when conditions become unacceptable.
5. Remains outside of permit space and communicates with entrants.
6. Monitors activities inside and outside of space including the atmosphere.
7. Perform non-entry rescues.
8. Summons rescue and emergency services.
9. Performs no other duties that would interfere with their primary duty.

D. Authorized Entrants

Entrants make actual entries into confined spaces and have been trained and authorized to:

1. Understand confined space hazards.
2. Use personal protective equipment, entry tools, and supplies.
3. Follow proper entry procedures and perform assigned job tasks.
4. Communicate with attendant.
5. Evacuate space immediately, if necessary.

Entrants shall exit the permitted space whenever:

1. Ordered by attendant or entry supervisor.
2. Entrant recognizes warning signs or symptoms of danger.
3. Entrant detects prohibited condition.
4. Evacuation alarms are activated.
5. Attendant has to leave his/her monitoring location for any reason.

## **V. Potential Hazards**

### **A. Oxygen Deficiency**

Atmospheres containing less than 19.5% oxygen are considered to be oxygen deficient. Normal breathing air contains 20.9% oxygen. Atmospheres with more than 23.5% oxygen are oxygen enriched and are immediately dangerous to life and health (IDLH).

Some of the more common causes of oxygen deficiency are:

1. Oxidation of metals (rusting)
2. Bacterial action in sewers, which consumes oxygen and produces carbon dioxide and hydrogen sulfide
3. Fuel combustion which uses oxygen and produces carbon monoxide
4. Displacement by other heavier gases, such as argon

### **B. Combustible Gases and Vapors**

These hazards are naturally occurring gases (natural gas) and the vapors of a large group of liquids which are used as fuels and solvents. Some of these liquids vaporize easily when placed in open air. Both gases and vapors may burn or explode when mixed with the required amount of air and an ignition source.

1. Many combustible & flammable gases/vapors are heavier than air and will flow down to the lowest point of a pit, tank, or opening in a confined area while other gases may be lighter than air and collect at the top of the space.
2. Many of these combustible gases/vapors are also toxic such as petroleum solvent vapors (paint thinner, gasoline, lacquer thinner) when they are concentrated in a confined space without adequate ventilation.

### **C. Toxic Atmospheres**

Gases and vapors which are known to produce disease, acute discomfort, bodily injury or death are atmospheric toxins. The two main classifications of gases found in these atmospheres are irritants and asphyxiants.

1. Irritants

Gases which are irritating to the respiratory and nervous system at low levels and may cause death at higher levels. An example is hydrogen sulfide which can occur naturally or as a by-product of natural decomposition of organic material.

## 2. Asphyxiants

These are gases which cause asphyxiation by displacing the oxygen in the atmosphere or by chemically interacting with respiratory mechanisms in the body. Three common examples are methane, hydrogen sulfide (sewer gas), and carbon monoxide. Methane and hydrogen sulfide is often encountered in sewers, storage bins, and tunnels. Carbon monoxide is the common toxic product of combustion.

## D. General Safety Hazards

### 1. Mechanical and Electrical

De-energization of mechanical and electrical systems must be completed to eliminate these hazards before entry into a confined space by an entrant. Special precautions must be taken to ensure that static electricity or other ignition sources are disconnected and other mechanical hazards are protected.

### 2. Communication Problems

When visual monitoring of the worker is not possible, two-way radio is necessary to ensure communication between the entrant and the attendant.

### 3. Entry and Exit

Entry and exit time is a major factor because of physical limitations. These spaces can force employees to work in positions that are hard on the body.

### 4. Physical

Physical hazards include thermal effects, noise, vibration, slick/wet surfaces, rotation, fatigue, engulfment, and falling objects.

- a. Thermal factors are air temperature, radiant heat exchange, and air movement. If the space is hot with a large amount of residual heat, such as a boiler or steam manhole, it must be allowed to cool before any entry. Allow boilers at least 3 days to cool before attempting entry into the various

compartments. Allow steam manholes enough time to cool and reach zero pressure on steam supply and condensate return lines before entry. Monitor entrants for signs of heat stress when entry is made into hot environments. To protect workers from heat stress/stroke, institute work-rest procedures to 15 minutes of work in a hot enclosed space.

- b. Operations that generate vibrations also produce noise which may further interfere with communication and generate static electricity which could provide a source of ignition in atmospheres with flammable or combustible vapors.
- c. Rotational hazards, such as electric motor shafts, fan belts, fan blades and blower squirrel cages pose physical hazards to entrants that must be controlled by de-energization (lockout/tagout) before entry into a confined space.
- d. Slick/wet Surfaces - Aside from slip and fall hazards, a wet surface will increase the likelihood for electric shock in areas where electrical circuits, equipment, and tools are used.
- e. Fatigue - Work/rest cycles should be determined prior to entry based upon temperature, humidity level and space limitations and modified as required.
- f. Engulfment hazards exist where a worker is surrounded by granular substances such as soil, gravel, or sand or potentially submerged in a liquid such as water or chemicals. Engulfment can cause physical harm by constriction, crushing, strangulation, or suffocation.
- g. Electrical Hazards- Confined spaces may also present electrical shock or electrocution hazards from potentially defective cables, the presence of water (flooded vault) in contact with electrical wiring, or by accidental physical contact with charged cables or wire leads. Employees are cautioned **NOT TO ENTER THE SPACE** if an electrical shock potential is identified.
- h. Lighting – the ability to see is often an important part of getting the work done. However, overhead lighting is not typically installed in these spaces so it has to be planned for when entering these spaces. Also, not every light source is certified for a confined space environment. If entering a

flammable atmosphere, any unapproved electrical lighting sources could have unprotected circuitry.

- i. Lockout/Tagout (LO/TO)– proper lockout/tagout and hazardous energy control procedures should be followed when workers are in confined spaces.

## **VI. General Requirements**

- A. Work areas have been evaluated to determine if they meet the definition of OSHA confined spaces. Additionally, confined spaces that meet the definition of permit-required confined spaces have been designated and specific entry permits have been drafted.
- B. Permit-required confined spaces are identified and employees are informed of their existence, location, and danger by posting “Danger – Permit Required Confined Space” signs.
- C. A written Permit-Required Confined Space program is used (See Section IX. Permit Required Confined Spaces).
- D. Entry permits are issued for each entry into a permit required confined space. (See **Appendix A- Summary of Confined Space Entry Permits** and **Appendix B - Entry Permit Content Requirements** for information on each permit.)
- E. When there are changes in the use, risk/hazard level or configuration of a non-permit or permit required confined space, it will be re-evaluated and reclassified as appropriate.
- F. When outside contractors are involved in permit confined space entry, the contractor will follow the confined space entry requirements described in the University Contractor Safety Program. The contractor should be in close contact with their designated UNC Charlotte Project Manager to ensure that they are in compliance with the Contractor Safety Program. Both confined space programs must be coordinated to comply with 29 CFR 1910.146 and the UNC Charlotte Confined Space Entry Program.

## **VII. Training**

- A. Training is provided to ensure understanding, knowledge, and skills are developed for assigned duties.
- B. Training is provided:
  1. Before initial assignment.

2. When there is a change in confined space entry requirements.
  3. When inappropriate deviations in program have been identified or employee knowledge levels indicate that additional training is warranted.
  4. Whenever the employer has reason to believe that there are deviations from the permit space entry procedures or that there are inadequacies in the employee's knowledge or use of these procedures.
- C. Employees must establish proficiency in duties assigned.
- D. Certification of training includes trainee names, date of-training and trainer's signature.

## **VIII. Rescue and Emergency Services**

- A. Charlotte Fire Department (CFD) provides rescue and emergency services.
1. CFD must be informed of potential confined space hazards involved in rescue.
  2. Access must be provided to all permit-required spaces for fire department/rescue team training purposes.
  3. Rescue team must be trained, equipped for, and proficient in performing the needed rescue services.
- B. To facilitate non-entry vertical rescues, retrieval systems must be used for authorized entrants, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant.
1. Each entrant shall use a body harness with a retrieval line attached.
  2. The other end of the retrieval line shall be attached to a mechanical device for any vertical permit-required space more than 5 feet deep.
  3. Contact the Environmental Health and Safety Office (EHS) for guidance in situations where the use of a body harness, retrieval line and mechanical device could endanger the employee.
- C. If exposure occurs to a substance for which a Safety Data Sheet (SDS) is required, the SDS must be provided to the medical facility.

## IX. Permit Required Confined Spaces

### A. Prevent Unauthorized Confined Space Entry

As outlined in each permit-required confined space permit, precautions such as cordoning/barricading the work area to prevent entry from students and other pedestrians must be employed to prevent unauthorized entry. [Confined Space Permits](#)

### B. Identify and Evaluate Hazards Before Entry

A summary sheet of all permit required confined spaces has been completed. If an additional permit required confined space is identified, please contact EHS before entry. [Confined Space Summary Sheet](#)

### C. Safe Permit Entry Operations include:

1. Ensuring all attendants, entrants and entry supervisors have received the appropriate level of training to perform their duties.
2. Obtain a permit for the type of permit required confined space.
3. Ensure all the mandatory equipment has been inspected, in good working order, and listed on the permit. This includes personal protective equipment (PPE). If additional PPE is needed for a specific job but is not listed on the permit, be sure to acquire it to provide the necessary protection.
4. Ensure work area is properly barricaded to prevent unauthorized entry.
5. The entry supervisor and/or entrant should complete items 1-12 on the entry permit. Special precautions should be administered before opening a confined space, especially manhole covers. This includes but is not limited to eliminating any hazards and guarding the opening (standard guardrail, temporary cover, etc.). The entry supervisor should review all information and certify accuracy by signing the entry permit and posting it at the job site.
6. The attendant, entrant and entry supervisor should pay particular attention to atmospheric testing using the multi-gas meter (See **Appendix D – Atmospheric Testing Procedures**), purging, inserting, flushing, lockout/tagout and/or ventilating the permit space as necessary to control the hazards. Please note continuous forced air ventilation shall be used, as follows:
  - a. If a hazardous atmosphere is detected by the multi-gas meter, an employee may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere.
  - b. The air ventilation shall be so directed as to ventilate the immediate areas where an employee is or will be present

within the space and shall continue until all employees have left the space.

- c. The air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space.

- 7. Once all precautionary measures have been taken and conditions are acceptable for entry, the authorized entrant may enter the confined space.

The permit must be canceled after work has been completed not to exceed 24 hours. The entry supervisor may cancel the permit by indicating the expiration date/time on the permit. A copy of the canceled permit must be forwarded to the EHS Office.

- D. The following equipment may be mandatory depending on the specific confined space to be entered:

- 1. Air testing and monitoring equipment
- 2. Ventilating equipment
- 3. Communications equipment
- 4. Personal protective equipment where engineering and work practice controls are insufficient
- 5. Adequate lighting equipment
- 6. Barriers and shields
- 7. Equipment for safe ingress and egress
- 8. Rescue and emergency service equipment
- 9. Body harness

- E. Equipment Maintenance and Calibration

Each department that is enrolled in this program is responsible for maintaining confined space equipment and ensuring that the equipment is properly operating prior to each use.

For atmospheric testing, multi-gas meters must be “bump tested” before each use and calibrated per the manufacturer’s instruction. Functional bump testing is a means of verifying by using a known concentration of test gas to ensure acceptable performance of sensors and monitor before use.

In order to ensure consistency across campus, the EHS office will conduct field calibrations per the manufacturer’s guidelines.

- F. Evaluation of Permit Space Conditions
1. Pre-entry testing for acceptable entry conditions is required before entry, and periodic testing is required for the duration of the operation.
  2. Where it is not feasible to isolate the space (as in sewers), continuous monitoring is required.
  3. Tests for atmospheric hazards require testing in this order (1) oxygen, (2) combustible gases and vapors, and (3) toxic gases and vapors.
- G. One attendant is required outside the permit space for the duration of entry operations. Please contact the EHS office if multiple spaces and/or entrants need to be monitored by one attendant.
- H. Duties are established and training is provided for all participants.
- I. Rescue and emergency services are provided by Charlotte Fire Department (CFD) only. The attendant will be in radio contact with Campus Police who will summon CFD.
- J. Entry operations follow the coordinated entry provisions when contractors or other employers are involved.
- K. A Permit-Required Confined Space Program Review is conducted:
1. At least annually
  2. Whenever there is reason to believe deficiencies may exist.
- L. A mandatory entry permit system is used for all permit-required confined space entries.
1. An entry permit must be completed prior to entry authorization and must be signed by the identified entry supervisor.
  2. The permit must be available at all times to authorized entrants at or near the point of entry.
  3. The permit may not exceed the time required to complete the assigned task. **Permits are valid for a maximum 24-hour period.**
  4. The entry supervisor will terminate entry and cancel the permit when:
    - a. Entry operations have been completed or
    - b. A condition not allowed by the permit arises.

5. Canceled Permits must be retained for at least 1 year by the issuing department to facilitate program review. A copy of the cancelled permits is to be forwarded to the EHS Office.
- M. Supervisors can use **Appendix C- Confined Space Field Inspection Form** with their employees to evaluate the effectiveness of the Confined Space Program. This inspection can be used as a training session as well as an indicator if employees are properly complying with the program.

# **APPENDICES**

## **APPENDIX A – Summary of Confined Space Entry Permits**

[Air Handlers](#)

[Boiler Entry Operations](#)

[Burson Roof Monitors](#)

[CAB Dining Hall Crawl Space](#)

[Cooling Towers](#)

[Diesel and Fuel Oil Tanks](#)

[Dust Collectors and Cyclones](#)

[Electrical Manholes](#)

[Electrical Vaults](#)

[Mechanical Sumps and Pits](#)

[Sanitary and Stormwater Pump Lift Stations](#)

[Sanitary Sewer Manholes](#)

[Steam Manholes](#)

[Stormwater/Greywater Manholes](#)

[Telecommunication Manholes](#)

## **APPENDIX B – Entry Permit Content Requirements**

The UNC Charlotte Confined Space Entry Permits identify the items below by permit section:

1. The permit space to be entered
2. The work to be performed
3. The date and time of permit issuance
4. The hazards of the permitted space
5. Additional permits or forms required for entry
6. Equipment required for entry/work in the confined space
7. Communication method used by attendants and entrants
8. Confined space rescue details
9. Authorized Entrants
10. Authorized Attendants
11. Preparation for entry requirements
12. Atmospheric testing – recording of acceptable conditions
13. Entry supervisor authorization
14. Permit cancellation

## APPENDIX C – Confined Space Field Insepction Form

Type of Confined Space: \_\_\_\_\_

Location: \_\_\_\_\_ Department: \_\_\_\_\_

Audit Date: \_\_\_\_\_ Auditor(s): \_\_\_\_\_

Instructions: Supervisor must use this form to assess a confined space entry:

1. Review each applicable question with confined space personnel and check corresponding Yes, No and/or Not Applicable (N/A) boxes.
2. Please include any notes in the notes/comments section of form.
3. The supervisor must review this form and his/her observations with all confined space authorized employees and have them sign the attendance form and send in a copy to EHS.

<i>Please answer the following questions.</i>	<i>Yes</i>	<i>No</i>	<i>N/A</i>	<i>Notes / Comments / Corrective Actions</i>
Is this a confined space?				
Are open holes or areas properly barricaded?				
Is access for entry and egress adequate?				
Is a multi-gas meter being used to monitor atmosphere within the space?				
Is the calibration on the multi-gas meter current?				
Have all proper Lockout/Tagout procedures been followed?				
Retrieval device/harnesses in place to remove entrant's in the event of an emergency?				
Is forced air ventilation being used to ventilate space?				
<b>Permit</b>				
Is the permit required form filled out correctly and properly signed?				
Is the permit posted at the entry site?				
<b>Attendant</b>				
Is there an Attendant at the site?				

<b>Please answer the following questions</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>Notes / Comments / Corrective Actions</b>
<b>Attendant Continued</b>				
Is the attendant aware of the hazards the entrant is exposed to?				
Is the attendant aware of the possible behavioral effects of hazard exposure to the entrant?				
Is the attendant aware of the number of entrants in the confined space?				
Does the attendant know what to do if an unauthorized person tries to enter the confined space?				
Does the Attendant know who the Entry Supervisor is?				
What type of communication is in place between the Attendant and the Entrant?				
Does the Attendant know the procedure to follow if he/she needs to leave the confined space area?				
Does the Attendant have a means of immediate communication to summon help if necessary?				
Does the Attendant know the requirements if the Attendant is to leave the area?				
<b>Entrant</b>				
Is the Entrant familiar with the hazards in the confined space?				
Does the Entrant know the method of communication with the Attendant?				
Is the Entrant wearing rescue equipment?				
Does the Entrant know he/she is to follow the direction of the Attendant or Entry Supervisor?				
<b>Contractors</b>				
Are the Contractors aware of the UNC Charlotte Contractor Safety Program?				
<b>Additional Comments:</b>				



## APPENDIX D – Atmospheric Testing Procedures

Atmospheric testing is required for two distinct purposes: evaluation of hazards of the permit space and verification that acceptable entry conditions into that space exist.

### 1. Evaluation Testing

The atmosphere of a confined space should be analyzed using equipment of sufficient sensitivity to identify and evaluate any hazardous atmospheres that may exist or arise within the space. The sampling results indicate the appropriate permit entry procedures that need to be developed and aide in defining the acceptable entry conditions stipulated for that space.

### 2. Verification Testing

The atmosphere of a permit space, which may contain a hazardous atmosphere, should be tested for residues of all of the evaluation's identified contaminants using the equipment specified on the permit. The purpose of sampling prior to and during entry is to determine if residual concentrations are within the acceptable range(s) for entry. Results of testing (i.e., actual concentration, etc.) should be recorded on the permit.

### 3. Duration of Testing

To ensure accurate data, sampling time should meet or surpass the minimum response time according to the instrument's manufacturer.

### 4. Testing Stratified Atmospheres

When monitoring atmospheres that are stratified (layered), the atmospheric envelope should be tested a distance of approximately 4 feet (1.22 m) in the direction of travel and to each side.

### 5. Order of Testing

A test for oxygen is performed first because most combustible gas meters are oxygen dependent and will not provide reliable readings in an oxygen deficient atmosphere. Combustible gases are tested for next because the threat of fire or explosion is both more immediate and more life threatening, in most cases, than exposure to toxic gases and vapors. If tests for toxic gases and vapors are necessary, they are performed last.