

**Northwestern**  
Confined Spaces  
Environmental Health and Safety

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## I. Purpose

This program establishes a process to protect employees from the hazards associated with entry into confined spaces and provides guidance for the safe access and entry into, working inside, and egress from confined spaces.

## II. Scope

This program applies to all contractors and Northwestern employees who have to perform work in a confined space.

### A. Definition

*Confined spaces* are defined as areas that:

- i. Are large enough for an employee to enter and perform work,
- ii. Have limited or restricted means for entry or exit, and
- iii. Are not designed for continuous occupancy.

Examples of confined spaces at Northwestern are sewers, manholes, tunnels, tanks, boilers, transformers, pipes, excavations, elevator pits, vaults, and ducts. For the purpose of this program, there are two classifications of confined spaces:

- i. *Non-permit confined space* – confined space that meets the definition of a confined space (above), but does not meet the requirements for a permit-required confined space (below).
- ii. *Permit-required confined space* – confined space that has one or more of the following characteristics:
  - a. Contains or has a 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 a floor that slopes downward and tapers to a smaller cross section, or
  - d. Contains any other recognized, serious safety or health hazard.

### B. Evaluation

- i. Assessments must be conducted to determine whether a confined space is classified as a non-permit confined space or a permit-required confined space (see **Appendix 1**).
- ii. Confined space assessments and photos are available on Environmental Health and Safety's SharePoint [website](#) and are accessible to authorized departments.
- iii. When there are changes in the use or configuration of a non-permit confined space, or when certain operations (e.g., welding, steam lines, chemicals) might introduce or create new hazards to entrants, the confined space must be re-evaluated prior to entry. If necessary, the space will be reclassified as a permit-required confined space.

## III. Responsibilities

### A. Environmental Health and Safety (EHS)

- i. Review, audit, and revise this program and permit process annually or anytime deemed necessary.
- ii. In collaboration with Facilities and Information Technology, assess new and existing confined spaces.
- iii. Provide guidance and technical assistance as needed.

- iv. Maintain the SharePoint database of confined space assessments.
- B. Departments and Units**
- i. Department chief, supervisor, or designee must approve entry into permit-required confined spaces, including contractors (see **Appendix 2** for guidelines regarding contractors working in confined spaces).
  - ii. Ensure employees are fully informed, authorized, and trained in confined space entry requirements and procedures as outlined in this program.
  - iii. Prevent unauthorized entry into permit-required confined spaces through training, signage, and security measures.
  - iv. Monitor employees' need for additional or refresher training, based upon assigned duties, changes in confined spaces, or changes to this program.
  - v. Collaborate with EHS to ensure each contractor's Confined Space Program and permit process is compliant with regulatory and Northwestern requirements.
- C. Project Managers**
- i. Inform contractors of work that involves any confined space entry and provide assessments for those spaces.
  - ii. Collaborate with Information Technology and/or Facilities when energy shutdowns or lifesaving impairments are necessary.
  - iii. Collaborate with EHS to ensure each contractor's Confined Space Program and permit process is compliant with regulatory and Northwestern requirements.
  - iv. Inform and provide contractors with the Northwestern Confined Spaces Program and specific procedures developed for confined space entries.
  - v. For more guidelines regarding contractors working in confined spaces, see **Appendix 2**.
- D. Authorized Entrants**
- i. Successfully complete confined space entry training.
  - ii. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of exposure.
  - iii. Conduct assigned tasks in a safe manner at all times.
  - iv. Wear appropriate personal protective equipment correctly.
  - v. Maintain communication with the attendant to alert regarding the need to evacuate the space.
  - vi. Exit the space as quickly as possible whenever:
    - a. An order to evacuate is given by the attendant or entry supervisor,
    - b. An entrant recognizes any warning signs or symptoms of exposure to a dangerous situation,
    - c. An entrant detects a prohibited condition, or
    - d. An evacuation alarm is activated.
  - vii. Report any injuries, illnesses, questions, or any unsafe working conditions to the department Supervisor.
- E. Authorized Attendants**
- i. Successfully complete confined space entry training.
  - ii. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of exposure.
  - iii. Conduct assigned tasks in a safe manner at all times.
  - iv. Be aware of possible behavioral effects of hazard exposure of entrants.
  - v. Accurately record all data on the permit (e.g., names of individuals, date, time of entry, atmospheric data) and be the sole person responsible for the permit.

- vi. Continuously maintain an accurate count of entrants in the space.
- vii. Ensure an attendant is always present while entrants are in the space.
- viii. Maintain communication with the entrants to assess entrant status and alert entrants of the need to evacuate immediately under the following conditions:
  - a. If an attendant detects a prohibited condition,
  - b. If an attendant detects the behavioral effects of hazard exposure in an entrant,
  - c. If an attendant detects a situation outside the space that could endanger the entrants, or
  - d. If an attendant cannot effectively and safely perform all the aforementioned duties.
- ix. Summon rescue or other emergency services if entrants need assistance to escape from the space.
- x. Ensure unauthorized entrants do not enter the permit-required confined space.
- xi. Report any injuries, illnesses, questions, or any unsafe working conditions to the department Supervisor.

**F. Authorized Entry Supervisors**

- i. Successfully complete confined space entry training.
- ii. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of exposure.
- iii. Conduct assigned tasks in a safe manner at all times.
- iv. Verify all tests specified by the Confined Space Entry Permit have been conducted and all procedures and equipment specified on the permit are in place prior to endorsing the permit and allowing entry to begin.
- v. Terminate the entry permit, whenever warranted.
- vi. Verify rescue services are available and a means to summon them is operable.
- vii. Report any injuries, illnesses, questions, or any unsafe working conditions to the department Supervisor.

**G. Contractors**

- i. Provide a copy of a site-specific/project-specific confined spaces program to Northwestern department project managers and EHS.
- ii. Confined Spaces programs must meet or exceed the minimum requirements set forth in this program, in addition to the OSHA General Industry and/or Confined Spaces in Construction regulations, as applicable.
- iii. Obtain copies of all necessary confined space assessments and coordinate all confined space entries with Northwestern project managers, including when both Northwestern and contractor personnel will be working in or near confined spaces; contractors must receive authorization from Northwestern Facilities or Information Technology prior to entry in a confined space.
- iv. Ensure employees are properly trained in confined space entry procedures.
- v. Provide the necessary equipment, personal protective equipment, personnel, and resources necessary for safe entry into confined spaces, including air-monitoring equipment and rescue equipment/services.
- vi. Post permits at confined space entry sites for the duration of the entry.
- vii. Contractors must use their own confined space permits and provide completed permits to Northwestern project managers.
- viii. Inform Northwestern project managers of any hazards confronted or created in the confined space.

- ix. Develop rescue procedures specific to the space(s) entered (see **Section IX**).
- x. In the event of an emergency requiring confined space rescue, the authorized entry supervisor or attendant will immediately notify emergency services.
- xi. Provide a scope of work to Northwestern project managers and EHS, prior to entry into confined spaces on Northwestern property that are not controlled or maintained by Northwestern (e.g., city sewers, ComEd electrical vaults).

#### IV. Non-Permit Confined Space Entry

- A. Before entry into non-permit confined spaces, authorized entry supervisors must evaluate the scope of work and determine whether conditions will change that might make the space a permit-required confined space. Examples include welding, working with hazardous chemicals, introduction or intrusion of a hazardous substance (e.g., flooding) or atmosphere (e.g., active steam release), and known or assumed structural failure. If such conditions are expected, suspected, or develop, supervisors must contact EHS to assist with a hazard assessment to conduct a permit entry.
- B. If non-permit confined spaces have no hazards, entry can be done without using the permit system.
- C. Only trained and authorized individuals may enter and perform work inside non-permit required confined spaces.

#### V. Permit-Required Confined Space Entry

##### A. Pre-Entry

- i. Notify EHS at [ehs@northwestern.edu](mailto:ehs@northwestern.edu) prior to entry into a permit-required confined space.
- ii. Notify University Police prior to entry into a permit-required confined space; this information must be noted on the entry permit.
  - a. Evanston Campus: (847) 491-3254
  - b. Chicago Campus: (312) 503-3456
- iii. Review the confined space assessment (see **Appendix 1** for a blank assessment) and scope of work to determine the permit requirements.
- iv. Evaluate the work activities and conditions, and develop a Safe Operating Procedure (SOP) (see **Safe Operating Procedure Guide** and **Safe Operating Procedure Template**) that addresses the work conditions, hazards, responsibilities, assigned duties, communication, and rescue/emergency services procedures.
- v. Approved SOPs and applicable confined space assessment forms must be emailed, with as much advanced notice as possible, to:
  - a. Evanston Fire Department at [mrsmith@cityofevanston.org](mailto:mrsmith@cityofevanston.org), [ppolep@cityofevanston.org](mailto:ppolep@cityofevanston.org), and [wmuno@cityofevanston.org](mailto:wmuno@cityofevanston.org), or
  - b. Chicago Fire Department at [andrew.mcgill@cityofchicago.org](mailto:andrew.mcgill@cityofchicago.org)
- vi. Review the SOP and applicable confined space assessment(s) and lockout/tagout procedure(s) with all parties involved during a pre-work briefing.
- vii. Test all air monitoring equipment before each entry into a confined space in accordance with the manufacturer's instructions, and calibrate if necessary.
- viii. No employee may enter a confined space until all identified hazards are eliminated or controlled and acceptable entry conditions have been established.

- ix. Because confined spaces may be immediately dangerous to life and health (IDLH), continuous forced air ventilation must be used to eliminate the potentially hazardous atmosphere:
  - a. Air must be taken from a clean source and continued until all employees have left the space.
  - b. If the minimum oxygen content of 19.5% cannot be maintained by forced air ventilation and the environment is oxygen-deficient, consult with Facilities Operations and EHS.
  - c. This method cannot be used if asbestos is present in the space.
- x. Before authorized entrants enter the space, the internal atmosphere must be tested with a calibrated, direct-reading instrument (see **Section VIII**).
  - a. Retain and record all air monitoring test/calibration data on the permit.
  - b. The entry supervisor must ensure air monitoring has been conducted within 15 minutes prior to entering any permit-required confined space.
  - c. Communicate all air monitoring results to all entrants or their authorized representative.
- xi. Submit the completed permit (see **Appendix 3** for a blank permit) to EHS for review and approval in-person or by such means as emailing or texting a photo of the permit. EHS will evaluate the permit to ensure all requirements are met prior to entry.
- xii. Post the authorized confined space permit at the entry portal, or by any other equally effective, conspicuous manner, prior to beginning work.

**B. Entry**

- i. Only trained and authorized employees may enter a confined space or act as an attendant or supervisor; measures must be in place to prevent unauthorized entries.
- ii. During permit-required confined space entries, an attendant must be present at all times; the attendant cannot perform any other tasks that could potentially interfere with his/her abilities to provide any/all support necessary to the entrant(s).
- iii. Smoking is prohibited in confined spaces and near the entrance/exit area.
- iv. Keep running vehicles away from the permit workspace.
- v. Maintain constant visual or voice communication between the attendant and entrants entering a permit-required confined space using intrinsically safe communications (see **Section VII**).
- vi. Access spaces with engulfment hazards away from affected areas or by top entry only.
- vii. Protect all openings to confined spaces with barriers when hatches, covers, or lids are removed to protect entrants and others from potential hazards.
- viii. When the possibility of a release of hazardous energy exists, appropriate lockout/tag out procedures must be utilized (see **Section X**).
- ix. Utilize all required personal protective equipment, as indicated in the SOP.
- x. In the event a hazardous atmosphere or condition is detected or suspected at any time during a confined space entry, all personnel must exit the space immediately and measures must be implemented to protect employees from the hazards before any subsequent entries take place; department supervisors and EHS must be notified.

- xi. If an emergency rescue becomes necessary or in the event of an injury, the Entry Supervisor or Attendant must call 911 immediately and provide information, guidance, and assistance as necessary. *Northwestern employees are not permitted to enter a confined space to perform a rescue under any circumstances.*

**C. Post-Entry**

- i. When all work is complete and personnel have exited the confined space, the Entry Supervisor must:
  - a. Ensure the worksite is returned to safe conditions,
  - b. Close out the permit,
  - c. Notify University Police and EHS the entry has been completed, and
  - d. Document any problems encountered during the entry.
- ii. Provide copies of all SOPs, permits, and any other relevant documentation (e.g., hot work permits) to EHS for post-entry review, who will:
  - a. Evaluate the entry permit and any other relevant documents to ensure they were completed properly,
  - b. Review the SOP to ensure all personnel involved signed it,
  - c. Provide immediate feedback and guidance to supervisors for any deficiencies identified, and
  - d. Maintain all relevant documentation for at least three years to facilitate the review of the Confined Spaces Program.

## VI. Signage

- A. For all permit-required confined spaces, post appropriate danger signage at the entry portal, hatch, cover, or equally effective location.
- B. When feasible, provide locks on all confined space access points.
- C. Steam, chilled water, and hot water vault access points must be marked with the vault number, in conspicuous manner, which corresponds to the system drawings and confined space assessments; paint, tags, or any other effective means of marking and identifying the vaults may be used.
- D. When infeasible to post permanent danger signage at confined space entry points (e.g., outdoor steam vaults, hot water vaults, chill water vaults), post temporary appropriate danger signage at the access point(s) when the access points are open.

## VII. Communication

- A. Departments and contractors must ensure two-way communication is available during all permit-required confined space entries and are responsible for ensuring adequate communication:
  - i. Between those inside the confined space,
  - ii. Between those inside the confined space and those outside, and
  - iii. To summon emergency responders in the event of an emergency.
- B. Examples of acceptable forms of communication are:
  - i. UHF portable radio;
  - ii. Cellular phone;
  - iii. Verbal;
  - iv. Tapping;
  - v. Fixed telephone, if available;



- vi. Visual (e.g., hand signals); and
  - vii. Tugs on a lifeline.
- C. Cellular service and UHF radio coverage may be limited in certain confined spaces at Northwestern. Effective communication is required for all permit-required confined space entries.

## VIII. Air Monitoring

- A. Departments are responsible for maintaining, calibrating, and operating all air monitoring equipment according to the manufacturer's instructions.
- i. Prior to performing air monitoring for permit-required confined space entry, perform a bump test or full calibration in accordance with the manufacturer's instructions using the appropriate test gas.
  - ii. Adjust instruments that fail a bump test by a full calibration before further use.
  - iii. Calibration of air monitoring equipment must be performed monthly and documented.
- B. Before authorized entrants enter the space and while entrants work in the space, atmospheric conditions must remain within the following limits:
- i. **Oxygen:** between 19.5% and 23.5%
  - ii. **Lower Explosive Limit (LEL):** less than 10%
  - iii. **Carbon Monoxide (CO):** less than 35 ppm (parts per million)
  - iv. **Hydrogen Sulfide (H<sub>2</sub>S):** less than 10 ppm (parts per million)
- C. Atmospheric conditions must be tested at least every 2 hours, as necessary based on the hazards present, and anytime deemed necessary by any member of the confined space entry team.
- D. Atmospheric test results must be documented on entry permits.

## IX. Rescue

- A. **Rescue Procedures**
- i. Rescue procedures are required for all permit-required confined space entries.
  - ii. The fire department is considered a back-up rescue service and must be notified prior to any confined space entry as outlined in **Section V**.
  - iii. If an entrant requires rescue from a confined space, the Entry Supervisor or Attendant must call 911 immediately and report the incident as a "confined space rescue."
  - iv. *Northwestern employees are not permitted to enter a confined space to perform a rescue under any circumstances.*
- B. **Rescue Methods**
- There are two types of rescue: entry and non-entry.
- i. Only trained 3<sup>rd</sup> party rescue professionals can perform entry rescue.
  - ii. Trained attendants and entry supervisors may perform non-entry rescue with the use of a retrieval system.
- C. **Rescue Method Selection**
- i. Retrieval systems, such as tripods, must be set-up and used whenever an employee enters a permit-required confined space to facilitate non-entry rescue, if needed.
  - ii. Retrieval systems must include a chest or full-body harness, retrieval line, and a mechanical retrieval device (if the vertical space is over 5 feet deep).

- iii. Only trained and authorized personnel may utilize retrieval equipment, and equipment must be inspected prior to use.
- iv. Retrieval equipment owned by departments and units must be inspected annually by a competent person and in accordance with the [Fall Protection](#) program.
- v. The retrieval system is not required if the equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant.
- vi. If non-entry retrieval equipment will be ineffective (e.g., horizontal exit points, piping or equipment obstructions), a means of entry rescue must be in place, such as a standby rescue team. Confined space assessments must be communicated to rescue teams, and the rescue team must review and sign the Safe Operating Procedure. The fire department cannot be designated as a standby rescue team but must always be notified immediately in the event of an emergency to provide additional support.

## X. Hazardous Energy Isolation

Every effort must be made to avoid entering confined spaces by such methods as reconfiguring or relocating equipment, using cameras for inspections, or utilizing extension tools to operate equipment. If confined spaces must be entered, hazardous energy must be isolated prior to entry.

- A. When hazardous energy must be isolated, the procedures outlined in Northwestern's [Control of Hazardous Energy \(Lockout/Tagout\) Program](#) must be followed.
- B. Isolation of all hazardous energy is required to reclassify a permit-required confined space to a non-permit required confined space.
- C. Isolation or de-energization of hazardous energy is required using documented lockout/tagout procedures. Examples of conditions when hazardous energy must be isolated include:
  - i. Line breaking;
  - ii. Visible or suspected steam leaks;
  - iii. Corroded piping;
  - iv. Installation, repair, or demolition of system components;
  - v. Adjusting or tightening compression seals, such as flanges;
  - vi. Operation of valves;
  - vii. Inspections or surveys;
  - viii. Draining or releasing hot water from steam traps or condensate lines;
  - ix. Any work in normally flooded spaces, such as boilers and water tanks;
  - x. When steam or condensate is enclosed in sealed piping and piping components (e.g., valves, steam traps); and
  - xi. When there is imminent risk of direct exposure to contained hazards.
- D. Single-valve isolation of flowable materials (e.g., steam, water) is not permitted.
- E. Flowable materials (e.g., steam, water) must be isolated by the use of the following techniques:
  - i. Blanking or blinding;
  - ii. Misaligning or removing sections of lines, pipes or duct; or
  - iii. Use of a double block and bleed system.

- F. Isolation of hazardous energy is not required in permit-required confined spaces where there is no foreseeable exposure to physical hazards (e.g., no visible or suspected steam leaks, no corroded piping, no other known conditions that could result in the potential release of hazardous energy) and when physical hazards are contained or enclosed, such as:
  - i. Electrical hazards that are enclosed in conduit or enclosures.
  - ii. Flowable physical hazards, such as steam, water, or liquids, that are:
    - a. Contained in tanks;
    - b. Enclosed in mechanically and structurally continuous runs of piping, without connections such as flanges, valves, and traps; and
    - c. Where there is no imminent risk of direct exposure to the contained hazard.
  - iii. If at any time a hazard is suspected, develops, or is discovered while in the space (e.g., discovery of a steam leak, damage, or corrosion), the space must be immediately evacuated and re-evaluated.

## XI. Reclassification Procedures

- A. A permit-required confined space may be reclassified as a non-permit confined space if the space poses no actual or potential atmospheric hazards and all hazards within the space are eliminated without entry into the space.
- B. Permit-required confined spaces such as steam vaults are not eligible for reclassification.
- C. A reclassification form (see **Appendix 4**) must be utilized to reclassify a permit-required confined space to a non-permit confined space.
- D. An SOP is required for confined space entries utilizing the reclassification form.
- E. If it is necessary to enter the permit space to eliminate hazards, such entry shall be performed using a confined space entry permit (see **Appendix 3**). If testing and inspection during that entry demonstrate that the hazards within the permit space have been eliminated, the permit space may be reclassified as a non-permit confined space for as long as the hazards remain eliminated.
- F. Control of atmospheric hazards through forced air ventilation does not constitute elimination of atmospheric hazards.
- G. If hazards arise within a permit space that has been declassified to a non-permit space, the space must be evacuated immediately and reevaluated to determine whether it must be reclassified as a permit space.
- H. Entry operations are immediately canceled when the work is completed, a condition that is not allowed under the form arises, or after 8 hours. Re-entry into the space requires a permit or new reclassification form.

## XII. Alternate Entry Procedures

- A. Alternate entry procedures may be utilized to enter a permit-required confined space if the only hazard posed by the permit space is an actual or potential hazardous atmosphere and continuous forced-air ventilation alone is sufficient to maintain that permit space safe for entry.
- B. Permit-required confined spaces such as steam vaults are not eligible for alternate entry procedures.

- C. An alternate entry form (see **Appendix 5**) must be utilized to certify that the space is safe for entry and that all required pre-entry measures have been taken, to authorize entry into the space, and to monitor and document the atmosphere within the space.
- D. An SOP is required for confined space entries utilizing the alternate entry form.
- E. If an initial entry of the permit space is necessary to verify that the only hazard posed by the permit space is an actual or potential hazardous atmosphere and continuous forced-air ventilation alone is sufficient to maintain that permit space safe for entry, the entry must be performed using a confined space entry permit (see **Appendix 3**).
- F. Any conditions making it unsafe to remove an entrance cover must be eliminated before the cover is removed.
- G. When entrance covers are removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and protect each employee working in the space from foreign objects entering the space.
- H. Before an employee enters the space, the internal atmosphere must be tested. There may be no hazardous atmosphere within the space whenever any employee is inside the space (see **Section VIII**).
- I. An employee may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere.
- J. The forced-air ventilation must be so directed as to ventilate the immediate areas where an employee is or will be present within the space and must continue until all employees have left the space.
- K. The air supply for the forced-air ventilation must be from a clean source and may not increase the hazards in the space.
- L. The atmosphere within the space must be periodically tested as necessary, and at least every 2 hours, to ensure that the continuous forced-air ventilation is preventing the accumulation of a hazardous atmosphere.
- M. Any employee who enters the space, or that employee's authorized representative, must be provided with an opportunity to observe the required periodic testing.
- N. If a hazardous atmosphere is detected during entry:
  - i. Each employee must leave the space immediately,
  - ii. The space must be evaluated to determine how the hazardous atmosphere developed, and
  - iii. Measures must be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.

### XIII. Training

#### A. Responsibility

Departments are responsible for ensuring employees are properly trained and proficient in the duties required for confined space entry. Additional training is required when procedures are updated or a new hazard exists.

#### B. Requirements

Confined space entry training is required:

- i. Before an employee is initially assigned a task involving a confined space as a supervisor, entrant, or attendant,
- ii. Whenever there is a change in a confined space that presents hazards(s) to which the employee has not been previously trained, or

- iii. If there are observed inadequacies in an employee's knowledge or execution of confined space procedures.
- C. **Refresher Training**  
Confined space refresher training is required every 3 years for all employees involved in confined space operations.
- D. **Fire Department**  
The fire department will be provided opportunities, when feasible, to utilize confined spaces and tunnels at Northwestern for training exercises. The fire department will also be provided with opportunities to attend University-led confined space training.

## XIV. Recordkeeping

Departments are responsible for maintaining confined space records.

- A. Northwestern and contractor entry permits and associated forms (e.g., Safe Operating Procedures, Hot Work Permits, Live Utility Work Authorizations) must be retained for at least three years.
- B. Air monitoring instrument records (i.e., bump tests, calibrations, and service repairs) must be retained for at least three years. Electronic means, such as instrument software, may be used to record this information in lieu of paper logs, if available. Refer to **Appendix 6** for an example of a bump test and calibration log sheet.
- C. EHS is responsible for maintaining the confined space assessments on the SharePoint [website](#). Assessments must be readily available, as long as they are valid and accurate. Any new assessments or changes to existing assessments must be included, as necessary.
- D. Departments are responsible for maintaining employee training records and must be kept for a minimum of three years; records must include employees' names, trainers' signatures or initials, and dates of training.

## XV. Regulatory Authority and Related Information

Northwestern and contractors will comply with the Occupational Safety and Health Administration's (OSHA) standards, National Fire Protection Association's (NFPA) codes, and any other applicable codes and standards, including:

[OSHA 29 CFR 1910.146 – Permit-Required Confined Spaces](#)

[OSHA Directive CPL 02-00-147 – The Control of Hazardous Energy – Enforcement Policy and Inspection Procedures](#)

[OSHA 29 CFR 1926 Subpart AA – Confined Spaces in Construction](#)

[NFPA 101 – Life Safety Code \(2018 version\)](#)

[Northwestern's Working On or Near Utilities Procedures](#)

[Northwestern's Control of Hazardous Energy \(Lockout/Tagout\) Program](#)

[Northwestern's Fall Protection Program](#)

[Northwestern's Safe Operating Procedure Guide](#)

[Northwestern's Safe Operating Procedure Template](#)

[EHS's SharePoint Website – Confined Space Assessments](#)

## XVI. Contact

For questions, contact Environmental Health and Safety at [ehs@northwestern.edu](mailto:ehs@northwestern.edu).

## Appendix 1 – Confined Space Assessment Form

**Instructions:** All confined spaces must be assessed using this form. The purpose of this form is to identify the hazards and characteristics of a space to determine if it is a non-permit required space or a permit-required confined space. This assessment does not replace a Confined Space Entry Permit. This assessment must be reviewed by the entry team prior to any entry into a permit-required confined space.

Section A: General Information												
1	Name:			Type of Space:								
2	Date of Assessment:			Assessment Conducted by:								
3	Location:											
Section B: Confined Space Determination									Yes	No		
4	The space is large enough and is so configured that an employee can bodily enter and perform assigned work.											
5	The space has limited or restricted means of entry or exit.											
6	The space is not designed for continuous employee occupancy.											
7	If items 4-6 were all marked <b>Yes</b> , then the space is considered a confined space; proceed to the next section. If you answered <b>No</b> to 4, 5, or 6, the space is not a confined space; check the box below.											
	The space does not qualify as a “confined space”:											
Section C: Atmospheric Hazards									Yes	No		
8	Does the space have or have the potential to contain a hazardous atmosphere? <i>If Yes, check the hazard(s) below.</i>											
9	Oxygen Deficient (O <sub>2</sub> below 19.5%):			Oxygen Enriched (O <sub>2</sub> above 23.5%):			Explosive Gas/Vapor:					
10	Hydrogen Sulfide (H <sub>2</sub> S):			Carbon Monoxide (CO):			Chlorine (Cl <sub>2</sub> ):					
11	Other (specify):											
Section D: Engulfment Hazards									Yes	No		
12	Does the space have the potential to engulf or suffocate the entrant? <i>If Yes, check the hazard(s) below.</i>											
13	Sand:		Water:		Soil:		Gravel/Rock:		Sewage:		Oil:	
14	Other (specify):											
Section E: Entrapment Hazards									Yes	No		
15	Does the space have an internal configuration that an entrant could become trapped? <i>If Yes, check the hazard(s) below.</i>											
16	Converging Walls/Downward Sloping:			Constriction/Taper to a Smaller Cross-Section:			Difficult Exit/Inadequate Access:					
17	Other (specify):											

Section F: Other Serious Hazards											Yes	No		
18	Is there a potential for any other serious safety and health hazards? <i>If Yes, check the hazard(s) below.</i>													
19	Electrical:		Moving Parts:		Slips/Trips/Falls:									
20	Hot/Cold Extremes:		Noise/Vibration:		Chemicals:									
21	Skin/Eye Irritants:		Pressurized Steam/ Condensate:		Unguarded Machinery:									
22	Pneumatic Energy:		Hydraulic Energy:		Stored Energy:									
23	Other (specify):													
Section G: Access														
24	Fixed Ladder:		Portable Ladder:		Stairs:		Door:		Hatch:		Manhole:		Lowering Winch:	
25	Other (specify)													
Section H: Ventilation														
26	None:		Unfavorable Natural:		Favorable Natural:		Mechanical:							
27	Mechanical ventilation is required in the space:													
Section I: Rescue											Yes	No		
28	Does the space have an internal configuration where non-entry rescue equipment (e.g., tripod and winch) will be <b>effective</b> in rescuing the entrant?													
29	Does the space have an internal configuration where non-entry rescue equipment (e.g., tripod and winch) may be <b>ineffective</b> in rescuing the entrant, depending on where the work is being performed inside the space?													
30	Will a standby rescue service be required outside the space if non-entry rescue equipment is <b>ineffective</b> in rescuing the entrant?													
Section J: Determination											Yes	No		
31	Is the space a Permit-Required Confined Space? <i>If items 8, 12, 15, or 18 were marked Yes, a permit is required to enter the space.</i>													
Section K: Notes														
32														
Section L: Hazardous Energy Isolation														
Hazards indicated in sections C through F may require isolation or de-energization in accordance with Northwestern's Control of Hazardous Energy (Lockout/Tagout) Program <b>prior to entry</b> .														

## Appendix 2 – Guidelines for Contractors Working in Confined Spaces

Northwestern Facilities Operations, Capital Projects, Northwestern Information Technology (NUIT), and Project Managers should use these guidelines to ensure all requirements of the Northwestern Confined Space Program and Control of Hazardous Energy Program are met prior to contractors entering and working in permit-required confined spaces, such as vaults, tanks, and elevator pits. Northwestern Facilities Operations, Capital Projects, NUIT, and Project Managers must retain copies of all contractor confined space entry permits and associated documentation for at least 3 years.

Northwestern Requirements		Group Responsible	Complete
1	Inform the contractor that the workplace contains permit-required confined spaces and that entry is allowed only through compliance with the Northwestern Confined Space Program	Facilities Operations, Capital Projects, or NUIT	
2	Provide a Statement of Work (SOW) that indicates the contractor will provide confined space equipment, rescue equipment, and trained employees	Facilities Operations, Capital Projects, or NUIT	
3	Provide the contractor with the Northwestern Confined Space Program, necessary confined space assessment(s), and identify any hazards inside or associated with the confined space(s)	Facilities Operations, Capital Projects, or NUIT	
4	Apprise the contractor of the elements, including the hazards identified and Northwestern's experience with the space, that make the space in question a permit-required confined space	Facilities Operations, Capital Projects, or NUIT	
5	Apprise the contractor of any precautions or procedures that Northwestern has implemented for the protection of employees in or near permit-required confined spaces where contractor personnel will be working	Facilities Operations, Capital Projects, or NUIT	
6	Coordinate entry operations with the contractor when both Northwestern personnel and contractor personnel will be working in or near permit-required confined spaces	Facilities Operations, Capital Projects, or NUIT	
7	Isolate or de-energize all sources of hazardous energy, and communicate isolations to the contractor to allow for group lockout/tagout	Facilities Operations, or NUIT	
8	Review the contractor's confined space entry permit and authorize the entry (sign and date the permit)	Facilities Operations, Capital Projects, or NUIT	
9	Debrief the contractor at the conclusion of the entry operations regarding the permit-required confined space program followed and any hazards confronted or created in permit-required confined spaces during entry operations	Facilities Operations, Capital Projects, or NUIT	
Contractor Requirements		Verified by	Complete
10	Obtain any available information regarding permit-required confined space hazards and entry operations from Northwestern	Facilities Operations, Capital Projects, or NUIT	
11	Coordinate entry operations with Northwestern when both Northwestern and contractor personnel will be working in or near permit-required confined spaces	Facilities Operations, Capital Projects, or NUIT	
12	Inform Northwestern of the permit space program that the contractor will follow and any hazards confronted or created in permit-required confined spaces, either through a debriefing or during the entry operation	Facilities Operations, Capital Projects, or NUIT	
13	Provide written procedures for work to be performed inside the permit-required confined space, including entry and rescue methods and procedures.	Facilities Operations, Capital Projects, or NUIT	
14	Attach lockout/tagout device(s) to all hazardous energy source isolations	Facilities Operations, or NUIT	
15	Provide confined space entry permit(s), and submit all permits to Northwestern for entry authorization	Facilities Operations, Capital Projects, or NUIT	

### Program Resources

[Northwestern's Confined Spaces Program](#)

[Northwestern's Control of Hazardous Energy \(Lockout/Tagout\) Program](#)

[Northwestern's Safe Operating Procedure Guide](#)

[Northwestern's Safe Operating Procedure Template](#)

[Northwestern's Working On or Near Utilities Procedures](#)



## Appendix 3 – Confined Space Entry Permit

<b>CONFINED SPACE ENTRY PERMIT</b>													
Use this permit when entering a permit-required confined space, which is only valid for the duration of work being performed and for no more than 8 hours. Post this permit at or near the entry point. An attendant is required outside the space, and must maintain communication with the entrant(s) and have a means to summon rescue services (e.g., 911). Review the confined space assessment to evaluate the space, and review the work to be performed within the space.													
<b>General</b>													
Space to be Entered:			Date & Time Issued:			Date & Time of Expiration:			Department or Contractor:				
Location of Space:			Date & Time of Expiration:			Department or Contractor:							
Purpose of Entry:			Date & Time of Expiration:			Department or Contractor:							
Entrant(s):			Date & Time of Expiration:			Department or Contractor:							
Attendant(s):			Date & Time of Expiration:			Department or Contractor:							
<b>Requirements</b>													
Assessment Reviewed:		<input type="checkbox"/>	Actual or Potential Hazards:		<input type="checkbox"/> None <input type="checkbox"/> Atmospheric <input type="checkbox"/> Entrapment <input type="checkbox"/> Engulfment/Suffocation <input type="checkbox"/> Steam <input type="checkbox"/> Condensate <input type="checkbox"/> Other (Specify)								
Special Requirements			Yes	N/A	Special Equipment			Yes	N/A				
Secure Area or Work Zone (e.g., barricading, fencing-off)					Fire Extinguisher (not CO <sub>2</sub> )								
Pumps / Lines Blanked, Blocked, Capped (i.e., LOTO)					Special Lighting (e.g., explosion-proof)								
Purging, Flushing, Venting of Utility Lines					Portable Blower (i.e., forced-air ventilation)								
Other Permits (e.g., Hot Work):		(specify)			Water Pumps								
Other Special Requirements:		(specify)			Other Equipment:		(specify)						
Energy Sources Isolated:		<input type="checkbox"/> Electrical <input type="checkbox"/> Mechanical <input type="checkbox"/> Hydraulic <input type="checkbox"/> Pneumatic <input type="checkbox"/> Chemical <input type="checkbox"/> Thermal <input type="checkbox"/> Steam <input type="checkbox"/> Condensate <input type="checkbox"/> Other (specify)											
Entrant Communication:		<input type="checkbox"/> Radio <input type="checkbox"/> Cellular Phone <input type="checkbox"/> Visual <input type="checkbox"/> Verbal <input type="checkbox"/> Fixed Telephone <input type="checkbox"/> Other (specify)											
Required Personal Protective Equipment:		<input type="checkbox"/> Gloves <input type="checkbox"/> Safety Glasses <input type="checkbox"/> Goggles <input type="checkbox"/> Face Shield <input type="checkbox"/> Hardhat <input type="checkbox"/> Ear Plugs/Ear Muffs <input type="checkbox"/> Respirator <input type="checkbox"/> Safety Shoes/Boots <input type="checkbox"/> Long Sleeves/Pants <input type="checkbox"/> Body Protection <input type="checkbox"/> Other (specify)											
<b>Atmospheric Testing</b>													
Atmospheric Gases <i>(test in this order)</i>		Permissible Limits <i>(must be within limits)</i>		Pre-Entry Time		Time During Entry - Record Readings Every 2 Hours (8-hour maximum)							
						AM		AM		AM		AM	
				PM		PM		PM		PM		PM	
Oxygen (O <sub>2</sub> )		19.5% to 23.5%		%		%		%		%		%	
Lower Explosive Limit (LEL)		Under 10%		%		%		%		%		%	
Carbon Monoxide (CO)		Under 35 ppm		ppm		ppm		ppm		ppm		ppm	
Hydrogen Sulfide (H <sub>2</sub> S)		Under 10 ppm		ppm		ppm		ppm		ppm		ppm	
Other: (specify)		(specify)											
<b>Tester's Initials:</b>													
Monitoring Equipment Make and Model			Serial Number			Calibration Date			Bump test passed prior to use? (required)	Yes			
<b>Rescue</b>													
Rescue Method			Yes	N/A	Attendant Requirement			Yes	N/A				
Non-Entry Retrieval Equipment (e.g., tripod, lifeline, hoist, harness)					Trained in the Use of Non-Entry Equipment								
Rescue Service On-Site (SCBAs, entry retrieval equipment)					Has Means to Summon Rescue Services (required)								
Rescue Communication:			<input type="checkbox"/> Radio <input type="checkbox"/> Cellular Phone <input type="checkbox"/> Visual <input type="checkbox"/> Verbal <input type="checkbox"/> Fixed Telephone <input type="checkbox"/> Other (specify)										
Northwestern Police Notified Prior to Entry:			<input type="checkbox"/> Evanston Campus (847) 491-3456 <input type="checkbox"/> Chicago Campus (312) 503-3456										
<b>Authorization</b>													
<i>I have reviewed the work authorized by this permit and the information contained here-in. This permit is not valid unless all appropriate items are completed. I certify that all actions and conditions necessary for safe entry have been performed.</i>													
Entry Supervisor:		(print):	(sign):			(title):							
<b>Cancellation</b>													
<i>Entry will be terminated and this permit will be cancelled when the entry operations covered by the permit have been completed or a condition that is not allowed under the entry permit arises in or near the permit space. Re-entry into the confined space will not be allowed until a new assessment is completed and permit is issued.</i>													
<b>Permit must be cancelled by Entry Supervisor and kept on file by departments for 3 years.</b>													
Permit Cancelled by:			Date & Time:										
<b>Reason:</b>		<input type="checkbox"/> Work Complete <input type="checkbox"/> Rescue Unavailable <input type="checkbox"/> Conditions Violate Permit <input type="checkbox"/> New Hazards <input type="checkbox"/> Other (Specify)											

## Appendix 4 – Permit-Required Confined Space Reclassification Form

<b>PERMIT-REQUIRED CONFINED SPACE RECLASSIFICATION FORM</b>										
Use this form to temporarily reclassify a permit-required confined space to a non-permit confined space, which is only valid for the duration of work being performed and for no more than 8 hours. The space cannot contain any actual or potential atmospheric hazards, and all hazards within the space must be eliminated without entry into the space. An attendant is required outside the space, and must maintain communication with the entrant(s) and have a means to summon rescue services (e.g., 911). Review the confined space assessment to evaluate the space, and review the work to be performed within the space.										
<b>General</b>										
Space to be Entered:					Date & Time Issued:					
Location of Space:					Date & Time of Expiration:					
Purpose of Entry:					Department or Contractor:					
Entrant(s):										
Attendant(s):										
<b>Requirements</b>										
Hazards	Yes	No	If <b>Yes</b> , describe how the hazard was eliminated without entry into the space.							
Does the space contain or have the potential to contain a hazardous atmosphere?			If <b>Yes</b> , reclassification is not permitted. <i>Note:</i> Control of atmospheric hazards through forced-air ventilation does not constitute elimination of the hazards.							
Does the space contain biological or chemical hazards?										
Does the space contain electrical hazards?										
Does the space contain engulfment hazards?										
Does the space contain mechanical hazards?										
Does the space contain entrapment hazards?										
Does the space contain extreme temperatures?										
Does the space contain any other <i>serious</i> hazards? (e.g., steam)										
Will the work being done inside or near the space introduce new hazards into the space? (e.g., welding, chemicals, painting fumes)										
<b>Atmospheric Testing</b>										
Atmospheric Gases <i>(test in this order)</i>	Permissible Limits <i>(must be within limits)</i>	Pre-Entry Time		Time During Entry - Record Readings Every 2 Hours (8-hour maximum)						
		AM	PM	AM	PM	AM	PM	AM	PM	
		PM	PM	PM	PM	PM	PM	PM	PM	
Oxygen (O <sub>2</sub> )	19.5% to 23.5%	%	%	%	%	%	%	%	%	
Lower Explosive Limit (LEL)	Under 10%	%	%	%	%	%	%	%	%	
Carbon Monoxide (CO)	Under 35 ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
Hydrogen Sulfide (H <sub>2</sub> S)	Under 10 ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
Other: (specify)	(specify)									
<b>Tester's Initials:</b>										
Monitoring Equipment Make and Model			Serial Number			Calibration Date			Bump test passed prior to use? <small>(required)</small>	<b>Yes</b>
<b>Certification and Authorization</b>										
By signing below, I certify that the space does not contain or have the potential to contain a hazardous atmosphere, all hazards within the space have been eliminated without entry, and no hazards will be introduced into or created within the space during the entry. I certify that all actions and conditions necessary for safe entry have been performed to temporarily reclassify the permit-required confined space to a non-permit confined space.										
Entry Supervisor:	(print):	(sign):	(title):							
<b>Cancellation</b>										
If hazards arise within a permit-required confined space that has been declassified to a non-permit confined space, the space must be evacuated immediately. The space must be reevaluated to determine whether it must be reclassified as a permit-required confined space. Entry will be terminated and this form will be cancelled when the entry operations covered by this form have been completed, or when a condition that is not allowed under this form arises in or near the space.										
Form must be cancelled by the Entry Supervisor and kept on file by departments for 3 years.										
Form Cancelled by:				Date & Time:						
Reason:		<input type="checkbox"/> Work Complete <input type="checkbox"/> Conditions Violate Form <input type="checkbox"/> New Hazards <input type="checkbox"/> Other (Specify)								

## Appendix 5 – Permit-Required Confined Space Alternate Entry Form

<b>PERMIT-REQUIRED CONFINED SPACE ALTERNATE ENTRY FORM</b>													
Use this form to temporarily enter a permit-required confined space using Alternate Entry Procedures (no permit required), which is only valid for the duration of work being performed and for no more than 8 hours. Alternate Entry may be used when the <b>only</b> hazard in the space is an actual or potential hazardous atmosphere that can be controlled with forced-air ventilation alone. If these conditions change, a Confined Space Entry Permit is required. Review the confined space assessment to evaluate the space, and review the work to be performed within the space.													
General													
Space to be Entered:							Date & Time Issued:						
Location of Space:							Date & Time of Expiration:						
Purpose of Entry:							Department or Contractor:						
Entrant(s):													
Attendant(s):													
Requirements													
<ol style="list-style-type: none"> <li>1. If work being done inside or near the space can introduce a new <i>serious</i> hazard (e.g., welding, chemicals, steam, unguarded or unprotected energized electrical equipment, painting fumes), a Confined Space Entry Permit is required if the hazard cannot be eliminated without entering the space.</li> <li>2. Continuous forced-air ventilation is required for the entire duration of the work being performed inside the space.</li> <li>3. Atmospheric testing within the space must be performed prior to entry, periodically as necessary, and at least every two hours for the duration of the work, to ensure that the continuous forced-air ventilation is preventing the accumulation of a hazardous atmosphere.</li> <li>4. An attendant must be outside the space anytime work is being performed inside the space to perform periodic communication checks with the entrant. The attendant must have a means to communicate with the entrant and the ability to summon rescue services (e.g., 911).</li> </ol>													
Atmospheric Testing													
<ol style="list-style-type: none"> <li>1. Before entry, test the atmosphere at the top of the space and every four feet until the bottom of the space. Record the results.</li> <li>2. If the atmosphere is not safe, ventilate, purge, and retest the atmosphere. If the atmosphere does not clear the test, do <b>not</b> enter the space!</li> <li>3. Once an acceptable atmosphere is obtained, continuously ventilate and monitor the space, recording the results at least every 2 hours.</li> </ol>													
Atmospheric Gases <i>(test in this order)</i>	Permissible Limits <i>(must be within limits)</i>	Pre-Entry		Time During Entry – Record Readings Every 2 Hours (8-Hour Maximum)									
				AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Oxygen (O <sub>2</sub> )	19.5% to 23.5%	%	%	%	%	%	%	%	%	%	%	%	%
Lower Explosive Limit (LEL)	Under 10%	%	%	%	%	%	%	%	%	%	%	%	%
Carbon Monoxide (CO)	Under 35 ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Hydrogen Sulfide (H <sub>2</sub> S)	Under 10 ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Other: <small>(specify)</small>	<small>(specify)</small>												
<b>Tester's Initials:</b>													
Monitoring Equipment Make and Model	Serial Number				Calibration Date				Bump Test Passed Prior to Use? <small>(required)</small>	<b>Yes</b>			
									Yes	No			
									Yes	No			
Certification and Authorization													
<i>By signing below, I certify that the space does not contain a hazardous atmosphere, no other serious hazards exist in the space, and no hazards will be introduced into or created within the space during the entry. I certify that all actions and conditions necessary for safe entry have been performed to temporarily enter the permit-required confined space via alternate entry procedures.</i>													
Entry Supervisor: <small>(print):</small>				<small>(sign):</small>				<small>(title):</small>					
Cancellation													
Entry will be terminated and this form will be cancelled when the entry operations covered by this form have been completed, or when a condition that is not allowed under this form arises in or near the space. If hazards arise within a permit-required confined space that has been entered via alternate entry procedures, the space must be evacuated immediately until safe entry requirements can be determined.													
<b>Form must be cancelled by the Entry Supervisor and kept on file by departments for 3 years.</b>													
Cancelled by:								Date & Time:					
Reason:	<input type="checkbox"/> Work Complete <input type="checkbox"/> Conditions Violate Form <input type="checkbox"/> New Hazards <input type="checkbox"/> Other <small>(Specify)</small>												



## Appendix 7 – Utility Tunnels

### A. Purpose

This appendix establishes the minimum safe working procedures and guidelines for working in Northwestern’s utility tunnels.

### B. Scope

Some of the tunnels on Northwestern’s Evanston and Chicago campuses are considered “Passageway Tunnels” and are not covered under this appendix. This appendix applies to all Northwestern employees and contractors who work in the utility tunnels, most of which meet all three or two of the three definition requirements of confined spaces:

- i. Large enough to enter and perform work;
- ii. Have limited or restricted means for entry or exit (e.g., fixed ladder and hatch for egress, dead-end more than 50-feet in length, requiring climbing over pipes, and/or requiring navigating through tight spaces); and
- iii. Not designed for continuous occupancy (e.g., the space does not have lighting and sufficient natural or forced ventilation; unfavorable natural ventilation that could contain or produce dangerous air contaminants).

Utility tunnels are classified based on the conditions present and their design and configuration:

- i. **Restricted Utility Tunnels** have a limited or restricted means for entry or exit, but are designed for continuous occupancy; as such, they are not classified as confined spaces, but Northwestern restricts access to authorized and trained personnel.
- ii. **Confined Space Utility Tunnels** have limited or restricted means for entry or exit and are not designed for continuous occupancy; as such, they are classified as confined spaces, and, due to the nature of and hazards within the tunnels, all Confined Space Utility Tunnels are considered permit-required spaces.

**Table 1 – Classification of Northwestern’s Utility Tunnels**

Restricted Utility Tunnels	Confined Space Utility Tunnels
<ul style="list-style-type: none"> <li>• Deering Tunnel (EV)</li> <li>• Deering 105 Mechanical Tunnel (EV) (<i>partial</i>)</li> <li>• Hogan Tunnel (EV)</li> <li>• Kresge Underground Tunnel (EV)</li> <li>• Main Steam Tunnel (CH)</li> <li>• North Swift Tunnel (EV)</li> <li>• North Tech Tunnel (EV)</li> <li>• Sargent Karl Wolff Tunnel (EV)</li> <li>• South Swift Tunnel (EV)</li> <li>• Tarry Tunnel (CH)</li> <li>• Tech-Catalysis Tunnel (EV)</li> </ul>	<ul style="list-style-type: none"> <li>• Deering 105 Mechanical Tunnel (EV) (<i>partial</i>)</li> <li>• Wirtz Tunnel (EV)</li> <li>• Cahn Auditorium Tunnel (EV)</li> </ul>

### C. Utility Tunnel Entry Requirements

#### i. Preplanning for Work

- a. Employees must notify their supervisor prior to entering utility tunnels and discuss the scope of work to be performed.
- b. The supervisor must verify that the employee has received the proper training.

#### ii. Required Documents

- a. **Restricted Utility Tunnels** require a Safe Operating Procedure (see **Safe Operating Procedure Guide** and **Safe Operating Procedure Template**) in order to perform work in them.

- b. **Confined Space Utility Tunnels** require a Safe Operating Procedure (see **Safe Operating Procedure Guide** and **Safe Operating Procedure Template**) and Confined Space Permit (see **Appendix 3**) prior to entry.
    - iii. **Proper Clothing and Equipment**
      - a. Long pants are required to protect lower extremities from burns and cuts when crossing steam lines and walking in tight quarters.
      - b. A communication device (radio or cell phone) is required in utility tunnels.
      - c. Additional equipment and protective clothing (e.g., flashlight, safety footwear, safety glasses, hardhat, leather gloves, long-sleeve shirt) may also be required.
    - iv. **Security**
      - a. Facilities, University Police, Information Technology, and Environmental Health and Safety (EHS) have permanent access to the utility tunnels. If employees from other departments or contractors need access, they must coordinate entry with Facilities or Information Technology.
      - b. All access points for utility tunnels must be either secured or continuously monitored during entry to prevent unauthorized entry.
      - c. All utility tunnels must be marked with signage indicating the entry requirements (e.g., permit-required confined space, safe operating procedures required).
      - d. Prior to entering and working in a restricted utility tunnel, University Police and EHS must be notified of the anticipated duration and location of the work to be performed.
      - e. Upon exiting a restricted utility tunnel, University Police and EHS must be notified that the space is evacuated and work is complete.
    - v. **Additional Requirements**
      - a. When working in a utility tunnel, access hatches or doors near the work area must be opened and barricaded to ensure at least two points of entry and exit separate and remote from one another can be maintained; if a fixed ladder is not installed at the hatch, an extension ladder must be supplied.
      - b. Prior to working in tunnels with mechanical ventilation, verify the ventilation is working properly at its control panel.
- D. Contractor Work in Tunnels**
- i. Contractors whose scope of work involves working in the tunnels will be informed of the conditions and requirements for accessing the tunnels by Facilities Operations, Capital Projects, or Information Technology.
  - ii. The contractor will assume overall responsibility for the work site.
  - iii. If the contractor encounters additional hazards within the tunnel or performs work that creates an additional hazard, the contractor must:
    - a. Exit the tunnel immediately,
    - b. Bring additional hazards to Northwestern’s attention, and
    - c. Comply with Northwestern’s Confined Spaces Program and applicable regulations (i.e., 29 CFR 1910.146 and 29 CFR 1926.800).