

**ADVISORY 2.0: GUIDELINES FOR CONFINED SPACE AND  
PERMIT-REQUIRED CONFINED SPACE ENTRIES**

**PURPOSE:**

The purpose of this Advisory is to provide an overview of OSHA Standard 29 CFR 1910.146, *Permit-Required Confined Spaces*. It is intended to inform University of Cincinnati employees about:

- confined space,
- permit-required confined space, and
- non-permit confined space; and to
- provide an overall understanding of the requirements for working in permit-required confined spaces, and
- ensure compliance with the applicable requirements of the OSHA confined space standard.

Confined spaces pose special dangers for workers because the areas are not designed for human occupancy and the configuration of the opening restricts entry and egress. Examples include tanks, vessels, silos, storage bins, hoppers, vaults, and pits.

Directors of University of Cincinnati departments or other administrative units (departments / units) whose jurisdictions include permit-required confined spaces should refer to OSHA Standard 29 CFR 1910.146 ([www.osha.gov/comp-links.html](http://www.osha.gov/comp-links.html)) to insure that their confined space entry programs are in full compliance with the provisions of this Standard.

**DEFINITIONS:**

OSHA defines a ***confined space*** as meaning any space that includes all of the following conditions:

1. large enough and so configured that a person can bodily enter and perform assigned work; and
2. has limited or restricted means for entry; and
3. the space is not designed for continuous employee occupancy.

A ***permit-required confined space (permit space)*** has in addition to the three conditions above that define a *confined space*, one or more of the following characteristics:

1. Contains or has a known potential to contain a hazardous atmosphere;
2. Contains a material with 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 that slopes downward and tapers to a smaller cross-section; or
4. Contains any other recognized serious safety or health hazards.

A ***non-permit confined space*** is a confined space that does not contain, or have the potential to contain, an atmospheric hazard capable of causing death or serious physical harm.

**HAZARDOUS ATMOSPHERE:**

OSHA defines a hazardous atmosphere as an atmosphere that may expose workers to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- Flammable gas, vapor, or mist in excess of 10% of its lower flammable limit (LFL).
- Airborne combustible dust at a concentration that meets or exceeds its LFL.
- Atmospheric oxygen concentration below 19.5% or above 23.5%.
- Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, of the OSHA General Industry Standard (29 CFR 1910.1000), and which could result in employee exposure in excess of its dose or permissible exposure limit.
- Any other atmospheric condition that is Immediately Dangerous to Life or Health (IDLH).

University of Cincinnati employees should only enter permit-required confined spaces:

- a) if the nature of their work requires it, and
- b) providing that they have been specifically trained for work in permit spaces.

Employees and contractors could encounter permit spaces in some maintenance operations and during emergencies when the natural human reaction is to attempt a rescue. However, all too often, unprepared rescuers become victims themselves. Training, communication, and the implementation of safe operating procedures specified in permit-required confined space entry programs can prevent the potentially tragic consequences of permit space entries during routine maintenance and/or emergency rescue operations.

**RESPONSIBILITIES**

These guidelines apply to all University of Cincinnati employees and to contractors who may be required to enter permit spaces at the University as part of their work environment. University departments/units whose jurisdiction includes permit spaces are responsible for ensuring that University employees who might be required to enter permit spaces are fully qualified, trained, and are provided with all available information on the hazards, safe-operating procedures, conditions of the permit, and emergency procedures. Site specific implementation must be carried-out through existing organizational line functions. The Directors of Operations and Maintenance in Facilities Management and other units must initiate a site-specific Permit-Required Confined Space Program integrated within their work activities and facilities under their control.

Each department/unit shall appoint a safety liaison and a person appointed to be responsible for overseeing all confined space entries. If any person within the departments/units has confined space entry as part of their work requirements, a program has to be developed. A Permit-Required Confined Space Program is the overall program for controlling, and where appropriate, for protecting employees from permit space hazards and for regulating employee entry into permit spaces.

Independent contractors whose work requires entering permit spaces at the University of Cincinnati must submit an acceptable, written permit-confined space program to the department contracting for their services (Construction Management, Facilities Management, etc.).

**Permit Space Entry Supervisor:**

The Director or Head of the employing department/unit shall appoint the Entry Supervisor. The Entry Supervisor is the person responsible for:

- determining if acceptable entry conditions are present at a permit space where entry is planned,
- for completing and posting the entry permit at the entry location,
- for advance notification of rescue services as appropriate,
- for authorizing entry and overseeing entry operations, and
- for terminating entry as required by the OSHA Standard.

The Entry Supervisor also has the primary responsibility to ensure that:

- Employees are fully qualified to safely enter, work in, and perform rescue in permit spaces.
- Employees have been instructed to follow all of the provisions of the written program and the OSHA Standard 29 CFR 1910.146.

**Permit Space Attendants & Authorized Entrants:**

University of Cincinnati employees who are trained to serve as permit space attendants or authorized entrants are responsible for:

- Complying with the provisions of the written program and the OSHA permit-required confined space standard,
- Following the directions of the Entry Supervisor
- Taking all measures necessary to protect themselves and co-workers from the hazards of working in permit-required confined spaces.

Employees who have not received training for permit-required confined space entry should not attempt to enter permit spaces.

**Environmental Health & Safety:**

The Environmental Health & Safety Office will provide training and technical assistance to Directors and Supervisors of departments/units having permit-required confined spaces within their areas of jurisdiction to enable them to provide training to ensure that their employees are qualified to safely work in permit-required confined spaces. Call 556-4968 for assistance.

**MAJOR ELEMENTS OF A PERMIT-REQUIRED CONFINED SPACE PROGRAM INCLUDE:**

- Permit-Required Confined Space Designation: Inventory and Labeling
- Permit Requirements
- Isolation and Security
- Training (including periodic training with rescue service personnel)
- Buddy System
- Personal Protective Equipment
- Purchase of Monitoring and Retrieval Equipment for Sites
- Outside Contractors

**Confined Space Designation – Inventory and Labeling:**

- University of Cincinnati operations and maintenance departments will inventory and evaluate work places under their jurisdiction to determine the spaces that should be designated as permit-required confined spaces.
- Managers of operations and maintenance departments will inform employees by posting signs reading

**DANGER  
PERMIT-REQUIRED CONFINED SPACE  
DO NOT ENTER**

and by providing education or training on the existence, location, and danger posed by the permit-required confined spaces.

- University departments/units having jurisdiction over permit spaces are required to inventory and label with appropriate signage all permit spaces. This inventory (**See Appendix A**) will be reviewed and updated annually by the responsible departments or administrative units, or when conditions change.
- Annual updates of the permit space inventory and site location maps with legends showing any additions or deletions shall be provided to Environmental Health and Safety by departments/units responsible for performing the inventory.

**Permit Requirements:**

- All permit spaces are considered to be Immediately Dangerous to Life or Health (IDLH) until proven otherwise. IDLH is defined by OSHA as any condition that poses an immediate or delayed threat to life, or that would cause irreversible adverse health effects, or that would interfere with an individual's ability to escape unaided from a permit-required confined space.
- **It is the policy of the University of Cincinnati that all entries into *permit-required confined spaces* require an Entry Permit. A sample entry permit is shown in Appendix D of the OSHA Standard 29 CFR 1910.146.**
- The Entry Permit is a written authorization by a qualified person that provides for safe work practices in a permit space. Permits shall be issued by the department implementing the work.
- The Entry Permit is the authorized document permitting a trained worker to enter a permit space based upon the entry supervisor's instructions regarding entry preparation, hazard identification atmospheric testing, personal protective equipment (PPE), safety devices, safe operating procedures, and emergency procedures. The Entry Permit must be completed, signed by the appropriate supervisors, and posted in a conspicuous place, i.e., by the point-of-entry, *before* entry into any permit-required confined space. The original copy of the permit shall be sent to the Environmental Health and Safety Office (ML 0218) where it will be retained for five years. The posted copy must be removed after work in the permit space has been completed.

**Isolation and Security:**

Isolation or lockout and tagout procedures to control hazardous energy sources will be implemented. (See EH&S Advisory 2.1 and OSHA Standard 29 CFR 1910.147 for additional information.) All energy sources must be secured and made intrinsically safe. Permit spaces must be guarded to prevent unauthorized or accidental entry.

**Training:**

The Entry Supervisor will hold a pre-entry safety briefing with authorized entrants, attendants, and rescue team members to ensure that they understand the hazards, their responsibilities, the safety equipment to be used, and what to do if an emergency situation arises.

University of Cincinnati employees will not be permitted to enter permit-required confined spaces until they have received adequate training and understand all of the information presented. Authorized entrants, attendants, rescue team members, and personnel in charge of authorizing entry shall be trained to work safely in and around permit-required confined spaces. This training will be provided annually and will at a minimum include:

- First aid and CPR
- Duties of authorized entry personnel
- Duties of attendants
- Duties of personnel authorizing or in charge of the entry
- Duties of personnel responsible for monitoring and emergency rescue
- Hazard recognition
- Communications
- Safety and personal protective equipment
- Safe operating procedures
- Isolation of energy sources; lockout and tagout procedures
- Atmospheric monitoring

Training records will be maintained by Environmental Health & Safety for a minimum of three (3) years.

**Buddy System:**

The "buddy system" will be used for entry into permit-required confined spaces. At least one authorized attendant will be stationed just outside the access opening while the space is occupied. Also, an adequate number of rescue personnel will be readily available to respond in an emergency situation. The attendant must:

- Maintain continuous awareness of the activities and well being of the person(s) in the permit space through visual and/or voice contact.
- Be trained, qualified capable, equipped, and ready to summon emergency assistance and to assist in emergency rescue.
- Not enter the permit space or leave the area until another qualified person is on duty.
- Continuously maintain an accurate count of all persons inside the permit space.
- Know of, recognize and monitor for potential hazards inside and outside the confined space.

**Personal Protective Equipment:**

All PPE must be approved for the hazards of the permit-required confined space.

Entry will be made only with a back-up person present. PPE varies with the work to be performed and the type of atmosphere present. PPE for permit-required confined space entry may include:

- Approved safety glasses (ANSI Z-87.1)
- Approved steel-toe shoes (ANSI Z-41)
- Approved hard hat (ANSI Z-89.1)
- Tyvek suit
- Protective gloves
- NIOSH-approved half- or full-face respirator (see Advisory 11.1, "Respiratory Protection Program")
- Approved self-contained breathing apparatus (SCBA) with 5-minute escape cylinder (NIOSH).

**Purchase of Monitoring and Retrieval Equipment:**

All purchases of monitoring and retrieval equipment are the responsibility of the department maintaining the respective sites.

**Outside Contractors:**

When outside contractors are utilized by Construction Management, Facilities Management, or other departments/units whose jurisdictions include permit-required confined spaces, the department making arrangements for the work will be responsible for distributing the confined space inventory and site locations to the contractor(s). All contractors must have a comprehensive safety program in place that includes permit-required confined-space operations.

Independent contractors whose work requires entering permit spaces at the University of Cincinnati must submit an acceptable, written permit-confined space program to the department contracting for their services (Construction Management, Facilities Management, etc.).

Contact Environmental Health & Safety project engineers on 556-4968 for assistance with outside contracts.

**INTERNAL ATMOSPHERIC TESTING AND MONITORING:**

Before an employee enters the permit space, the internal atmosphere shall be tested with a calibrated, direct-reading instrument for oxygen content, for flammable gases and vapors, and for potential toxic air contaminants, in that order. Testing must be conducted by a trained, qualified person using state-of-the-art, direct-reading instruments (oxygen meter, combustible gas meter, organic vapor analyzer, etc.). The instruments must be properly calibrated in accordance with manufacturers' recommendations. University of Cincinnati employees will have atmospheric monitoring equipment calibrated prior to testing confined-space atmospheres and entering a confined space.

Instruments will test for *hazardous atmospheres*:

- Oxygen deficiency (below 19.5%)
- Oxygen enrichment (above 23.5%)
- Flammable or explosive levels (above 10% of the lower flammability level [LFL] or lower explosive limit [LEL])
- Toxic materials (above PEL, TLV, or REL).

**No person shall be permitted to enter or remain in a permit-required confined space if a hazardous atmosphere exists or instrument alarms sound.**

If a self-contained breathing apparatus is not worn, oxygen levels will be continuously monitored when the permit space is occupied. The Entry Supervisor will determine if continuous or periodic monitoring for atmospheric contaminants will be conducted to ensure that acceptable conditions are present. Employees who are authorized permit space entrants, or their authorized representatives, shall be provided the opportunity and are encouraged to observe any testing of the space that is conducted prior to entry or subsequent to such entry during the required, periodic monitoring of the space to insure that a safe atmosphere exists within the permit space.

**INSTRUMENTS:**

Instruments must first be checked in fresh air for a proper zero indication for combustible and toxic gases and 20.9% oxygen indication. Measurements will be taken through an opening in the down wind side of the space at enough locations (minimum of top, middle, and bottom) in the confined space to be representative of the atmosphere within the space. NOTE: Some chemical atmospheres are more or less dense than normal atmospheres.

**POST- CALIBRATION OF THE TESTING EQUIPMENT SHALL BE PERFORMED TO INSURE ACCURATE EQUIPMENT RESPONSE**

**HEAT STRESS / COLD STRESS:**

The permit space area should also be evaluated for heat or cold stress as appropriate. Attendants and authorized entrants should know the signs and symptoms of heat/cold stress and take the necessary precautions to protect the worker(s).

**EMERGENCY CONDITIONS:**

All entries will cease and all University of Cincinnati employees or students will immediately leave the confined space should a non-permit condition exist. This would include alarm signal(s), or other warnings such as employee symptoms of over-exposure, or sudden leaks of liquid or gas. An alarm would be a warning of an unsafe condition such as:

- an audible warning indicating an oxygen-deficient atmosphere (less than 19.5% oxygen); or
- a potential flammable hazard (greater than 10% LEL), or
- a toxic gas alarm greater than 35 ppm carbon monoxide (CO) or a 10 ppm hydrogen sulfide (H<sub>2</sub>S), or
- any other means of warning personnel (sirens, signal lines, etc.) of a non-permitted condition.

The permit-required confined space must be made as clean and free as possible of any hazardous materials prior to entry. The space may be pumped out, flushed, purged, steam cleaned, vacuumed, chemically neutralized, or ventilated as long as the methods and materials are compatible with the contents. A review of appropriate Materials Safety Data Sheets (MSDS) should be performed to confirm compatibility.

Positive mechanical ventilation may be used in conjunction with continuous atmospheric monitoring and with emergency rescue precautions in place in permit-required confined spaces with hazardous or potentially hazardous atmospheres. Ventilation equipment must be approved for the conditions and be capable of adequately ventilating the space. The ventilation air source must remain uncontaminated at all times. Mechanical equipment must be intrinsically-safe (non-sparking) where use in potentially explosive environments is expected.

Covers, lids, doors, and other objects must be removed or secured to prevent closing or falling into the space and to avoid obstructing the opening. Pedestrian, vehicle, or other barriers should be used as required to protect entrants from external hazards.

Hot-work, e.g., welding, cutting, or burning, in permit spaces must meet the OSHA requirements stipulated in 29 CFR 1910.252(c)(4) including the provision of forced local exhaust ventilation and continuous air monitoring. Gas supply cylinders must not be placed into the permit space area at any time. When hot work operations cease for a period of thirty minutes or more, gas lines must be removed or disconnected outside the confined space.

All contaminated equipment or items removed from the confined spaces should be handled in accordance with established facility decontamination and/or disposal procedures.

All University of Cincinnati employees and students who are performing permit-required confined space entry duties must receive and pass a physical examination administered by University Health Services assuring that they are physically able to perform the activities and use the monitoring, rescue, and respiratory protection equipment.

Respirator users shall be fit-tested and trained in the use of respiratory protection equipment that they will use during normal permit-required confined space activities and emergencies in accordance with the OSHA respiratory protection standard 29 CFR 1910.134 and the University of Cincinnati Respiratory Protection Guidelines described in Advisory 11.1.

Entrants will be briefed on the hazards of the permit space and the purpose of the entry. Each authorized entrant, or the entrant's authorized representative, is to be provided an opportunity to observe the pre-entry testing and any subsequent testing or monitoring of the permit space(s).

The department head, or other designated individual, issuing the permit must ensure that rescue personnel are notified and available to respond in a timely manner considering the hazard(s) identified in the permit space prior to anyone entering the space.

Appropriate measures to prevent unauthorized entry will be implemented. These measures include, but are not limited to: barricades, posting a guard, physical, mechanical, or other means. The permit space must not remain open and unattended unless other means of safeguarding the permit space are employed to prevent unauthorized entry.

Entrants must wear personal protective equipment (PPE) that is appropriate for the specific hazards. All entrants must be properly trained and fitted to wear PPE under the conditions of the work and be medically cleared to do so.

**RESCUE AND EMERGENCY SERVICES:**

Directors and Supervisors of departments/units having permit-required confined spaces within their areas of jurisdiction should refer to §1910.146 (k) and non-mandatory Appendix F "Rescue Team or Rescue Service Evaluation Criteria" to insure that plans to use local fire departments for rescue services are properly coordinated with local fire department representatives. It is essential to evaluate a prospective rescuer's ability to respond to a rescue summons in a timely manner considering the hazards identified. The definition of "timely" will vary according to the specific hazards involved in each entry.

**Note:** OSHA Standard 1910.134 "Respiratory Protection" §(g)(3) requires that a standby person or persons be stationed at the entry site capable of immediate action to rescue employees wearing respiratory protection while in work areas defined as Immediately Dangerous to Life and Health (IDLH).



Emergency rescue plans are to be made prior to entering a permit-required confined space. All emergency rescue personnel and equipment must be readily available. Emergency rescue techniques should be practiced outside of the confined space whenever possible. **Under no circumstance should a confined space attendant enter the space to attempt a rescue alone.** The rescue team must be fully equipped and prepared to complete a rescue.

**Rescue Team:**

The rescue team will consist of qualified, trained individuals that have been informed of the work activity and hazards of the permit space. They will be equipped and ready to perform rescue during the permit space entry. The rescue team must practice performing confined space rescue operations at least once every twelve months. If outside response personnel are used to assist in the rescue of confined space entrants, they must be informed of the hazards prior to entering the permit space.

**Minimum Rescue Procedures:**

Rescue procedures should be defined prior to allowing entry into a permit-required confined space. Review the following:

- ✓ Ensure that appropriate rescue equipment is present at the entrance of the permit space or is immediately available for the rescue team.
- ✓ If the employees entering the permit space are wearing a safety harness or wrist harness attached to lifelines, make certain their harness is secured and tied-off.
- ✓ If safety harnesses and lines are not feasible, determine an alternative means of rescue.
- ✓ Make sure the rescue team has been notified prior to starting entry activities and is able to effect the rescue within a reasonable time.
- ✓ Make plans for summoning outside emergency response assistance authorities, e.g., emergency medical assistance.
- ✓ In the event of an emergency, Attendants must observe entrant(s) until help arrives. A single Attendant may not enter a permit space to attempt a rescue or leave the area before help arrives.
- ✓ Attempt to identify the cause of an emergency so that proper response action can be taken.
- ✓ Be prepared to prevent additional entry personnel from entering the permit space if a hazardous condition or emergency situation occurs

**RECORDS:**

All testing, monitoring, and calibration records must be kept on file for a minimum of three (3) years.

**ADDITIONAL RESOURCES:**

<http://www.cdc.gov/niosh/>

<http://www.osha.gov/comp-links.html>

<http://www.osha-slc.gov/SLTC/confinedspaces/index.html>

NIOSH Publication No. 86-110 *Preventing Occupational Fatalities in Confined Spaces*

NIOSH Publication No. 80-106 *Criteria for a Recommended Standard...Working in Confined Spaces.*

**APPENDIX A**

**CONFINED SPACE INVENTORY**

**Academic Areas**

<b>BLDG. CODE</b>	<b>SPACE LOCATION</b>	<b>TYPE OF SPACE</b>	<b>PERMIT</b>
ALMS	Room 500C	Return air duct chase	
ALMS	Intake wells for AC-7		
ALMS	Access in duct work for AC-8		
ALMS	Behind fan AC-8		
ARMRY	East & west mechanical room	Crossover tunnel between the rooms	No
ARMRY	East & west	Horizontal pipe run off mechanical room	Yes
BALDW	Off Room 436	Old building ventilation shafts	No
BLEGN	Room 101A entry to chase	Crawl space tunnel for steam & water pipes	No
CASCI	Outside along Victory Pkwy.	Domestic water pits (3)	
CASCI	Boiler room	Manhole, electrical service	
CRSLY	Rms. 1603A & 1606	Chase	No
CRSLY	Rms. 1500, 1501-C, 1504, 1505, 1509	Chase	No
CRSLY	Rms. 1301, 1301B, 1302, 1307-D, 1308	Chase	No
CRSLY	Rms. 1101, 1102, 1103, 1107, 1108, 1109	Chase	No
CRSLY	Rms. 1110, 1115, 1117, 1118, 1121	Chase	No
CRSLY	Rms. 900, 901, 902, 903, 907, 908	Chase	No
CRSLY	Rms. 700, 704, 705, 708, 710, 711	Chase	No
CRSLY	Rms. 500, 502, 503, 506-B, 508	Chase	No
CRSLY	Rms. 300, 302, 304, 310, 312, 313	Chase	No
CRSLY	Floors 15, 13, 11, 9, 7, & 5	Duct chase across from elevator	No
EDNGR	Driveway northeast	Electrical pit	No
EDWRDS	Pit for steam	Condensate & chilled water entry / exit	Yes
HPB	HPB North Wing to Kettering North Wing	Utility tunnel	No
HPB	South Wing, G-Level	Crawl space, dirt floor, 6 ft. high	No
HPB	Off Main Hallway	Tunnel	No
HPB		Tunnel leading to Holmes Hospital	No
HPB	Front yard and side yard	Manholes (2)	Yes
KETTRG	Room B-5	Mechanical room sump	
KETTRG	Room B-9	Crawl space, dirt floor, 4- 8 ft. high	No
KETTRG	Front yard	Manhole	Yes
KETTRG	Side yard, west	Manhole for lab waste neutralization sump	
KETTRG	Side yard, west	Manhole for storm water retention tank	
KETTRG	Side yard, west	Air intake structure, 25 ft. deep	No
KETTRG	NW corner outside	Manhole, electric feeders (high voltage)	
KETTRG	Yard outside, along north wall	Electrical pit	Yes
LANGSM	6th floor near Stairway 13	Pipe chase	No
LAUR	Under main mechanical room floor	Outdoor air intake	
LNDR	Access door to Return Air Fan #1		
LNDR	Access door to AC-2	Return ducts for fire damper and mix-damper	
LNDR	Access door to Return Air Fan #2		
LNDR	Access door to AC-3		
LNDR	Room 002-B	Duct for fire damper	
LNDR	Ground level, unexcavated	Storage room	No
LNDR	Ceiling above restrooms	Access door to piping	No

LNDR	1st floor	Access door for fire damper	
LNDR	Rooms 214 or 222, entry	Duct chase	
LNDR	Room 211	Access door in ceiling for fire damper	
LNDR	G-06 & elevator	Unfinished room storage-entry hatch, back wall	
LOGAN	Basement	Crawl space, concrete	Yes
MCM	Room 48, entry from	Tunnel for steam and water pipes	
MSB	Sub-receiving level	Tunnel	No
MSB-outside	Parking area of driveway	Brine tanks for salt water / softener	Yes
MSB	Multiple	Blind utility cores (survey in process)	No
MSB	?	Vent pipe chase	No
MSB	Kresge Auditorium, E & R levels	Hatch solid ceiling fire walls and tunnel	No
MSB-outside	?	Electric and water meter manholes	Yes
MSB	?	Acid-waste drain sump	Yes
MSB	R-Level animal quarters	Space above plaster ceiling under floor slab	No
NIPP-outside	Sidewalk manhole	Entry to steam tunnel	
OSHRN	North, south, and east	Unexcavated crawl space	No
PROCTR	Basement	Horizontal pipe run	No
PROCTR	G-Level overhang	2 ft. high entry to pipe chase	No
RHODES	Rms. 407B & 407C	4th floor mechanical room	Yes
RHODES	Rm. 1003	Roof still room	No
RHODES	9th Floor	Hood fan sheets access areas	No
RHODES	Room 902	Hood fan chase	Yes
RVSCL	Ceiling above Rms. 823A--823D	Animal rooms	No
RVSCL	Access door for fan, AC 1-11		
RVSCL	Access door for fan, AC 1-10 (2)		
RVSCL	Room 819	Area behind autoclave	
RVSCL	Room 821-B	Chase	
RVSCL	Stairwells, both	Area above ceilings	
RVSCL	Chase Rm. 731 in all restrooms	Access hatch to pipes	No
RVSCL	Rooms 614A & 614B	Chase	
RVSCL	Duct on AC-15 for fire damper		
RVSCL	Rms. 412, 417, 422A	Chase	
RVSCL	Rms. 420S, 429F, 429H, 429V, & 431	Chase	
ROTC	Crawl space under most of building	Water supply and drain lines	Yes
SRU	1st floor	Crawl space above plastered ceiling	No
VARIOUS	Streets	Manholes--investigation in process	
WHERRY	Mechanical room & basement	Crawl space, dirt floor, 4 ft. high inside	No
WHERRY	Front yard	Manholes (2)	Yes
WILSON	Access door in 191-B stair		
WILSON	Rms. 215 & 216	Area above ticket booth	No
WILSON	Rms. 311A & 311B		
WILSON	Upper part of Room 405-A		No
WILSON	Rms. 111, 111A--111C	Mechanical room and utility areas	
WLFSN	Air intake for AC-10		
WLFSN	Dust collector		
WLFSN	3rd & 5th floor mens' restrooms	Above ceiling pipe chase	No
WLFSN	4th & 6th floor women's' restrooms	Above ceiling pipe chase	No
WLFSN	7th floor mechanical room	Pipe chase	
ZIMMR	Rm. 315 mechanical room	Utility supply tunnel	No

ZIMMR	Above Zimmer Auditorium	Space above ceiling	

**CONFINED  
SPACES--UTILITY  
PLANTS**

BUILDING	SPACE LOCATION	TYPE OF SPACE	PERMIT
E&W CU Plant	Ground level air intake, supply side of fan	Duct, fresh air intake, fan #1 & #2 boilers	Yes
E&W CU Plant	Boiler #1 & #2, ground level	Water wall drums (2) north & south	Yes
E&W CU Plant	Boiler #1 & #2, ground level	Gas/oil combustion chamber (furnace)	Yes
E&W CU Plant	Boiler #1 & #2, ground level	Steam drum	Yes
E&W CU Plant	Boiler #1 & #2	Deck above ground floor economizer	Yes
E&W CU Plant	Boiler #1, ground level	Wind box (duct)	
E&W CU Plant	Boiler #2, ground level	Wind box (duct)	
E&W CU Plant	Boiler #1 upper catwalk	Duct breeching going out to stack	Yes
E&W CU Plant	Upper deck, north side of plant	Deaerator tank	Yes
E&W CU Plant	Below deaerator tank	Heater tank holds water	Yes
E&W CU Plant	Ground level, north end	Water softener tanks for City water (3)	Yes
E&W CU Plant	Ground floor, northeast	Brine storage tank	
E&W CU Plant	Ground level, northeast	Tank #1&#2; condensate softener tank (polishing)	Yes
E&W CU Plant	Ground floor	Soft water tank	
E&W CU Plant	Ground floor, north side	Condensate tank	
E&W CU Plant	Below grate in floor, ground level	Pit for supply steam	No
E&W CU Plant	Entrance (East End) to main utility tunnel	Sump pit	Yes
E&W CU Plant	Lower level	Compressed air tank (instrument air)	Yes
E&W CU Plant	Lower level	Air receiver tank (service air)	Yes
E&W CU Plant	Lower level	Sump pit	Yes
EC Power Plant	North end of firing lane	tank	Yes
EC Power Plt.	3rd level mezzanine	Deaerator tanks (2)	Yes
EC Power Plt.	Ash pit for boiler #4, basement	Ash pit	Yes
EC Power Plt.	Boiler #4, basement	Fly ash hopper	Yes
EC Power Plt.	Boiler #5, ground level	Exhaust gas ductway	Yes
EC Power Plt.	Boiler #5, ground level	Exhaust duct under economizer	Yes
EC Power Plt.	Boiler #4	Firebox/combustion chamber	Yes
EC Power Plt.	Boiler #4	Fly ash cinder reinjection hopper	Yes
EC Power Plt.	Boiler #3 basement	Soot blower air tank	No
EC Power Plt.	Boiler #3 basement	Fly ash hopper	Yes
EC Power Plt.	Boiler #4, basement	Boiler #4 sump	Yes
EC Power Plt.	Boiler #5	Firebox/combustion chamber	Yes
EC Power Plt.	Boiler #3 basement	Blowdown tank sump	Yes
EC Power Plt.	Boiler #4, lower steam drum	Steam drum	
EC Power Plt.	Boiler #2, exhaust duct after economizer	Exhaust duct	Yes
EC Power Plt.	Boiler #2, south side, ground level	Flue gas duct	Yes
EC Power Plt.	Boiler #2, east side	Mud drum area	Yes
EC Power Plt.	North end of firing lane	Brine tank for water softener	
EC Power Plt.	Boiler #2 exhaust duct, top, west side	Exhaust duct	Yes
EC Power Plt.	Grate area of boiler #3 between grates	Grate	Yes
EC Power Plt.	Boiler #3	Firebox/combustion chamber	
EC Power Plt.	Boiler #3, ground level	Firebox, boiler #3, west side at ash pit	Yes

EC Power Plt.	Boiler #3, gas passage entrance	Exhaust gas passage	Yes
EC Power Plt.	Boiler #3, east side	Cinder return hoppers (2), north & south	Yes
EC Power Plt.	Boiler #5, 3rd level	Steam drum	Yes
EC Power Plt.	Between ground and 2nd level	Hopper feeding Boiler #5	Yes
EC Power Plt.	Boiler #5, 3rd level	Duct before economizer tubes	Yes
EC Power Plt.	Boiler #4, 3rd level	Duct for flue gas after tertiary filter	Yes
EC Power Plt.	Boiler #3, 3rd level	Duct at outlet end of induced draft fan	
EC Power Plt.	Boiler #4, 3rd level	Fly ash hopper	Yes
EC Power Plt.	Boiler #4, 3rd level	Access to top of boiler tubes	Yes
EC Power Plt.	Boiler #4, 3rd level	Inside boiler above economizer behind steam drum	Yes
EC Power Plt.	Boiler #4, 3rd level	Steam drum	Yes
EC Power Plt.	Boiler #4, 3rd level	Duct	Yes
EC Power Plt.	Boiler #4, 3rd level	Tertiary filter for flue gas	
EC Power Plt.	Boiler #4, 3rd level	Duct for induced draft fan	Yes
EC Power Plt.	Boiler #3, 3rd level	Duct for induced draft fan	
EC Power Plt.	Boiler #3, lower level	Blowdown tank	Yes
EC Power Plt.	Boiler #3, lower level basement	Ash pit for boiler #3	Yes
EC Power Plt.	Boiler #2, 2nd level	Duct exhaust out to stack	Yes
EC Power Plt.	Boiler #3, ground level	Drum (tank) middle drum	
EC Power Plt.	Boiler #2, 3rd level	Drum (tank) steam drum	Yes
EC Power Plt.	Boiler #2, ground level	Fire box for boiler #2	Yes
EC Power Plt.	Boiler #2, ground level, burns gas & oil	Tank (drum) steam drum	Yes
EC Power Plt.	Boiler #2, ground level	Box	Yes
EC Power Plt.	Fan intake	Fan intake	Yes
EC Power Plt.	Steam tunnel by women's restroom	Steam tunnel	Yes
EC Power Plt.	West side by ash hopper	Fly ash catch basin	Yes
EC Power Plt.	Coal handling area below hopper	Compressed air tank	No
EC Power Plt.	Rooftop	Steel silo	Yes
EC Power Plt.	Blow down room	Blow down tank	Yes
EC Power Plt.	Rooftop above ash silo	Tertiary bag house filter	Yes
EC Power Plt.	Rooftop	Concrete coal silo	
EC Power Plt.	Rooftop above boiler #3	Bag house dust hoppers A,B,C,D	Yes
EC Power Plt.	Rooftop ESP above boiler #4	Dust/ash collection hoppers A,B	Yes
EC Power Plt.	Rooftop above boiler #3	Coal bunker for boiler #3	Yes
EC Power Plt.	Rooftop chiller 1,2,3	Access under rooftop chiller/cooling tower	No
EC Power Plt.	Absorber room	Chilled water expansion tank	Yes
EC Power Plt.	West side coal hopper below ground level	Hopper	Yes
EC Power Plt.	Stack on south side for boiler #5	Exhaust stack	Yes
EC Power Plt.	South side of power plant	Ash silo	
EC Power Plt.	Engine room	Feedwater heater tanks (2)	Yes
EC Power Plt.	Top of cooling tower for chillers 1,2,3	Access hatches (3) for packing for 3 fans	Yes
EC Power Plt.	Rooftop at electrostatic precipitators	Top of electrostatic precipitators	Yes
EC Power Plt.	Rooftop at electrostatic precipitators	Insulator box	Yes
EC Power Plt.	Roof	Electrostatic precipitator	Yes
EC Power Plt.	Cooling tower for #4 & #5 chillers	Cooling tower access opngs (4) on top side of fill	
EC Power Plt.	Baghouse A-D bypass access to gate roof over boiler #3		Yes
EC Power Plt.	Duct between baghouses A,B,C,D	Duct	Yes

EC Power Plt.	Rooftop above boiler #3	Bag house top side	Yes
EC Power Plt.	Rooftop of bag house	Exhaust duct above bag house horizontal run	Yes
EC Power Plt.	Silo	Coal bag house (from other bldgs. list)	Yes
EC Power Plt.	Baghouse, roof level, utility plant	Coal dust (from other bldgs. list)	Yes
EC Power Plt.	Tunnel from power plant to West Campus	(from other bldgs. list)	No
WCUTL	East side of Utilities	coal hopper	Yes
WCUTL	Pump room	condensate tank	Yes
WCUTL	Under grate	6 damper for boiler #4	Yes
WCUTL	Outside east side of maint shed, beneath chiller	50,000 gal. fuel oil tank	Yes
WCUTL	Chiller plant	Blow-down tank	Yes
WCUTL	Chiller plant	Chilled water surge tanks (2)	Yes
WCUTL	Chiller plant	Air receiver tank	Yes
WCUTL	Chiller plant, SE corner, outside	Brine tank	Yes
WCUTL	Steam plant boiler #1	Furnace (fire box)	Yes
WCUTL	Steam plant boiler #1	Cinder return pit	Yes
WCUTL	Steam plant boiler #1	Inside furnace B/N grate	Yes
WCUTL	Steam plant boiler #1	Mud drum	Yes
WCUTL	Steam plant boiler #1	Mechanical collector, fly ash	Yes
WCUTL	Steam plant	Fly ash bin	Yes
WCUTL	Lower level, boiler #1	Ash pit	Yes
WCUTL	Lower level (#1 basement) boiler #1	Fly ash pits	Yes
WCUTL	Heater room	Heater tank	Yes
WCUTL	Upper level, boiler #1	Steam drum	Yes
WCUTL	Boiler #1, steam plant	Gas passage duct	Yes
WCUTL	Heater room	2 Deaerator tanks	Yes
WCUTL	North end, west side of roof	3 ash hoppers for #1 precipitator	Yes
WCUTL	Roof	#1 precipitator	Yes
WCUTL	Top of precipitator #1	Precipitator #1 doghouses (3)	Yes
WCUTL	#1 Precipitator	Inside top of precipitator #1	Yes
WCUTL	NW corner of roof	Ash hopper for precipitator #4	Yes
WCUTL	NW portion of roof	Precipitator #4 doghouses (3)	Yes
WCUTL	N side ash silo	Ash silo	Yes
WCUTL	Roof	#1 precipitator, outlet duct	Yes
WCUTL	Flight conveyor room	Coal bunker	Yes
WCUTL	Top of coal silo	Conveyor duct	Yes
WCUTL	Top of coal silo	Coal silo	Yes
WCUTL	SE rooftop	Cooling tower 8-10	
WCUTL	Roof	Cooling tower top 1-7	Yes
WCUTL	Ground level #2 boiler still in service	Furnace combustion chamber, oil fired	Yes
WCUTL	Ground level #2 boiler	Steam drum	Yes
WCUTL	Steam plant, boiler #2 (gas)	Duct beneath boiler and economizer	Yes
WCUTL	Steam plant	Exhaust duct above economizer	Yes
WCUTL	Steam plant, boiler #3 (not in service)	Furnace combustion chamber	Yes
WCUTL	Steam plant, boiler #3	Under grate in firebox (combustion chamber)	Yes
WCUTL	Steam plant, boiler #3, basement	Ash pit	Yes
WCUTL		Mud drum	
WCUTL	Steam plant, upper deck	Return duct #4 precip., riser from precip. to upper deck inside bldg.	
WCUTL	Steam plant	Steam drums (3), center, front, & back	Yes

WCUTL	Steam plant, upper deck, boiler #2	Exhaust duct breeching	
WCUTL	Upper deck, steam plant	Duct exhaust to precipitator #4 (disconnected equipment)	
WCUTL	Steam plant, boiler #4	Steam drum	Yes
WCUTL	Steam plant, boiler #4	Mud drum	Yes
WCUTL	Steam plant, boiler #4 ground level	Fly ash bin (hopper)	
WCUTL	Basement, boiler #4	4 fly ash bins connected, open at top of funnel	
WCUTL	Steam plant, boiler #4	Combustion chamber	Yes
WCUTL	Basement, boiler #4	Ash hopper	Yes

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