# Appendix C

## Confined Space Summary

Appendix B provides a detailed listing of the specific confined space at each PCC campus/center but there are various types of spaces found throughout the campus/center. The following is a summary of the overall types of spaces found and the basic hazard issues.

The following spaces may be entered by trained and qualified PCC employees or by qualified contractors on behalf of PCC through Project Management systems. These include:

- **Vaults** - containing backflow (double check) valves, water shut off valves, fire protection system valves, electrical equipment, and telephone equipment.

- **Manholes** - sewage and storm manhole access.

- **Utility Tunnels in Basements**.

- **Boilers and Related Equipment** - there are no large boiler systems remaining at PCC. The boilers are now small units at each building. The units are about 3 feet by 4 feet in total size and do not have any openings large enough to enter.

- **Pits** - containing equipment, condensate drain, and other exhaust releases.

- **HVAC Units and Ductwork** - these commonly would be defined as confined spaces but they would be non-permit in character because there is no potential for oxygen deficiency under normal work entrance. There could be problems if specialized welding or chemical applications are made to the interior of spaces.

- **Cooling Towers** - these units are confined spaces but generally are non-permit because they have outside air flow into the units and would not have a hazardous atmosphere. However, if welding is performed or other types of chemical related activities occur, such as painting, the space would be permit required. **While cooling tower entry may be non-permit under normal conditions there can be problems of heat stress or other work conditions where the space classification would need to be changed to a permit.** There are also additional significant hazards when working on or in cooling towers including proper control of hazardous energy by lockout; fall protection is needed when working on top of towers especially when removing drift plates.

## Appendix C: PCC Confined Space Summary

| Campus Utilities Systems including Water and Irrigation-Water Vaults, Electrical/Telephone Vaults, and Sewer | | | | |
|---|---|---|---|---|
| **TYPE OF SPACE AND CLASSIFICATION** | **ACCESS/EGRESS** | **DESIGNED FOR OCCUPANCY** | **REASON FOR ENTRY AND SIZE** | **PERMIT CHARACTERISTICS[1]** |
| ***Domestic and Fire Water*** intake vaults with valves and backflow preventer, these are on every campus and center with some in vaults, some inside buildings, occupied basements, or ground floor spaces.<br><br>**PERMIT/ALTERNATE** | TYPES OF ACCESS INCLUDES: Metal hatch doors or round covers, many of the space are 8' deep with water valves and backflow preventer. The spaces that are shallow are shown on the index but are not confined spaces because a person cannot fully enter the space. | **NO** | At least annual testing of the backflow preventer and possible control of water to the campus | 1. Oxygen deficiency and toxic gas hazards in the space<br>2. Possible physical hazards from falling or slipping<br>3. High pressure water lines – physical pressure and drowning if lines are being opened. |
| ***Communication Systems Vaults:*** Telephone/Internet Equipment Vaults<br><br>**PERMIT/ALTERNATE** | These vary with square hatch or round manhole openings. Some of the vaults are about 6' to 8' deep with others less than 4' to 2' which makes the space too small to enter. | **NO** | Routine Maintenance | 1. Low voltage electrical systems<br>2. Oxygen deficiency<br>3. Falls from ladder or slipping |
| ***Electrical Equipment Vaults***<br><br>**PERMIT REQUIRED under Electrical Standards** | These vary with type of hatch or circular manhole openings. The vaults vary in depths from 12', 8' to shallow spaces for conduit. | **NO** | Routine Maintenance; Repairs to systems | 1. Electrical hazards and only qualified electrical workers may enter<br>2. Oxygen deficiency<br>3. Falls |

[1] Hazardous Atmosphere, Engulfment, Trapping Configuration, Other recognized hazards

## Appendix C: PCC Confined Space Summary

| TYPE OF SPACE AND CLASSIFICATION | ACCESS/EGRESS | DESIGNED FOR OCCUPANCY | REASON FOR ENTRY AND SIZE | PERMIT CHARACTERISTICS[2] |
|---|---|---|---|---|
| ***Manholes to pipe systems for SEWER INCLUDING SEWER LIFT STATIONS AND STORM WATER***<br><br>**PERMIT REQUIRED** | STANDARD manhole covers throughout campus. Generally there is no plan for PCC staff to enter sewers – contracted activity. | **NO** | System repairs, inspection, flow testing – all by outside contractors. | 1. Oxygen deficiency and toxic gas hazards in the space.<br>2. Sewer/water flow – engulfment.<br>3. Pathogenic micro-organism contact – infectious diseases.<br>4. Possible physical hazards from falling or slipping. |
| ***SYLVANIA ONLY: Tunnel system*** that runs the length of the campus under the buildings providing runs for water, sewer, utility services including electrical, phone, internet, HVAC hot water, HVAC units<br><br>**NON-PERMIT REQUIRD** | There are various entrances throughout the system, which include personnel stairs, ground floor personnel doors, and there are some hatches within building structures that lead to the underground tunnels.<br>HATCH ENTRANCES TO THE TUNNEL IN: LRC AND PAC | **YES**<br>Some areas of shops and the tunnels were designed for access to various utility systems for routine maintenance and inspection. | Routine maintenance and inspection of the utility systems. | 1. Most of the system is part of supply ventilation air so not an air quality issue.<br>2. ANY STEAM?<br>3. Much of the tunnels are like walking in a basement but there are horizontal chase runs that become narrow and low overhead.<br>4. Communication systems do not work throughout the tunnels for emergency notification. |
| ***Plumbing and Pipe Chases in various buildings.*** **These are open to the top of the interior roof area.**<br><br>**NON-PERMIT REQUIRED** | Generally not entered, but there are various openings especially in bathrooms that have valves, to access; generally require removal of walls. | **NO** | Special maintenance repair related to the plumbing system for water or sewage. | 1. As long as they are dry and absent of welding or chemical usage these are open to atmosphere safes so no air quality issue.<br>5. Access may result in fall protection hazard. |

[2] Hazardous Atmosphere, Engulfment, Trapping Configuration, Other recognized hazards

## Appendix C: PCC Confined Space Summary

| TYPE OF SPACE AND CLASSIFICATION | ACCESS/EGRESS | DESIGNED FOR OCCUPANCY | REASON FOR ENTRY AND SIZE | PERMIT CHARACTERISTICS[3] |
|---|---|---|---|---|
| ***OIL WATER SEPARATORS*** **(outside vault locations)**<br><br>**PERMIT REQUIRED** | Access through hatch doors or manhole covers, work would be done by a contractor. | **NO** | Most work is done with contractor vactor truck services but may need repairs. | 1. Oxygen deficiency and toxic gas hazards in the space.<br>2. Stormwater engulfment.<br>3. Pathogenic micro-organism contact from soil debris.<br>4. Possible physical hazards from falling or slipping. |
| ***Cooling Towers***<br><br>**PERMIT REQUIRED until all hazards controlled, NON-PERMIT** | Side door/hatchways and possible entry from the top. | **NO** | Cleaning and repairs to interior equipment | 1. Bacteria contact; potential Legionnaires bacteria.<br>2. Water tank.<br>3. Physical hazards including sloping sides, fall from top, large mechanical fan blades, electricity.<br>4. Welding repairs: toxic metal exposures (permit only procedure).<br>5. Heat stress in summer. |
| ***HVAC Air Supply Return Plenums and Fan Housings.***<br><br>**NON-PERMIT REQUIRED if proper lockout is followed and no fall hazards.** | Partially personnel door size openings that give access generally to the filters and cooling coils for maintenance.<br><br>Fan housings have hatch to door openings (most lockout) | **YES** for maintenance,<br><br>**NO** for continuous occupancy. | Routine filter and plenum cleaning, repairs and servicing motors and valves and lines. | 1. Physical hazards from fans, electrical systems require proper lockout.<br>2. May have small openings, tight space. |

[3] Hazardous Atmosphere, Engulfment, Trapping Configuration, Other recognized hazards

## Appendix C: PCC Confined Space Summary

| TYPE OF SPACE AND CLASSIFICATION | ACCESS/EGRESS | DESIGNED FOR OCCUPANCY | REASON FOR ENTRY AND SIZE | PERMIT CHARACTERISTICS[4] |
|---|---|---|---|---|
| ***BOILERS***<br>○ ***Older Style Boilers***<br>• ***Small cast iron Boiler too small to enter***<br>• ***New Condensing Water Heating systems too small to enter***<br>• ***None of the ductwork is large enough to enter***<br><br>**PERMIT REQUIRED if can be entered** | Bolted down fire box/tubes entry, which requires lockout and removal prior to opening. Back side to fire tubes is also bolted down. | **NO**<br>Requires significant preparation for taking boiler off line, cool down, lockout of natural gas, water lines and electrical in preparation for opening the vessel | Opening is only done by qualified boiler technicians and/or outside boiler contractors. Entry is only done for pressure vessel inspections or specialty repairs | 1. Thermal burns steam/hot water.<br>2. Fire hazard from natural gas.<br>3. Potential oxygen deficiency initially in the boiler tube but eliminated by opening both ends and using ventilation fan.<br>4. Physical hazards from water pressure and electrical systems require proper lockout. |
| ***Boiler Systems Expansion Hot Water Pressure Tank.***<br><br>**PERMIT REQUIRED if can be entered** | Access through a bolted bottom round plate. Lockout and draining the tank. | **NO**<br>Not designed for occupancy at all and in general no interior maintenance. Specialized repairs only. | Inspection may be done from outside, after proper lockout procedures to stop water flow. | 1. Thermal burns from hot water – need cool down and proper lockout and draining.<br>2. Oxygen deficiency.<br>3. Proper ladder set up for observation and/or entry through a bottom hatch. |
| ***TANKS, PRIMARILY FUEL TANKS***<br>Access manual holes and small access ports for filling the gasoline and diesel fuel dispensing system.<br><br>**PERMIT REQUIRED** | Bolted down manhole covers and small fill hatches. | **NO**<br>The hatches allow access to the underground tanks. | Small covers are removed by fuel delivery personnel. | 1. Oxygen deficiency and toxic gas hazards in the space;<br>2. Extreme fire hazard;<br>3. Possible physical hazards from falling or slipping. |

[4] Hazardous Atmosphere, Engulfment, Trapping Configuration, Other recognized hazards

## Appendix C: PCC Confined Space Summary

**The crews and types of job tasks that they perform that may or may not have potential for confined space entry include:**

- ***Building Maintenance Crews***: They primarily perform structural repairs that would not generally involve any confined space entry.
- ***Construction Crews***: Their primary confined space involvement would be as Project Managers for jobs that may require contractor confined space entry.
- ***Custodial Crews***: Their work does not involve confined spaces nor are they authorized to perform confined space entry.
- ***Electricians***: Their work in electrical vaults or tunnels with wiring or electrical installations could involve confined space entry.
- ***HVAC Technicians***: They do enter HVAC plenums, attics, crawl spaces, and cooling towers but these installations are generally non-permit confined spaces unless otherwise noted in the confined space listing.
- ***Plumbing Crews***: They may perform the most frequent confined space entry involving building pump systems for sewage and storm water or drinking water, and for inspection of back flow preventers in vaults.
- ***Telephone/Cabling Crews***: They do enter potential confined spaces such as tunnels, attics, and crawls spaces to install or repair various cable systems.

NOTE: The above named crews may also work together on projects that involve confined spaces.