CONFINED SPACE NUMBER: /_____/ - /_____/ - /_____/ - /_____/
Building Class Group Number

Work to be done: _____

Who will be doing the work? ☐ UofT Employees ☐ Contractor(s) _____
(Company Name)

☐ Both (Co-ordination Document - is required & attached.)

## HAZARD ASSESSMENT

**1.** Atmospheric Hazards (including gases, vapours, fumes, dusts, mists) resulting in acute health effects (e.g. "immediately dangerous to life and health) or interfere with the ability to escape unaided.

| Hazards | | Present (✓) Possible (?) Not Present (×) | Source, Type, Explanation |
|---|---|---|---|
| Oxygen Deficiency (<19.5%) | | ? | Decaying organic materials, bacteria, oxygen displacement |
| Oxygen Enrichment (>23%) | | × | NA |
| Flammable or Combustible Atmospheres | | ? | Spilled flammable liquids, methane leak tracking along frozen ground or through duct banks |
| Toxic Atmosphere | Carbon Monoxide | ? | Vehicle exhaust |
| | Hydrogen Sulfide | ? | Decaying organic materials, bacteria |
| | Other(s) (specify) | ? | |

**2.** Other Hazards (due to design, construction, location, use or contents)

| Hazards | Present (✓) Possible (?) Not Present (×) | Source, Type, Explanation |
|---|---|---|
| Chemical | ? | Stagnant water, Chemical spill |
| Biological | ? | Vermin (mice, rats), bacteria, molds, organic wastes, needles |
| Mechanical | × | |
| Stored energy | ✓ | Falling into hole or while descending into hole |
| Electrical | ✓ | High and low voltage electrical cables |
| Physical | ? | Sharp edges/points on cable supports, slippery surfaces |
| Temperature | ? | Blowing in hot/cold outdoor air, high humidity |
| Engulfment | × | |
| Difficult entry/exit | ✓ | Small hole, ladder access only |
| Different work levels | × | |
| Cramped work area | × | |
| Noise/vibration | ? | Noise created by work will be amplified. |
| Poor visibility/lighting | ? | Natural light only in some locations, hard to see in corners |
| Ergonomics | ✓ | Removal of hole cover |
| Traffic | ? | Vehicles in on-road locations, Pedestrians in off-road locations |
| Weather | ? | Extreme hot or cold outdoor temperature, wind, rain or snow |
| Hot work | ? | Possibly depends on work being done (e.g. cable splicing) USE SOP #1B |

HAZARD ASSESSMENT SUMMARY:

There is a possibility of an atmospheric hazard in a cable chamber before it is opened. Once opened and vented, however, there is a low probability of an atmospheric hazard in this confined space provided no hot work, chemical coating, etc. is performed during entry. Any change in atmospheric conditions would occur gradually and be detected by continuous monitoring. Non-entry rescue is possible since a fall arrest system is required for fall protection which can be used for rescue since most cable chambers are vertical holes without obstructions.

## ENTRY PLAN

(Check all that apply)

### Space Preparation Methods:

- ☐ Cable chambers are usually clean, no ventilation is required under normal conditions.
- ☐ Water may need to be pumped out (check monthly inspection reports).

### Ventilation (if required):

- ☐ Mechanical fresh air supply: 1500 cfm blower and flex ducting with (optional) saddle vent prior to entry. Ventilation for 10 minutes recommended.
- ☐ Ventilation not normally require during entry but should be left set up and available if needed
- ☐ Ventilation failure warning system: Attendant/entrant can hear blower prior to entry and attendant will verbally warn entrant if failure occurs during entry

### Hazardous Energy Isolation (UofT Lockout Procedures):

- ☐ Electrical lockout not normally required for inspection or minor repair work by U of T personnel
- ☐ Electrical lockout may be required for work by Contractors

### Work Equipment Required (See Rescue Plan for Rescue Equipment):

- ☐ Fall arrest tripod, block/winch, harness and lifeline
- ☐ Pedestrian traffic barricades
- ☐ Cover lifting tool
- ☐ Blower, flexible ducting and saddle vent (optional)
- ☐ Portable pump and hose (if required)
- ☐ Flashlight

### Communication Method:

- ☐ Verbal from opening (primary)
- ☐ Visual from opening (backup)
- ☐ Cell phone (Emergency – call 911)

### Personal Protective Equipment

- ☐ Safety glasses
- ☐ Hard hat
- ☐ CSA Green Patch protective footwear
- ☐ Protective clothing or coveralls (if required)

### Entry Procedure:

1. Setup appropriate traffic controls as required for vehicle or pedestrian traffic.

2. Place the gas detector sampling tube through the cover opening or partially open the cover and test the atmosphere below the cover using the testing device and record the result.

3. If the atmosphere is acceptable (No alarm) open the cover while standing away from the immediate opening point. Use the cover lifting tool.

4. If the atmosphere is not acceptable (tester alarms/ high levels) then ventilate the chamber using forced-air ventilation (1500 cfm) for ten minutes and then retest the atmosphere.

5. If there is water in the chamber then remove the water by pumping it out.

6. Setup the rescue equipment (tripod, winch and lifeline/cable).

7. The person who will enter the chamber puts on the required PPE (safety boots, safety glasses, coveralls, hardhat), and full body harness and connects his/her harness to the lifeline. Combined fall arrest and lifeline is required when the descent is 3 meters (10 feet) or more.

8. Re-test the air at the middle and bottom of the chamber. If the atmosphere is safe, entry can commence. If the atmosphere is not safe then ventilate the space using mechanical ventilation prior to and during entry.

9. The atmosphere is continuously monitored during entry into and while working in the chamber. The entrant will immediately leave the chamber if the gas monitor indicates a harmful atmosphere is developing or the gas monitor alarms.

10. The worker will proceed with the planned work. (No Hot Work!)

11. The atmosphere of the chamber will be re-tested prior to any entry or re-entry to ensure that it remains safe and free of atmospheric hazards.

12. Atmospheric monitoring results will be recorded on the entry permit. For continuous atmospheric monitoring, readings will be recorded at a regular periodic frequency as stated on the entry permit.

## RESCUE PLAN

(Check all that apply)

### Rescue Team:

- □ Non-entry rescue technique
- □ Rescue will be performed by Entrant with assistance by Attendant (Attendant never enters the space and does not interfere with Attendant duties).
- □ Entrant and Attendant has received training on how to perform a self-rescue including the use of the equipment. This is in addition to Confined Space Awareness Training provided by EHS.

### Rescue Equipment Required:

- □ Same as work equipment in this case.

### Rescue Procedure

1. Rescue will include self-rescue with backup non-entry rescue.

2. The person who enters the chamber will carry an alarming gas monitor. The entrant will immediately exit the chamber if the gas monitor alarms or he/she perceives any symptoms (dizziness, headache).

3. Non-entry rescue will be provided by the attendant equipped with tripod, winch and lifeline connected to the full body harness worn by the person entering the chamber.

4. If the gas monitor alarms, entrant signals or appears distressed the attendant will call 911 and remove the person from the sump by rapidly turning the winch and lifting the person out.

*Note: This Standard Operating Procedure was created by DMA Technical Services and reviewed by the U of T based on a sample of typical Cable Chambers in May/June 2007. It is the responsibility of the supervisor to verify that conditions haven't changed from this baseline Standard Operating Procedure and to identify any new or temporary hazards before entering (e.g. working conditions and hazards change substantially if hot work or chemical coating is involved).*

## Onsite review of hazards:

- ☐ Are there any additional hazards or changing conditions?
- ☐ Are there any changes required to the Entry Plan or Rescue Plan?

| *LIST ADDITIONAL HAZARDS AND CHANGES TO THE ENTRY AND RESCUE PLAN* |
|---|
| Additional Hazards / Controls: |
| Changes to Entry or Rescue Plans: |
| *Note: If the changes are substantial, a new Hazard Assessment, Entry and Rescue Plan are recommended using U of T Generic Confined Space Entry Forms.* |

**This Standard Operating Procedure for Cable Chamber Entry has been reviewed and the Hazard Assessment, Entry Plan and Rescue Plan meet on site conditions with the changes as noted above (if any).**

### Owner of Confined Space:

**Name (print):** _____ **Position:** _____

**Department/Area:** _____ **Phone:** _____

**Signature:** _____ **Date:** _____

### Non-owner, e.g. Utilities, Trades or Contractor who will be doing the work:

**Name (print):** _____ **Position:** _____

**Department/Company:** _____ **Phone:** _____

**Signature:** _____ **Date:** _____

***Attach Entry Permit (required) and Co-ordination document (if required.)***

CONFINED SPACE NUMBER: /_____/ - /_____/ - /_____/ - /_____/
Building Class Group Number

Work to be done: _____

Who will be doing the work? ☐ UofT Employees ☐ Contractor(s) _____

☐ Both (Co-ordination Document - is required & attached.) (Company Name)

## HAZARD ASSESSMENT

1. Atmospheric Hazards (including gases, vapours, fumes, dusts, mists) resulting in acute health effects (e.g. "immediately dangerous to life and health) or interfere with the ability to escape unaided.

| Hazards | | Present (✓)<br>Possible (?)<br>Not Present (×) | Source, Type, Explanation |
|---|---|---|---|
| Oxygen Deficiency (<19.5%) | | ?<br>✓ | Decaying organic materials, bacteria, oxygen displacement<br>Hot work could consume o2 |
| Oxygen Enrichment (>23%) | | × | NA |
| Flammable or Combustible Atmospheres | | ?<br>✓ | Spilled flammable liquids, methane leak tracking along frozen ground or through duct banks<br>Chemicals used for splicing e.g. solder |
| Toxic Atmosphere | Carbon Monoxide | ? | Vehicle exhaust |
| | Hydrogen Sulfide | ? | Decaying organic materials, bacteria |
| | Other(s) (specify) | ? | |

**2.** Other Hazards (due to design, construction, location, use or contents)

| Hazards | Present (✓)<br>Possible (?)<br>Not Present (×) | Source, Type, Explanation |
|---|---|---|
| Chemical | ? | Stagnant water, Chemical spill |
| Biological | ? | Vermin (mice, rats), bacteria, molds, organic wastes, needles |
| Mechanical | × | |
| Stored energy | ✓ | Falling into hole or while descending into hole |
| Electrical | ✓ | High and low voltage electrical cables |
| Physical | ? | Sharp edges/points on cable supports, slippery surfaces |
| Temperature | ? | Blowing in hot/cold outdoor air, high humidity |
| Engulfment | × | |
| Difficult entry/exit | ✓ | Small hole, ladder access only |
| Different work levels | × | |
| Cramped work area | × | |
| Noise/vibration | ? | Noise created by work will be amplified. |
| Poor visibility/lighting | ? | Natural light only in some locations, hard to see in corners |
| Ergonomics | ✓ | Removal of hole cover |
| Traffic | ? | Vehicles in on-road locations, Pedestrians in off-road locations |
| Weather | ? | Extreme hot or cold outdoor temperature, wind, rain or snow |
| Fire | ✓ | Possibility from open flame |

HAZARD ASSESSMENT SUMMARY:

There is a possibility of an atmospheric hazard in a cable chamber before it is opened. Once opened and vented, however, there is a low probability of an atmospheric hazard in this confined space provided no hot work, chemical coating, etc. is performed during entry. Any change in atmospheric conditions would occur gradually and be detected by continuous monitoring.

Hot work increases the risk of an atmospheric hazard since oxygen would be consumed by an open flame or more rapidly if a fire occurs.

Non-entry rescue is possible since a fall arrest system is required for fall protection which can be used for rescue since most cable chambers are vertical holes without obstructions.

## ENTRY PLAN

(Check all that apply)

### Space Preparation Methods:

- ☐ Cable chambers are usually clean.
- ☐ Water may need to be pumped out (check monthly inspection reports).

### Ventilation:

- ☐ Ventilation is mandatory during hot work to maintain the atmosphere below 5% LEL.
- ☐ Mechanical fresh air supply: 1500 cfm blower and flex ducting with (optional) saddle vent prior to entry.
- ☐ Ventilation failure warning system: Attendant/entrant can hear blower prior to entry and attendant will verbally warn entrant if failure occurs during entry

### Hazardous Energy Isolation (UofT Lockout Procedures):

- ☐ Electrical lockout not normally required for inspection or minor repair work by U of T personnel
- ☐ Electrical lockout may be required for work by Contractors

### Work Equipment Required (See Rescue Plan for Rescue Equipment):

- ☐ Fall arrest tripod, block/winch, harness and lifeline
- ☐ Pedestrian traffic barricades
- ☐ Cover lifting tool
- ☐ Blower, flexible ducting and saddle vent (optional)
- ☐ Portable pump and hose (if required)
- ☐ Flashlight

### Communication Method:

- ☐ Verbal from opening (primary)
- ☐ Visual from opening (backup)
- ☐ Cell phone (Emergency – call 911)

### Personal Protective Equipment

- ☐ Safety glasses
- ☐ Hard hat
- ☐ CSA Green Patch protective footwear
- ☐ Protective clothing or coveralls (if required)

Entry Procedure:

1. Setup appropriate traffic controls as required for vehicle or pedestrian traffic.

2. Place the gas detector sampling tube through the cover opening or partially open the cover and test the atmosphere below the cover using the testing device and record the result.

3. If the atmosphere is acceptable (No alarm) open the cover while standing away from the immediate opening point. Use the cover lifting tool.

4. If the atmosphere is not acceptable (tester alarms/ high levels) then ventilate the chamber using forced-air ventilation (1500 cfm) for ten minutes and then retest the atmosphere.

5. If there is water in the chamber then remove the water by pumping it out.

6. Setup the rescue equipment (tripod, winch and lifeline/cable).

7. The person who will enter the chamber puts on the required PPE (safety boots, safety glasses, coveralls, hardhat), and full body harness and connects his/her harness to the lifeline. Combined fall arrest and lifeline is required when the descent is 3 meters (10 feet) or more.

8. Re-test the air at the middle and bottom of the chamber. If the atmosphere is safe, entry can commence. If the atmosphere is not safe then ventilate the space using mechanical ventilation prior to and during entry.

9. The atmosphere is continuously monitored during entry into and while working in the chamber. The entrant will immediately leave the chamber if the gas monitor indicates a harmful atmosphere is developing or the gas monitor alarms.

10. The worker will proceed with the planned work. (Hot work permitted only with continuous ventilation.)

11. The atmosphere of the chamber will be re-tested prior to any entry or re-entry to ensure that it remains safe and free of atmospheric hazards.

12. Atmospheric monitoring results will be recorded on the entry permit. For continuous atmospheric monitoring, readings will be recorded at a regular periodic frequency as stated on the entry permit.

## RESCUE PLAN

(Check all that apply)

### Rescue Team:

- ☐ Non-entry rescue technique
- ☐ Rescue will be performed by Entrant with assistance by Attendant (Attendant never enters the space and does not interfere with Attendant duties).
- ☐ Entrant and Attendant has received training on how to perform a self-rescue including the use of the equipment. This is in addition to Confined Space Awareness Training provided by EHS.

### Rescue Equipment Required:

- ☐ Same as work equipment in this case.

### Rescue Procedure

1. Rescue will include self rescue with backup non-entry rescue.

2. The person who enters the chamber will carry an alarming gas monitor. The entrant will immediately exit the chamber if the gas monitor alarms or he/she perceives any symptoms (dizziness, headache).

3. Non-entry rescue will be provided by the attendant equipped with tripod, winch and lifeline connected to the full body harness worn by the person entering the chamber.

4. If the gas monitor alarms, entrant signals or appears distressed the attendant will call 911 and remove the person from the sump by rapidly turning the winch and lifting the person out.

*Note: This Standard Operating Procedure was created by DMA Technical Services and reviewed by the U of T based on a sample of typical Cable Chambers in May/June 2007. It is the responsibility of the supervisor to verify that conditions haven't changed from this baseline Standard Operating Procedure and to identify any new or temporary hazards before entering (e.g. working conditions and hazards change substantially if hot work or chemical coating is involved).*

## Onsite review of hazards:

- ☐ Are there any additional hazards or changing conditions?
- ☐ Are there any changes required to the Entry Plan or Rescue Plan?

| *LIST ADDITIONAL HAZARDS AND CHANGES TO THE ENTRY AND RESCUE PLAN* |
|---|
| Additional Hazards / Controls:<br><br>_____<br><br>_____<br><br>_____ |
| Changes to Entry or Rescue Plans:<br><br>_____<br><br>_____<br><br>_____ |
| *Note: If the changes are substantial, a new Hazard Assessment, Entry and Rescue Plan are recommended using U of T Generic Confined Space Entry Forms.* |

**This Standard Operating Procedure for Cable Chamber Entry has been reviewed and the Hazard Assessment, Entry Plan and Rescue Plan meet on site conditions with the changes as noted above (if any).**

### Owner of Confined Space:

**Name (print):** _____ **Position:** _____

**Department/Area:** _____ **Phone:** _____

**Signature:** _____ **Date:** _____

### Non-owner, e.g. Utilities, Trades or Contractor who will be doing the work:

**Name (print):** _____ **Position:** _____

**Department/Company:** _____ **Phone:** _____

**Signature:** _____ **Date:** _____

***Attach Entry Permit (required) and Co-ordination document (if required.)***

CONFINED SPACE NUMBER: /_____/ - /_____/ - /_____/ - /_____/
Building Class Group Number

Work to be done: _____

Who will be doing the work? ☐ UofT Employees ☐ Contractor(s) _____

☐ Both (Co-ordination Document - required & attached.) (Company Name)

## HAZARD ASSESSMENT

1. Atmospheric Hazards (including gases, vapours, fumes, dusts, mists) resulting in acute health effects (e.g. "immediately dangerous to life and health) or interfere with the ability to escape unaided.

| Hazards | | Present (✓) Possible (?) Not Present (×) | Source, Type, Explanation |
|---|---|---|---|
| Oxygen Deficiency (<19.5%) | | ? | Poor air circulation, oxidation of piping |
| Oxygen Enrichment (>23%) | | × | NA |
| Flammable or Combustible Atmospheres | | × | NA |
| Toxic Atmosphere | Carbon Monoxide | × | NA |
| | Hydrogen Sulfide | × | NA |
| | Other(s) (specify) | × | NA |

**2.** Other Hazards (due to design, construction, location, use or contents)

| Hazards | Present (✓) Possible (?) Not Present (×) | Source, Type, Explanation |
|---|---|---|
| Chemical | ? | Residual water treatment chemicals. |
| Biological | × | |
| Mechanical | × | |
| Stored energy | × | |
| Electrical | × | |
| Physical | ? | Sharp edges/points on supports, slippery surfaces |
| Temperature | ? | Residual process heat |
| Engulfment | × | |
| Difficult entry/exit | ✓ | Small hole |
| Different work levels | × | |
| Cramped work area | × | |
| Noise/vibration | ? | Noise created by work will be amplified. |
| Poor visibility/lighting | ? | Natural light only through openings, hard to see in middle |
| Ergonomics | ✓ | Removal of cover |
| Traffic | × | |
| Weather | × | |
| Hot work | ? | Possibly depending on the work being done (e.g. tube repair) **USE Generic SOP** |

HAZARD ASSESSMENT SUMMARY:

There is a low probability of an atmospheric hazard in this confined space provided no hot work, chemical coating, etc. is performed during entry. The size and restrictions in the space pose rescue challenges which

dictate the need for entry rescue. Rescue entry is an acceptable risk since the most likely cause of entrant distress is heat stress or a medical emergency

## ENTRY PLAN

(Check all that apply)

### Space Preparation Methods:

- ☐ Natural air circulation in boiler when shut down, drained and opened up, no ventilation is required under normal conditions to maintain atmosphere.
- ☐ Ventilation may be useful for managing heat

### Ventilation (if required):

1. Mechanical fresh air supply: 1500 cfm blower with flex ducting (optional) at one end prior to entry. Continuous ventilation recommended for cooling.
2. Ventilation failure warning system: Attendant/entrant can hear blower prior to entry and attendant will verbally warn entrant if failure occurs during entry

### Hazardous Energy Isolation (UofT Lockout Procedures):

- ☐ Complete boiler lockout as per shutdown procedure.

### Work Equipment Required (See Rescue Plan for Rescue Equipment):

- ☐ Blower with flexible ducting (optional)
- ☐ Flashlight

### Communication Method:

- ☐ Verbal from opening (primary)
- ☐ Visual from opening (backup)
- ☐ Plant or cell phone (Emergency – call 911)

### Personal Protective Equipment

- ☐ Safety glasses
- ☐ CSA Green Patch protective footwear
- ☐ Protective clothing or coveralls

### Entry Procedure:

1. Allow boiler to cool down after shutdown. Open all covers to allow natural circulation.

2. Place the gas detector through the opening to be entered and test the atmosphere using the testing device and record the result.

3. If the atmosphere is acceptable (no alarm), extend the gas detector further into the drum using a long tool.

4. If the atmosphere is not acceptable (tester alarms/ high levels) then ventilate the drum using forced-air ventilation (1500 cfm for ten minutes) and then retest the atmosphere.

5. The person who will enter the drum should be wearing the required PPE (safety boots, safety glasses, coveralls). Fall arrest and lifeline is required if working height is more than 3 metres (10 feet).

6. Re-test the air continuously as you move further into drum. If the atmosphere is not safe then exit the drum, ventilate the space using mechanical ventilation prior to and during entry.

7. The atmosphere is continuously monitored during entry into and while working in the drum. The entrant will immediately leave the chamber if the gas monitor indicates a harmful atmosphere is developing or the gas monitor alarms.

8. The worker will proceed with the planned work. (No Hot Work or Chemical Coating!)

9. The atmosphere of the chamber will be re-tested prior to any re-entry to ensure that it remains safe and free of atmospheric hazards.

10. Atmospheric monitoring results will be recorded on the entry permit. For continuous atmospheric monitoring, readings will be recorded at a regular periodic frequency as stated on the entry permit.

## RESCUE PLAN

(Check all that apply)

### Rescue Team:

- □ Entry rescue technique
- □ 2 people readily available in plant (in addition to Entrant + Attendant)

### Rescue Equipment Required:

- □ 2 lifelines
- □ Wristlets/anklets
- □ Skedco stretcher

### Rescue Procedure

1. Rescue will include self rescue with backup entry rescue by 2 rescuers on standby. The attendant will remain outside at all times to act as emergency coordinator and communicator.

2. The person who enters the chamber will carry an alarming gas monitor. The entrant will immediately exit the chamber if the gas monitor alarms or he/she perceives any symptoms (dizziness, headache).

3. While it is highly unlikely the gas monitor will alarm, if the entrant signals or appears distressed for any reason, the attendant will call 911 and initiate the rescuers to assist and retrieve the entrant.

4. Entry rescue will be provided by the rescuer(s) who will enter the drum from either end as necessary with a lifeline and wristlets/anklets.

5. The attendant will pass in the Skedco stretcher to the rescuer(s) who will facilitate removal of the entrant from the drum.

6. The rescuer who enters the chamber will carry an alarming gas monitor. The entrant will immediately exit the chamber if the gas monitor alarms or he/she perceives any symptoms (dizziness, headache).

7. Entry rescue will be provided by the rescuer(s) who will enter the drum from either end as necessary with a lifeline and wristlets/anklets.

8. The attendant will pass in the Skedco stretcher to the rescuer(s) who will facilitate removal of the entrant from the drum.

*Note: This Standard Operating Procedure was created by DMA Technical Services and reviewed by the U of T based on a sample of typical Boiler Drums in May/June 2007. It is the responsibility of the supervisor to verify that conditions haven't changed from this baseline Standard Operating Procedure and to identify any new or temporary hazards before entering (e.g. working conditions and hazards change substantially if hot work or chemical coating is involved).*

## Onsite review of hazards:

- ☐ Are they any additional hazards or changing conditions?
- ☐ Are there any changes required to the Entry Plan or Rescue Plan?

| *LIST ADDITIONAL HAZARDS AND CHANGES TO THE ENTRY AND RESCUE PLAN* |
|---|
| Additional Hazards / Controls:<br><br>_____<br><br>_____<br><br>_____ |
| Changes to Entry or Rescue Plans:<br><br>_____<br><br>_____<br><br>_____ |
| *Note: If the changes are substantial, a new Hazard Assessment, Entry and Rescue Plan are recommended using U of T Generic Confined Space Forms* |

**This Standard Operating Procedure for Boiler Drum Entry has been reviewed and the Hazard Assessment, Entry Plan and Rescue Plan meet on site conditions with the changes as noted above (if any).**

### Owner of Confined Space:

**Name (print):** _____ **Position:** _____

**Department/Area:** _____ **Phone:** _____

**Signature:** _____ **Date:** _____

### Non-owner, e.g. Utilities, Trades or Contractor who will be doing the work:

**Name (print):** _____ **Position:** _____

**Department/Company:** _____ **Phone:** _____

**Signature:** _____ **Date:** _____

***Attach Entry Permit (required) and Co-ordination document (if required.)***

CONFINED SPACE NUMBER: /_____/ - /_____/ - /_____/ - /_____/
Building Class Group Number

Work to be done: _____

Who will be doing the work? ☐ UofT Employees ☐ Contractor(s) _____

☐ Both (Co-ordination Document - Form 1A is required & attached.) (Company Name)

## HAZARD ASSESSMENT

1. Atmospheric Hazards (including gases, vapours, fumes, dusts, mists) resulting in acute health effects (e.g. "immediately dangerous to life and health) or interfere with the ability to escape unaided.

| Hazards | | Present (✓) Possible (?) Not Present (×) | Source, Type, Explanation |
|---|---|---|---|
| Oxygen Deficiency (<19.5%) | | ? | Poor air circulation or oxidation of tank/piping |
| Oxygen Enrichment (>23%) | | × | NA |
| Flammable or Combustible Atmospheres | | × | NA |
| Toxic Atmosphere | Carbon Monoxide | × | NA |
| | Hydrogen Sulfide | × | NA |
| | Other(s) (specify) | × | |

**2.** Other Hazards (due to design, construction, location, use or contents)

| Hazards | Present (✓) Possible (?) Not Present (×) | Source, Type, Explanation |
|---|---|---|
| Chemical | ? | Residual water treatment chemicals. |
| Biological | × | |
| Mechanical | × | |
| Stored energy | × | |
| Electrical | × | |
| Physical | × | |
| Temperature | ? | Residual process heat |
| Engulfment | × | |
| Difficult entry/exit | ✓ | Small hole |
| Different work levels | × | |
| Cramped work area | × | |
| Noise/vibration | ? | Noise created by work will be amplified. |
| Poor visibility/lighting | ? | Natural light only through openings, hard to see inside |
| Ergonomics | ✓ | Removal of cover |
| Traffic | × | |
| Weather | × | |
| Hot work | ? | Possibly depending on the work being done (e.g. welding) USE GENERIC SOP |

HAZARD ASSESSMENT SUMMARY:

There is a possibility of an oxygen deficiency in a tank when it is opened, however, once vented there is a low probability of an atmospheric hazard in this confined space provided no hot work, chemical coating, etc. is performed during entry. Any change in atmospheric conditions would likely occur gradually and be detected by continuous monitoring provided the sources of flow to a tank are properly locked out. Non-entry rescue is possible with a fall arrest system for a vertical tank or a lifeline/harness provided the tank is without obstructions.

## ENTRY PLAN

(Check all that apply)

### Space Preparation Methods:

- ☐ Ventilation is required under normal conditions before tank entry.

### Ventilation (if required):

- ☐ Mechanical fresh air supply: 1500 cfm blower and flex ducting with attachment to lower piping vent prior to entry. Ventilation for 10 minutes recommended.
- ☐ Continuous ventilation during entry for fresh air and to control heat.
- ☐ Ventilation failure warning system: Attendant/entrant can hear blower prior to entry and attendant will verbally warn entrant if failure occurs during entry. Ventilation failure warning system: Attendant/entrant can hear blower prior to entry and attendant will verbally warn entrant if failure occurs during entry

### Hazardous Energy Isolation (UofT Lockout Procedures):

- ☐ Mechanical lockout of input(s), output(s) and drainage of tank including decoupling of piping to provide an opening to blow in fresh air.

### Work Equipment Required (See Rescue Plan for Rescue Equipment):

- ☐ Fall arrest tripod, block/winch, harness and lifeline (vertical entry)
- ☐ Only harness and lifeline (horizontal entry)
- ☐ Blower, flexible ducting and piping attachment
- ☐ Cover removal rigging (if required)
- ☐ Flashlight

### Communication Method:

- ☐ Verbal from opening (primary)
- ☐ Visual from opening (backup)
- ☐ Cell phone (Emergency – call 911)

### Personal Protective Equipment

- ☐ Safety glasses
- ☐ CSA Green Patch protective footwear
- ☐ Protective clothing or coveralls
- ☐ Rubber boots

## Entry Procedure:

1. Verify tank is completely locked out and ventilate through pipe opening.

2. Use the gas detector to test the atmosphere below the cover using the testing device and record the result.

3. If the atmosphere is not acceptable (tester alarms/ high levels) then increase ventilation then retest the atmosphere.

4. Setup the rescue equipment (anchor, winch and lifeline/cable).

5. The person who will enter the tank puts on the required PPE (safety boots, safety glasses, coveralls), and full body harness and connects his/her harness to the lifeline. Combined fall arrest and lifeline is required when the descent is 3 meters (10 feet) or more.

6. Re-test the air at the middle and bottom of the tank. If the atmosphere is safe, entry can commence.

7. The atmosphere is continuously monitored during entry into and while working in the tank. The entrant will immediately leave the chamber if the gas monitor indicates a harmful atmosphere is developing or the gas monitor alarms.

8. The worker will proceed with the planned work. (No Hot Work or Chemical Coating!)

9. The atmosphere of the chamber will be re-tested prior to any re-entry to ensure that it remains safe and free of atmospheric hazards.

10. Atmospheric monitoring results will be recorded on the entry permit. For continuous atmospheric monitoring, readings will be recorded at a regular periodic frequency as stated on the entry permit.

## RESCUE PLAN

(Check all that apply)

### Rescue Team:

- ☐ Non-entry rescue technique for vertical or horizontal tank
- ☐ 2 Rescuers available to assist the Attendant

### Rescue Equipment Required:

- ☐ Fall arrest tripod, block/winch, harness and lifeline (vertical entry)
- ☐ Only harness and lifeline (horizontal entry)
- ☐ Fixed anchor point above tank for vertical entry

### Rescue Procedure

1. Rescue will include self rescue with backup non-entry rescue.

2. The person who enters the chamber will carry an alarming gas monitor. The entrant will immediately exit the chamber if the gas monitor alarms or he/she perceives any symptoms (dizziness, headache).

*A. Vertical Tank Rescue*

3. Non-entry rescue for a vertical tank will be provided by the attendant equipped with block / winch connected to a fixed anchor point and lifeline connected to the full body harness worn by the person entering the tank.

4. If the gas monitor alarms, entrant signals or appears distressed the attendant will call 911 and remove the person from the sump by rapidly turning the winch and lifting the person out.

*B. Horizontal Tank Rescue*

3. Non-entry rescue for a horizontal tank will be provided by the attendant and 2 rescuers equipped with a lifeline connected to the full body harness worn by the person entering the tank.

4. If the gas monitor alarms, entrant signals or appears distressed the attendant will call 911. Rescuers will pull on the lifeline to drag the person to the opening and lift the person out.

5. In both cases, the rescuers will assist the Attendant lower the Entrant to the floor.

*Note: This Standard Operating Procedure was created by DMA Technical Services and reviewed by the U of T based on a sample of typical Tanks in May/June 2007. It is the responsibility of the supervisor to verify that conditions haven't changed from this baseline Standard Operating Procedure and to identify any new or temporary hazards before entering (e.g. working conditions and hazards change substantially if hot work or chemical coating is involved).*

## Onsite review of hazards:

- ☐ Are they any additional hazards or changing conditions?
- ☐ Are there any changes required to the Entry Plan or Rescue Plan?

| *LIST ADDITIONAL HAZARDS AND CHANGES TO THE ENTRY AND RESCUE PLAN* |
|---|
| Additional Hazards / Controls:<br><br>_____<br><br>_____<br><br>_____ |
| Changes to Entry or Rescue Plans:<br><br>_____<br><br>_____<br><br>_____ |
| *Note: If the changes are substantial, a new Hazard Assessment, Entry and Rescue Plan are recommended using U of T Generic Confined Space Forms.* |

**This Standard Operating Procedure for Tank Entry has been reviewed and the Hazard Assessment, Entry Plan and Rescue Plan meet on site conditions with the changes as noted above (if any).**

### Owner of Confined Space:

**Name (print):** _____ **Position:** _____

**Department/Area:** _____ **Phone:** _____

**Signature:** _____ **Date:** _____

### Non-owner, e.g. Utilities, Trades or Contractor who will be doing the work:

**Name (print):** _____ **Position:** _____

**Department/Company:** _____ **Phone:** _____

**Signature:** _____ **Date:** _____

***Attach Entry Permit (required) and Co-ordination document (if required.)***

CONFINED SPACE NUMBER: /_____/ - /_____/ - /_____/ - /_____/
Building Class Group Number

Work to be done: _____

Who will be doing the work? ☐ UofT Employees ☐ Contractor(s) _____

☐ Both (Co-ordination Document - is required & attached.) (Company Name)

## HAZARD ASSESSMENT

1. Atmospheric Hazards (including gases, vapours, fumes, dusts, mists) resulting in acute health effects (e.g. "immediately dangerous to life and health) or interfere with the ability to escape unaided.

| Hazards | | Present (✓) Possible (?) Not Present (×) | Source, Type, Explanation |
|---|---|---|---|
| Oxygen Deficiency (<19.5%) | | ? | Decaying organic materials, bacteria, oxygen displacement, oxidation |
| Oxygen Enrichment (>23%) | | × | NA |
| Flammable or Combustible Atmospheres | | ? | Spilled flammable liquids |
| Toxic Atmosphere | Carbon Monoxide | ? | vehicle exhaust |
| | Hydrogen Sulfide | ? | Decaying organic materials, bacteria |
| | Other(s) (specify) | ? | |

**2.** Other Hazards (due to design, construction, location, use or contents)

| Hazards | Present (✓) Possible (?) Not Present (×) | Source, Type, Explanation |
|---|---|---|
| Chemical | ? | Chemical spill, unknown chemicals put down drain |
| Biological | ? | Vermin (mice, rats), bacteria, molds, organic wastes, needles |
| Mechanical | × | NA |
| Stored energy | ✓ | Falling into hole while descending |
| Electrical | ? | Submersible sump pump |
| Physical | × | NA |
| Temperature | × | NA |
| Engulfment | ✓ | Flow of water from sewer or drains into sump |
| Difficult entry/exit | ✓ | Initial step down onto the ladder is awkward. |
| Different work levels | ✓ | Depth of the sump (greater than 3 meters/10 feet) |
| Cramped work area | ✓ | Sumps are generally small spaces |
| Noise/vibration | ? | Noise will be amplified |
| Poor visibility/lighting | ✓ | Depth or location of sump, away from well lighted areas |
| Ergonomics | ? | Depends on the nature of the work required to retrieve pump |
| Traffic | ? | Sump may be located in parking garage |
| Weather | ? | Mostly located indoors but some outdoor locations |
| Hot work | ? | Cutting, grinding or soldering of piping<br>USE GENERIC SOP |

HAZARD ASSESSMENT SUMMARY:

There is a possibility of an atmospheric hazard in a sump before it is opened. Once opened and vented, however, there is a low probability of an atmospheric hazard in this confined space provided no hot work, chemical coating, etc. is performed. Any change in atmospheric conditions would likely occur gradually and be detected by continuous monitoring but since the sources of flow to a sump are usually difficult to lock out, the risk of an atmospheric hazard is higher. Non-entry rescue is possible since a fall arrest system is required for fall protection which can also be used for rescue since most sumps are vertical holes without obstructions.

## ENTRY PLAN

(Check all that apply)

Space Preparation Methods:

- ☐ Pump out sump if needed.

Ventilation (if required):

- ☐ Mechanical fresh air supply: 1500 cfm blower and flex ducting prior to entry. Ventilation for 7-10 minutes recommended.
- ☐ Ventilation not normally required during entry but should be left set up and available if needed
- ☐ Ventilation failure warning system: Attendant/entrant can hear blower prior to entry and attendant will verbally warn entrant if failure occurs during entry

Hazardous Energy Isolation (UofT Lockout Procedures):

- ☐ Isolate electrical if applicable and piping if possible.

Work Equipment Required (See Rescue Plan for Rescue Equipment):

- ☐ Fall arrest tripod, block/winch, harness and lifeline
- ☐ Blower, flexible ducting and saddle vent (optional)
- ☐ Portable pump and hose (if required)
- ☐ Flashlight

Communication Method:

- ☐ Verbal from opening (primary)
- ☐ Visual from opening (backup)
- ☐ Cell phone (Emergency – call 911)

Personal Protective Equipment

- ☐ Safety glasses
- ☐ Hard hat
- ☐ CSA Green Patch protective footwear
- ☐ Protective clothing or coveralls
- ☐ Rubber boots

Entry Procedure:

1. Setup appropriate pedestrian traffic controls as required for sump location.

2. Place the gas detector sampling tube through a cover opening or partially open the sump cover and test the atmosphere below the cover using the testing device and record the result.

3. If the atmosphere is acceptable (No alarm) open the sump cover while standing away from the immediate

opening point.

4. If the atmosphere is not acceptable (tester alarms/ high levels) then ventilate the sump using forced-air ventilation (1500 cfm) through the cover opening for ten minutes and then retest the atmosphere.

5. Isolate the flow of water (if possible) into the sump by closing valves or blocking the piping.

6. If there is water or sewage in the sump then remove the water or sewage by pumping it out.

7. Setup the rescue equipment (tripod, winch and lifeline/cable).

8. The person who will enter the sump puts on the required PPE (safety boots, safety glasses, coveralls, hardhat), and full body harness and connects his/her harness to the lifeline. Combined fall arrest and lifeline is required when the descent is 3 meters (10 feet) or more.

9. Re-test the air at the middle and bottom of the sump. If the atmosphere is safe entry can commence. If the atmosphere is not safe then ventilate the space using mechanical ventilation prior to and during entry.

10. The atmosphere is continuously monitored during entry into and while working in the sump. The entrant will immediately leave the sump if the gas monitor indicates a harmful atmosphere is developing or the gas monitor alarms.

11. The worker will proceed with the planned work (e.g. remove and repair sump pump, sump pump piping or sump control floats) as described.

12. The atmosphere of the sump will be re-tested prior to any entry or re-entry to ensure that it remains safe and free of atmospheric hazards.

13. Atmospheric monitoring results will be recorded on the entry permit. For continuous atmospheric monitoring, readings will be recorded at a regular periodic frequency as stated on the entry permit.

## RESCUE PLAN

(Check all that apply)

### Rescue Team:

- ☐ Non-entry rescue technique
- ☐ Rescue will be performed by Entrant with assistance by Attendant (Attendant never enters the space and does not interfere with Attendant duties).
- ☐ Entrant and Attendant has received training on how to perform a self-rescue including the use of the equipment. This is in addition to Confined Space Awareness Training provided by EHS.

### Rescue Equipment Required:

- ☐ Same as work equipment in this case.
- ☐ Fixed anchor point in event tripod doesn't fit over sump hole (portable davit arm or permanently mounted "eye")
- ☐ Sling to fasten FAS block/winch to "eye"

### Rescue Procedure

1. Rescue will include self rescue with backup non-entry rescue.

2. The person who enters the chamber will carry an alarming gas monitor. The entrant will immediately exit the chamber if the gas monitor alarms or he/she perceives any symptoms (dizziness, headache).

3. Non-entry rescue will be provided by the attendant equipped with tripod, winch and lifeline connected to the full body harness worn by the person entering the sump.

4. If the gas monitor alarms, entrant signals or appears distressed the attendant will call 911 and remove the person from the sump by rapidly turning the winch and lifting the person out.

*Note: This Standard Operating Procedure was created by DMA Technical Services and reviewed the U of T based on a sample of typical Sump Pits in May/June 2007. It is the responsibility of the supervisor to verify that conditions haven't changed from this baseline Standard Operating Procedure and to identify any new or temporary hazards before entering (e.g. working conditions and hazards change substantially if hot work or chemical coating is involved).*

## Onsite review of hazards:

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| Changes to Entry or Rescue Plans:<br><br>_____<br><br>_____<br><br>_____ |
| *Note: If the changes are substantial, a new Hazard Assessment, Entry and Rescue Plan is recommended using U of T Generic Confined Space Forms.* |

**This Standard Operating Procedure for Sump Pit Entry has been reviewed and the Hazard Assessment, Entry Plan and Rescue Plan meet on site conditions with the changes as noted above (if any).**

### Owner of Confined Space:

**Name (print):** _____ **Position:** _____

**Department/Area:** _____ **Phone:** _____

**Signature:** _____ **Date:** _____

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**Name (print):** _____ **Position:** _____

**Department/Company:** _____ **Phone:** _____

**Signature:** _____ **Date:** _____

***Attach Entry Permit (required) and Co-ordination document (if required.)***