

Confined Spaces

Program

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This program was developed by [Blu-Metric Environmental](#) for the University of Ottawa.

PURPOSE

This procedure describes the Confined Space Entry (CSE) Program used by the University of Ottawa in the identified areas inventoried and identified in Appendix A. The Program requirements are established to:

1. Protect all workers performing CSE in the identified areas by ensuring a safe work environment is established and maintained prior to entering and while performing work in confined spaces;
2. Ensure compliance with requirements of the Confined Space Regulations made under the Ontario Occupational Health and Safety (OHS) Act, O.Reg 632/05 Confined Spaces; and
3. Provide measures and procedures to accomplish the aforementioned during the time period that the University of Ottawa Occupational Health and Safety Management system is formally modified and undergone document controls to include the approved CSE Program also compliant with O.Reg.632/05.

APPLICATION

All workers of the University of Ottawa performing work related to or in the confined spaces identified in Appendix A must follow this procedure. Contractors performing work on behalf of the University of Ottawa must meet the requirements of this Program. A list of the confined spaces at the University of Ottawa to which this procedure applies is found in Appendix A.

DEFINITIONS

“Acceptable Atmospheric Levels” –means:

- a) Atmospheric concentration of any explosive or flammable gas or vapour is less than:
 - i. 25 percent of its lower explosive limit, if paragraph 1 of subsection 19 (4) applies;
 - ii. 10 percent of its lower explosive limit, if paragraph 2 of subsection 19 (4) applies;
 - iii. 5 percent of its lower explosive limit, if paragraph 3 of subsection 19 (4) applies;
- b) Oxygen content of the atmosphere is at least 19.5 percent (%) but not more than 23 percent (%) by volume; and
- c) Exposure to atmospheric contaminants does not exceed any applicable level set out in a regulation made under the Occupational Health and Safety Act.

“Atmospheric hazards” – means,

- a) Accumulation of flammable, combustible or explosive agents;
- b) An oxygen content in the atmosphere that is less than 19.5 % or more than 23 % by volume;
or
- c) The accumulation of atmospheric contaminants, including gases, vapours, fumes, dusts or mists, that could:
 - i. result in acute health effects that pose an immediate threat to life; or
 - ii. interfere with a person's ability to escape unaided from a confined space.

“Attendant” – an assigned individual that is stationed outside and near the entrance to a confined space and monitors the safety of the Entrant(s).

“Cold work” – work that cannot produce a source of ignition.

“Confined Space” - a fully or partially enclosed space:

- a) that is not both designed and constructed for continuous human occupancy; and
- b) in which atmospheric hazards may occur because of its construction, location or contents or because of the work that is done in it.

“Confined Space Rescue Team (CSRT)” - all specified persons trained in rescue procedures and any necessary equipment required during confined space rescue, as well as First aid and CPR training.

“Competent Person” - person, who:

- a) is qualified due to knowledge, training, and experience to organize the work and its performance;
- b) is familiar with all legal requirements of the work; and
- c) has knowledge of any potential and actual dangers to H&S in the workplace.

A “competent person” is different from a “competent worker” or a person having “adequate knowledge, training, and experience”. There is an added responsibility of also having “to organize the work”, which is typically associated with supervisory responsibility.

“Competent worker”— in relation to specific work, means a worker who is qualified because of knowledge, training and experience to perform the work, is familiar with all legal requirements that apply to the work and has knowledge of any potential and actual dangers to H&S in the workplace.

“Coordination Document” – document that is prepared by the “lead employer”; applies if the workers of more than one employer perform work in the same confined space or related work with respect to the same confined space; and ensures that the duties of employers under Confined Space Regulations (all sections except general training, personal protective equipment and records) are performed in a way that protects the health and safety of all workers who perform work in, or related work to, the confined space.

“Entrant” – person entering the confined space for any reason.

“Entry” – action by which a person or part of a person passes through the plane of the opening into a confined space and includes ensuing work activities.

“Entry Permit” – written or printed document (prepared before every CSE) to allow and control entry into a confined space with the purpose of verifying communication to workers about the hazards identified and the controls in place. A permit requires completion, verification, signature and posting, prior to any CSE.

“Entry Supervisor” – in context of this program for the University of Ottawa, is a “competent person” responsible for coordinating confined space entry and verifying the Entry Permit prior to entry into a confined space.

“Hazard Assessment” – written document that considers, with respect to each confined space, the hazards that may exist due to the design, construction, location, use or contents of the confined space; and the hazards that may develop while work is done inside the confined space.

“Hot work” – work that could produce a source of ignition, such as a spark or open flame.

“IDHL” – Immediately Dangerous to Life or Health. Any condition which poses an immediate threat to health or life of an Entrant or would cause irreversible adverse health effects or would interfere with an individual’s ability to escape unaided from a confined space.

“JHSC” – Joint Health and Safety Committee, per section 9 of the OHS Act

“Lead employer” – employer who contracts for the services of one or more other employers or independent contractors in relation to one or more confined spaces that are located in the lead employer’s own workplace, or in another employer’s workplace.

“ORM” – Office of Risk Management

“Plan” – a specific set of measures and procedures to control hazards identified by the Hazard Assessment for that confined space to allow workers to enter and work in a specific confined space safely. The Plan must include provisions for on-site rescue procedures, rescue equipment and methods of communication, in addition to the other provisions listed above.

“Program” – the written document that includes: a method for recognizing each confined space to which the program applies; a method for assessing the hazards to which workers may be exposed; a method for the development of CSE Plans (which include on-site rescue procedures); a method for training workers; and an Entry Permit system. This document constitutes the University of Ottawa CSE Program.

“Purging” – removing contaminants inside the confined space by displacement with air to achieve acceptable atmospheric levels. For example, if a confined space originally contained a toxic gas, air would be blown into the space to reduce the concentration of the toxic gas to below the appropriate atmospheric exposure level.

“Related work” – work performed near a confined space in direct support of work inside the confined space.

“Ventilation” – continuous provision of fresh air into the confined space by mechanical means to maintain acceptable atmospheric levels. It must be continued while work is being carried out within the space, to maintain an acceptable oxygen concentration, to provide protection in case of accidental release of chemicals, to remove contaminants generated by the work performed, and/or to cool the enclosure.

RESPONSIBILITIES

Management (Senior Management)

- Management has the assigned responsibility to appoint only “competent persons” as supervisors and to ensure that the CSE Program is implemented and maintained.
- Management will ensure that the Program has appropriate assessments, Plans, documentation, signage, procedures, training and auditing.

Office of Risk Management (ORM)

- Responsible for coordinating the CSE Program for the University of Ottawa;

- Collaborate with Facilities to ensure all confined spaces are identified and hazard warnings posted;
- Audit program compliance periodically;
- Maintain the CSE Program documents;
- Report deficiencies in the Program to Management as soon as practically possible.

Deans and Directors located in Respective Sectors

- Ensure that Hazard Assessments for all identified confined spaces are completed;
- Coordinate training for all University of Ottawa workers who will be entering confined spaces;
- Ensure the Entry Plan(s) have been performed for all confined spaces;
- Ensure unauthorized persons do not enter confined spaces. No person is authorized to enter a confined space without proper approval and training;
- Ensure that each entrance to a confined space is adequately secured against unauthorized entry; or has been provided with adequate barricades, adequate warning signs regarding unauthorized entry, or both;
- Responsible for keeping documentation of all CSE conducted by their staff.

Ensure that workers in their area:

- Receive the required training prior to entering into a confined space;
- Follow the requirements of the University of Ottawa CSE Program.
- Understand the hazards and Entry Plan associated with the confined space they will be entering;
- Take all appropriate precautions to protect their health and safety prior to entry;
- Work in compliance with the OHS Act & Regulations as well as requirements of the University of Ottawa.

Confined Space Entry Supervisor

The confined space entry supervisor may be the same as Deans / Directors located in respective sectors.

- Assign an Attendant to be stationed outside or near the entrance to a confined space and fulfill the corresponding Attendant duties under O.Reg. 632/05 as well as those outlined in this CSE Program;
- Appoint a person with adequate knowledge, training and experience (“competent worker”) to perform adequate tests as often as necessary before and during a CSE, to ensure that acceptable atmospheric levels are maintained in the confined space in accordance with the relevant Plan. The appointed person in most cases will be the Attendant;
- Responsible for keeping documentation of all CSE conducted by their staff.

Ensure that the following are done for each entry:

- Entry does not occur unless absolutely necessary;
- A Hazard Assessment has been reviewed for adequacy, signed and dated prior to CSE;
- A written Plan has been developed and is available for the CSE;
- Pre-entry testing and inspections are conducted according to the Plan;
- The precautions and control measures identified in the Plan are in place and are being followed;

- Other precautions not directly related to the CSE but required by the OHS Act & Regulations are being followed:
- An Entry Permit is completed, complies with the corresponding Plan, posted at the entry to the confined space and maintained by the Attendant throughout the entry, if necessary;
- Signs CSE permit, prior to posting and CSE;
- Workers are removed from the space and the adequacy of the safety procedures are reviewed if changes occur during the entry that affects the safety of the workers.

Entrants, Attendants, Rescue Team

Workers will:

- Ensure that they know the hazards associated with the space;
- Abide by all the requirements of the CSE Plan for each confined space;
- Receive the required CSE training;
- Complete the permit documenting precautions taken and results of gas testing;
- Communicate any health and safety concerns to their direct supervisor immediately;
- No person is authorized to enter a confined space without proper approval and training.

Attendant

An assigned CSE Attendant must:

- Not enter the confined space at any time;
- Remain stationed outside and near the entrance to the confined space at all times;
- Remain in constant communication with the Entrant, as agreed, in advance of entry;
- Monitor the safety of the Entrant;
- Provide assistance to Entrant;
- Summon the Rescue Team, should the need arise;
- Keep a record on the Permit of those persons who enter the space and exit the space;
- Prevent any unauthorized entry into the confined space while assigned to a confined space;
- Perform all Attendant duties required by this CSE Program.

Rescue Team

The Rescue Team will:

- Be directly involved with the rescue of person(s) from a confined space;
- Be trained in rescue procedures and any necessary equipment required during confined space rescue as well as First aid and CPR;
- Be responsible for rescue equipment and ensure equipment has been checked and is in place;
- Be readily available and ensure a response time of less than 5 minutes to reach the confined space;

Joint Health and Safety Committee (JHSC)

The JHSC has a right to the following CSE documents, when requested:

- A copy of any Coordination Document;
- A copy of the Program;
- A copy of any Hazard Assessment.

The JHSC also has the following consultation rights:

- Be consulted by the University of Ottawa with regard to the development and maintenance of the Confined Space Program;

- Be consulted in regard to the development of worker training;
- Be consulted by the University of Ottawa with regard to reviewing the confined space training on an annual basis, as well as whenever there is a change in circumstances;
- Be afforded the opportunity to attend the beginning of industrial hygiene testing.

HAZARD ASSESSMENT

Identifying Confined Spaces and Hazards

Potential confined spaces were evaluated to determine if it is a “confined space” per O.Reg. 632/05. The following table is provided to facilitate evaluation of areas that may or may not be considered a confined space:

Is it designed and constructed for continuous human occupancy?	Is it possible to have an atmospheric hazard?	Is this a confined space?
Yes	Yes	No
Yes	No	No
No	Yes	Yes
No	No	No

Workspaces such as offices, arenas, maintenance rooms, control rooms, etc., are obvious places that are designed for humans to occupy for long periods of time (continuously). These spaces are not considered as confined spaces, regardless of the atmospheric hazards that may occur in them. Occupational health and safety legislation and regulations apply and must be complied with to protect workers.

Hazard Assessment

A Hazard Assessment has been completed for all confined spaces listed in the inventory in Appendix A, using the confined space Hazard Assessment Form in Appendix C. Hazard Assessments will be available for every entry into the confined spaces listed in Appendix A and shall be reviewed prior to each entry to verify that the same conditions exist as well as the adequacy of the Plan and permit documents. Once reviewed and determined adequate, the Hazard Assessment will be signed and dated, prior to entry.

A confined space will be re-assessed whenever changes are introduced to the space that could affect the adequacy of the Entry Plan instructions and controls developed for the space or when inadequacies with the Plan are identified as a result of the entry or incident occurring during the entry.

A listing of “potentially hazardous spaces” (not considered to be confined spaces) is included in Appendix H for information purposes. It should be noted that a Hazard Assessment (conducted in October/ November 2006) identified these spaces not to be confined spaces. However, the work to be performed in these spaces should be re-evaluated for additional potential hazardous conditions prior to working in these spaces. Proper control measures for the hazards should be implemented, if required. These “potentially hazardous spaces” are not considered to be confined spaces and hence an Entry Permit is not required for entry at locations listed in Appendix H only.

A Hazard Assessment may include any or all of the following hazards/controls:

- Oxygen deficiency/oxygen enrichment;
- Flammable, combustible or explosive agents;
- Toxic air contaminants, smoke, fumes, and dusts and corresponding exposure levels;
- Residual chemicals/materials;
- Ignition hazards, including hot work, tools and other potential sources of ignition;
- Chemical contact hazards, including acids, alkalis;
- Physical hazards, including mechanical hazards, thermal stress, humidity, radiation, noise and vibration, working/walking surfaces, engulfing materials, physical obstacles, poor visibility;
- Electrical hazards, including lines and cables, exposed terminals;
- Traffic hazards, including pedestrian, mobile equipment;
- Biological hazards, including animals and biological agents;
- Other hazards related to the confined space, including piping/distribution systems, pressurizing fluids, any type of uncontrolled energy (water, liquid, vapour, electric, magnetic, gaseous, etc.), limited access and egress;
- Necessary precautions for safe entry and work;
- Emergency procedures and equipment required;
- PPE required;
- Attendant requirement.

Atmospheric hazard decision trees are provided in Appendix B.

CONFINED SPACE ENTRY PLAN

Development

The authorizing CSE Supervisor will ensure that a Base Entry Plan is created for each CSE for spaces listed in Appendix A. Where CSE has been contracted out to another Employer, such as a Contractor, the Plan will be developed by the respective Contractor.

Content

The Base Plan will include duties of workers, measures and procedures to control hazards (including PPE, isolation of energy sources, ventilation, etc.), Attendants, atmospheric testing, provisions for on-site rescue procedures, rescue equipment and methods of communication and adequate means for entry and exit.

The University of Ottawa, for the purposes of their CSE Program, has incorporated the Base Plan into the Entry Permit in Appendix D.

If questions concerning confined space entry and assessment arise contact the Facilities Health and Safety Officer and/or the Office of Risk Management.

CONFINED SPACE ENTRY PERMIT

Verification

All confined space entries will require that a CSE Permit be completed. The authorizing CSE

Supervisor will verify that the Permit complies with the corresponding CSE Plan and sign their name, prior to entry. A copy of the corresponding CSE Plan will be included and will form part of the CSE Permit.

Maintenance

The Attendant will keep a record of those persons who enter the space and exit the space, on the CSE Permit, for the duration of the CSE Permit. The Attendant does not need to sign workers in and out for every minor exit required to work in the space, such as leaving momentarily to obtain a nearby tool.

Cancellation

Confined Space Entry Permits will be cancelled by the CSE Supervisor upon completion of the work, or when any prohibited condition arises. Permits cannot be left open and “allowed” to expire. Cancelled permits will be kept by CSE Supervisor and its faculty or service for 1 year. A copy of the cancelled permit should also be sent to the Office of Risk Management.

Requirements

A sample Confined Space Entry (Base Plan) and Permit is in Appendix D and contains the following required information as well as other records:

- Location of confined space;
- Description of work to be performed;
- Description of hazards and corresponding control measures;
- Time period for which the Entry Permit applies;
- Name of the Attendant and Entrant;
- Record of each worker’s entries and exits (time);
- List of the equipment required for entry and rescue, and verification that equipment is in good working order;
- Results of atmospheric testing;
- Any hot work, adequate provisions for the hot work and corresponding control measures

Other CSE documentation may be incorporated within the Entry Permit and the University of Ottawa, for the purposes of the CSE Program, will incorporate the Plan, onsite rescue equipment inspection records and air testing results into the CSE Plan and Permit document, provided in Appendix D.

CONFINED SPACE ENTRY PROCEDURE

The following section outlines the steps to be taken prior to each confined space entry:

- Complete Hazard Assessment;
- Establish Plan that includes required procedures and PPE required for Entrant;
- Establish communication between Entrant and Attendant;
- Perform atmospheric testing prior to entry, record results on Permit form;
- Complete Entry Permit and post Entry Permit near confined space;
- Station Attendant outside confined space;
- Execute required control procedures (hot work, lockout/tagout, ventilation);
- Enter space and monitor continuously.

Step 1 – Hazard Assessment

The Hazard Assessment shall be reviewed and verified by the CSE Supervisor prior to each entry to verify that the same conditions exist. A confined space will be re-assessed whenever changes are introduced to the space that could affect the adequacy of the Entry Plan instructions and controls developed for the space or when inadequacies with the Plan are identified as a result of the entry or incident occurring during the entry.

Any new suspect confined spaces not identified on the Inventory list in Appendix A should be immediately reported to the ORM to be evaluated prior to entry.

The Hazard Assessment shall include but is not limited to: oxygen content, flammability, toxics, energy, engulfment, entrapment and personal safety (see form in Appendix C).

Step 2 – Establish Plan and Procedures & Protective Equipment

Based on the Hazard Assessment, determine appropriate control measures and equipment required for CSE. The Plan will be incorporated into the Entry Permit.

Step 3 – Establish Communication

Communication between Attendant and Entrant, and Attendant and Rescue Team must be established and in place depending on the specific confined space. The means of communication between the Attendant and the Entrant must be appropriate for the space, especially in areas with high background noise, or possible interference with radio or cell phone transmissions.

Possible methods of communication between the Attendant and Entrant may include: verbal, cell phone, two-way radios, hand signals, rope tugs or tapping. Means of communication must be in place prior to entry into the confined space.

Step 4 – Perform Atmospheric Testing Prior to Entry

Atmospheric testing shall be performed in accordance with this program. Atmospheric testing shall be monitored prior to every entry when space is vacant. If ventilation is required, atmospheric testing shall be performed after a 10-minute ventilation period and continuously during entry.

If atmospheric conditions are found to be unacceptable, entry is not permitted until adequate control methods, such as ventilation, are implemented or installed to ensure acceptable levels. If acceptable atmospheric levels are not possible, breathing air supply (either using supplied air system or self-contained breathing apparatus (SCBA)), is required.

If at any time atmospheric conditions are found to be unacceptable while the Entrant is working in the confined space, no matter what the reason, all personnel shall immediately exit the space and no others shall enter until atmospheric conditions are returned to acceptable levels.

Step 5 – Entry Permit

Prior to entry, the Entry Permit shall be correctly and completely filled out.

Each Entry Permit shall be given a unique Entry Permit number such as year/ building identifier/confined space #/number. For example, if entering confined space number 63 in Power Plant in 2006 the corresponding Entry Permit number would be 06-PP-63-01.

The Entry Permit shall be verified by the Entry Supervisor and signed. No entry into any confined space is permitted without a valid Entry Permit.

Step 6 – Station Attendant

The Attendant shall be posted near entrance of confined space for duration of the work and shall be in constant communication with the Entrant(s) while working in confined space. The Attendant shall not enter the confined space unless relieved by a qualified person (i.e. another Attendant) and entry can be safely performed.

Step 7 – Execute Required Procedures

Ensure control measures have been properly performed, including lock-out / tag-out of all necessary equipment. If a hot work permit is required, ensure hot work permit paper work is properly filled out, with a copy attached to the Entry Permit.

Step 8 – Enter Space and Monitor

All Entrants shall use the sign-in log when entering space and sign-out when exiting. Attendant shall be responsible for maintaining sign in/out log for the duration of the work. Atmospheric conditions shall be monitored continuously while in the confined space.

CONTROLS

Placarding

Every confined space will be identified by a unique number and a placard posted at the entry point to the confined space in order to warn workers of the confined space hazard. Communication corresponding to confined spaces will clearly indicate:



Signage at the University of Ottawa is depicted in Appendix I.

Entry Authorization

All confined space entries will be authorized by a CSE Supervisor. Authorization will be granted by the CSE Supervisor only after all requirements of the CSE Program and corresponding documented measures have been complied with.

Prevention of Unauthorized Entry

Prior to CSE, a means of barricading, cordoning off, taping off and posting will be used in order to notify persons in the area of restricted access to the confined space entry point as well as related work area.

An Attendant will be assigned by a CSE Supervisor and located outside or near the entrance to the confined space. The Attendant will not enter the confined space but will remain in constant

communication with the Entrant while monitoring the Entrant's safety as well as preventing any unauthorized entry. All entries will be documented by the Attendant on the CSE Plan/Permit.

Energy Isolation

Prior to CSE, all energy sources must be isolated and controlled to ensure that no material or contaminants enter the confined space through process lines, drains, vents, etc.

Lock-Out / Tag-Out Procedures

Workers must be protected against any hazard(s) associated with equipment or electrical energy inside the confined space by ensuring that they are de-energized or otherwise controlled.

All energy isolation will be done according to the University of Ottawa Lock Out/Tag Out procedures. Refer to the Facilities Lockout Procedure.

Isolating Lines

"Blanking" is the insertion of a solid metal barrier, called a blank, between the flanges of two sections of pipe. A confined space extends to the blank.

"Disconnecting" is the removal of a section of piping to ensure that no material can flow into the confined space. Note: care must be taken to ensure that high-pressure or toxic material cannot pass across a disconnected space (e.g. high pressure steam can cross between the sections of pipe if the piece that has been removed is in-line with the two sections of pipe).

If blanking or disconnecting piping is not practical in the circumstances for technical reasons the confined space must be adequately protected against the release of hazardous substances into the confined space by other adequate means.

Other Measures

Other adequate measures for protecting against hazards associated with equipment or electrical energy can include a "double-block and bleed" system or the formation of a properly engineered "freeze plug".

Unguarded equipment, or equipment that may have exposed moving parts or that may create a pinch point, will be de-energized or blocked to prevent movement. However, a properly guarded pump or fan need not be de-energized. In a confined space in which flammable, combustible or explosive agents might accumulate, the same equipment must be de-energized or designed so that it does not create a spark.

Entrance Cover Removal

Wherever possible, all unsafe conditions will be eliminated before removing an entrance cover. After removing an entrance cover, where there is a vertical descent, the confined space opening will be guarded with a railing, temporary cover, or other temporary barrier to prevent accidental falls through the opening. Measures will also be put in place to protect Entrants from objects falling into the space.

Atmospheric Testing

Requirements

Atmospheric testing is required when the relevant assessment determines that the confined space may contain atmospheric hazards. The results of testing and calibration information will be documented on the CSE Plan/Permit.

Where indicated by the Hazard Assessment and Plan, before CSE, the atmosphere will be tested with a calibrated instrument in good working order and in a manner that is appropriate for the hazard(s) identified in the relevant assessment.

When monitoring a confined space, the following procedure should be used:

- a) Test equipment function, (i.e. battery test and all-level function);
- b) Ensure all monitor warning alarms are set appropriately;
- c) Test for the following atmospheric hazards:
 - i. Oxygen content– 19.5% to 23.0%
 - ii. Flammable gases and vapors:
 - 1) less than 25% LEL for inspection work;
 - 2) less than 10% LEL for cold work (work that does not produce sparks or other sources of ignition); and
 - 3) less than 5% LEL for hot work (spark producing work or other sources of ignition as a result of the work to be performed) and the requirements of 5.11 are complied with.
 - iii. Potential toxic air contaminants - less than established limits in O.Reg.833 or designated substance regulations (or ACGIH TLVs if not in O.Reg. 833).
- d) The first test must be done near the entry point, with probe placed approximately 5 cm (2 inches) above the entry point;
- e) Insert the probe through an inspection port or another opening to take atmospheric reading;
- f) If neither combustible nor toxic gases are present, remove the cover and then sample the atmosphere at several levels (heights);
- g) Once the readings have been taken, they must be recorded on the Confined Space Entry Plan/Permit;
- h) If an explosive, oxygen-deficient or toxic atmosphere is detected, entry into the confined space is not permitted. Hazard control measures such as ventilation and purging must be employed and space re-tested prior to entry.

Frequency

Testing of the confined space must be performed prior to each and every entry and then continuously while work is underway, to ensure that acceptable atmospheric levels are maintained. Entrants must be allowed an opportunity to observe the pre-entry and periodic testing.

Where applicable, testing will be conducted prior to purging/ventilation and again after purging/ventilation, and prior to each new entry into the space. A new entry takes place when all Entrants have vacated the space and one of the workers or a new worker is going to enter the space.

Response to Elevated Findings and Exit Procedure during CSE

If a hazardous atmosphere is detected during CSE, all of the following will occur:

- Evacuate workers from the space immediately;
- Cancel the Entry Permit;

- Evaluate the space to determine how the hazardous atmosphere developed;
- Implement measures to protect workers from the hazardous atmosphere before re-entry;
- Before re-entry into the same space, verify the Plan and new Permit correspond and are verified and that the space is safe for entry.

Continuous Monitoring

Continuous monitoring is required when performing hot work, when there may be a flammable or explosive atmosphere, in an inert space or where a toxic atmosphere is likely to be generated or present during the CSE or as set out in the Plan. Continuous monitoring will be accomplished using appropriate personal gas detectors worn by all Entrants during CSE.

Ventilation

Purging

If atmospheric hazards exist or are likely to exist in a confined space, the confined space shall be purged, ventilated or both, before any worker enters it, to ensure that acceptable atmospheric levels are maintained while any worker is inside. In some cases, the ventilation of the space will continue throughout the CSE.

Where toxic gases or vapours are present, spaces will be purged wherever possible; contaminants will be displaced with fresh supply air to the space.

Ventilating

Ventilation of a space will either be accomplished through displacing air and diluting it through the introduction of fresh air or the continuous removal of contaminants by local exhaust ventilation for point sources. To ensure adequate ventilation, the points of air supply and exhaust should be separated as far as possible. Openings must be provided for the entry of clean replacement air or to allow the exhaust of air. Pure oxygen must not be used to ventilate a confined space.

Failure Alarm

To warn of ventilation failure and facilitate safe exit of Entrants from the space, an adequate warning system such as an audible or visual alarm and exit procedure shall be provided. The alarm should be activated by a flow or pressure switch in the air stream rather than by electrical failure or other motive power failure. Refer to Section 9 *Response to Elevated Findings and Exit Procedure during CSE* for exit procedure during alarm.

Other Precautions

If, for technical reasons, it is not practical to ventilate or purge, a worker entering the confined space shall use,

- Adequate respiratory protective equipment (to be used during CSE and signed off as appropriate on Entry Permit);
- Adequate equipment to allow persons outside the confined space to locate and rescue the worker if necessary, and;
- Such other equipment as is necessary to ensure the worker's safety.

All personal protective equipment (PPE) must be inspected by a person with adequate knowledge, training and experience, appointed by the employer, and shall be in good working order before the worker enters the confined space.

Hot Work

Precautions

In the case of an explosive or flammable gas or vapour, the space must be either:

- i. Made safe by inerting with an inert gas and continuously monitoring the atmosphere, particularly with regard to oxygen concentration. Workers must wear adequate respiratory protective equipment and equipment to allow persons outside the confined space to locate and rescue them, if necessary; or
- ii. The following precautions must be taken:
 - a. The space is purged and continuously ventilated to maintain an atmosphere of less than 5% of the LEL;
 - b. The space is purged and continuously ventilated to maintain an oxygen concentration of 19.5% - 23%;
 - c. The atmosphere in the confined space is continuously monitored;
 - d. The Entry Permit includes adequate provisions for hot work and details the appropriate measures to be taken; and
 - e. An alarm and exit procedure are in place to provide adequate warning and allow safe escape if the levels in a) or b) above are not met. It is good practice to incorporate a safety factor that provides for adequate warning should the levels be approached.

Hot Work Permit

A completed University of Ottawa Hot Work Permit will be included with the CSE Permit, prior to authorizing the entry.

Personal Protective Equipment

All workers entering a confined space must have adequate personal protective equipment based on the Hazard Assessment, identified in the Plan and in accordance with respective Regulations.

RESCUE PROCEDURES

Identify Team

The Entry Supervisor will ensure that before a confined space entry can occur, rescue procedures are in place and the members of the Rescue Team are immediately available for the duration of the entry.

On-Site Rescue Procedures

If at any time there is questionable action or non-movement by the Entrant inside the confined space, the Attendant will make an immediate communication check. If there is no response or a questionable response, the Attendant will order the Entrant in the confined space to evacuate the space immediately.

If possible, the Entrant(s) will initiate self-rescue by climbing out of the confined space.

If self-rescue is not possible, the Attendant will activate the Confined Space Rescue Team (CSRT) by the means of communication recorded on the Entry Permit. The Attendant will attempt to retrieve the Entrant via the connected retrieval line (for vertical confined space entry only).

If retrieval of an Entrant is required by means other than a tripod/winch (vertical confined space entry), the attendant should immediately summon the CSRT.

If the Entrant is disabled due to falling or impact, the Attendant shall activate CSRT and the Entrant will not be removed from confined space until paramedics arrive and/or unless immediately dangerous to life.

Under no circumstances shall the Attendant enter space to perform rescue.

The University of Ottawa on-site Rescue Team Procedures are detailed in Appendix E.

Training Requirements and Records

The University of Ottawa Rescue Team (or contracted rescue service) will provide records of training of rescue personnel to the University of Ottawa's Office of Risk Management. The Rescue Team must have the following:

- Have completed a minimum of 1 day confined space awareness course with 1^{1/2} day practical component;
- Be trained in confined space rescue procedures including scenarios;
- Have received training in confined space rescue equipment;
- Have undergone respiratory fit testing and be capable of wearing a respirator;
- Have received training in first aid and cardiopulmonary resuscitation (CPR).

All members of the Rescue Team shall have all required elements of training.

Rescue Equipment

Rescue equipment will include harnesses and lifelines, hoist/retrieval systems, self-contained breathing apparatus, fall arrest, safety footwear, protective gloves, personal flotation device and/or hard hats. The rescue equipment and procedures will be documented on each CSE Plan and available and present at the CSE point prior to entry taking place. The emergency equipment shall be inspected and verified to be in good working condition prior to the entry. This inspection will be documented.

Rescue Procedure and the CSE Plan

The University of Ottawa Rescue Team will ensure that the Rescue Plan will be able to effectively remove a worker who has been overcome in a specific confined space.

If entry is required to perform a rescue, rescue personnel must be properly trained and protected against all hazards within the specific confined space.

A minimum of two Rescue Team members should be included in each Rescue Plan.

The Attendant will not be part of the Rescue Team and will remain in place stationed outside and near the entrance to the confined space. The Attendant may assist the rescue from outside the space, as long as the work does not impede the Attendant's duties.

ON-SITE RESCUE PROCEDURES SHALL BE INCLUDED IN THE PLAN DEVELOPED FOR EACH CONFINED SPACE, PRIOR TO CSE.

CONTRACTORS

Regulatory and Program Requirements

NOTE: Most often, work performed by a Contractor will fall under the jurisdiction of the Regulations respecting Construction under the OHS Act and therefore, the Contractor must comply with

O.Reg.632/05 as well as the requirements of the University of Ottawa CSE Program (compliant with O.Reg.632/05).

A copy of this CSE Program will be provided to each Contractor performing CSE work for the duration of this CSE Program.

The Contractor will have their own CSE Program and the Contractor Program must meet or exceed the University of Ottawa CSE Program.

Coordination Document

If there is more than one employer performing work within the same confined space at a time, a Coordination Document is required. A sample Coordination Document is provided in Appendix F.

With the exception of construction projects, the Coordination Document must be prepared by the "lead employer". The "lead employer" is defined in section 3.0 of this document, and will typically be the University of Ottawa.

The Constructor is responsible for the preparation of the Coordination Document if more than one contractor is hired to perform work in the same confined space or related work with respect to the same confined space on a construction project.

The Coordination Document ensures that employer duties with respect to the following subject matters are performed in a way that protects the health and safety of all workers performing CSE or CSE related work:

- Confined space program;
- Hazard assessment;
- Written Plan;
- Plan-specific training (if applicable);
- Entry Permits;
- Written on-site rescue procedures and equipment;
- Isolation of energy and control of materials movement;
- Attendants;
- Entering and exiting;
- Unauthorized entry;
- Atmospheric testing;
- Explosive and flammable substances; and
- Ventilation and purging of atmospheric hazards.

TRAINING

Content

Supervisors, Attendants, Entrants and Rescue Team members must be adequately trained in O.Reg. 632/05, this CSE Program, Plan, Permit process, Hazard Assessment/identification and controls, rescue awareness, equipment to be used, personal protective equipment, and documentation. Workers with emergency rescue responsibilities will need training related to rescue response as well as those outlined in section 10.0 of this Program.

Training must include hands-on experience with the safety equipment including the personal protective equipment and safety harnesses.

Minimum Training Requirements

Minimum training requirements for various positions are outlined below. All training outlined herein must be documented and kept on file by the Office of Risk Management. Training requirements and needs should be reviewed on an annual basis.

CSE Supervisor:

- Must be aware of all hazards associated with a confined space and communicate this to his/her workers;
- Must communicate and monitor the procedures surrounding safe entry and work are followed;
- Must communicate how to work safely around the hazards identified. Supervisor must enforce the proper use and care of required PPE (eyes, ears, and foot protection);
- Must ensure all workers assigned to a confined space have undergone the prescribed training.

Confined Space Worker (Entrant, Attendant) – This encompasses all individuals preparing, entering, guarding or testing the confined space. Every worker who works in or with a confined space must receive adequate training in the recognition of hazards associated with confined spaces and training to be able to safely perform the assigned duties for that specific confined space.

On-site rescuers – An adequate number of on-site rescue workers must be available to perform rescue in accordance with the Rescue Plan. In addition to general confined space training, they will need to be trained in First aid and CPR, on-site rescue procedures, and use of rescue equipment. All workers – Basic awareness at H&S meetings that confined spaces are present, where they are and that there is prohibited entry to all confined spaces unless authorized by supervisor.

Training	Personnel / Positions to be Trained
Basic awareness of confined spaces	Entrant, Attendant, CSE Supervisor, Rescue Team
CSE Program and Hazards	Entrant, Attendant, CSE Supervisor, Rescue Team
CSE Plans	Entrant, Attendant, CSE Supervisor, Rescue Team
Facility Emergency Response Plan	Entrant, Attendant, CSE Supervisor, Rescue Team
Confined Space Emergency Procedures	Entrant, Attendant, CSE Supervisor, Rescue Team
First Aid, CPR	Rescue Team
Gas testing	Entrant, Attendant, CSE Supervisor, Rescue Team

Note: There could be more than one Entrant, Attendant or CSE Supervisor at training session.

Review

Training will be reviewed with or by the ORM whenever there are changes in the Confined Space Program or at least annually. A copy of the most recent training program and records identifying workers who received the training will be forwarded to, and retained by the Office of Risk Management.

DOCUMENTATION AND RECORDKEEPING

Required written documents:

- Coordination document (if applicable)*
- Program *
- Hazard Assessment
- Plan
- Training records
- CS Entry permit
- On-site rescue procedures *
- On-site rescue equipment inspection records
- Air testing results

All of the above documents are incorporated within the Entry Permit except for those with an asterisk (*). The University of Ottawa, for the purposes of the CSE Program has incorporated the Plan, onsite rescue equipment inspection records and air testing results into one document (the Permit) in Appendix D.

Retention

The University of Ottawa must retain all of the above documents for at least 1 year after they are created, and at least the two most recent records of each document must be retained, with the exception of the Confined Space Program which must be maintained at all times if the workplace includes a confined space that workers may enter to perform work.

For construction projects, these documents must be retained for the duration of the project, and at least one year after the completion of the project.

Distribution and Availability

The Co-ordination document and Confined Space Program document must be provided to the JHSC and other employers, where applicable.

The Hazard Assessment document must be provided, upon request, to the JHSC.

Entry Permits must be readily available to every person who enters the confined space or performs related work during the time for which it applies (posted).

The Plan, training records, on-site rescue procedures, rescue equipment inspection and air testing results documents should be readily available at the workplace.

For Construction projects:

- The University of Ottawa must keep available for inspection at the project the Hazard Assessment, Plan, co-ordination document, record of training, Entry Permit, record of inspection of rescue equipment, and air testing records.
- After the completion of the project, the University of Ottawa or the Constructor must keep a copy of these documents for at least one year.

APPENDIX A – INVENTORY OF CONFINED SPACES

CS NUMBER	BUILDING	LOCATION	DESCRIPTION
WW	Campus Area	Campus	Service Manholes
XX	Campus Area	Campus	Electrical Services
YY	Campus Area	Campus	Storm Sewers
ZZ	Campus Area	Campus	Sanitary Sewers
2	Thompson Residence	PM-05	Domestic Hot Water Tank
3	Thompson Residence	Rm. 224	Domestic Hot Water Tank
4	Marchand Residence	Basement B05	Domestic Hot Water #2
5	Marchand Residence	Basement B05	Domestic Hot Water #1
6	Stanton Residence	PM-4	Domestic Hot Water
10	Roger Guindon	Rm. 1138 Mezzanine Level	Domestic Hot Water Tank No 2
11	Roger Guindon	Rm. 1138 Mezzanine Level	Domestic Hot Water Tank No 3
12	Roger Guindon	Rm. 1138	Expansion H.W. Tank
14	Roger Guindon	Rm. 3003A	Expansion H.W. Tank
15	Marion Hall	SB-15	Domestic Hot Water
17	Jock Turcot Hall	Rm. 0031 Block A/B	Sanitary/Storm Pit
18	Jock Turcot Hall	Rm. 0033	Sanitary/Storm Pit
19	Monpetit Hall	Rm. 003B	Sanitary Pit
20	Marchand Residence	B5 -Basement	Sanitary / Storm Pit
21	Brooks Complex	Garage (Garbage room #1)	Sanitary/Storm Pit
22	Morisset Hall	Rm. 0042 off tunnel	Storm Pit
23	Thompson Residence	Rm. 004	Sanitary / Storm Pit
24	FSS	Room 0500	Sanitary / Storm Pit
25	Fauteux	Rm. 142	Sanitary / Storm Pit
26	Simard Hall	Rm. 0012	Sanitary / Storm Pit
28	Brooks Complex	Garage	Sanitary/Storm Pit
29	Brooks Complex	Garage M4 pillar	Sanitary/Storm Pit
30	Brooks Complex	Garage (Garbage room #1)	Sanitary/Storm Pit
31	Monpetit Hall	Rm. 003B	Storm pit
32	Lamoureux Hall	Rm. 03 (beside fan#4A)	Sanitary/Storm Pit

CS NUMBER	BUILDING	LOCATION	DESCRIPTION
36	Brooks Complex	Garage F4 pillar	Storm Pit
37	Brooks Complex	Garage M4 pillar	Storm Pit
38	Brooks Complex	Garage F4 pillar	Storm Pit
39	Brooks Complex	Garage M4 pillar	Storm Pit
40	Brooks Complex	Garage (near elevator)	Storm Pit
41	Perez Hall	Garage J4 pillar	Storm Pit
50	Physical Plant	M09	Deaerator Tank
51	Physical Plant	M 09 2nd Floor Mezz.	Steam Drum #1
52	Physical Plant	M 09 2nd Floor Mezz.	Steam Drum #2
55	Physical Plant	M 09A 2nd floor Mezz.	Flue to Chimney Stack for Boiler #1
56	Physical Plant	M 09A 2nd floor Mezz.	Flue to Chimney Stack for Boiler #3
57	Physical Plant	M09	Hot Well Tank
59	Physical Plant	O03	Condensation Tank 2
61	Physical Plant	O 03	Primary Hot Water Tank
62	Physical Plant	O 03	Mud Tank #1
63	Physical Plant	O03	Mud Tank #2
64	Physical Plant	O 03	Fire Box/Wind Box #1
65	Physical Plant	O 03	Fire Box/Wind Box #2
66	Physical Plant	O 03	Flue Gas Vent #1
67	Physical Plant	O 03	Flue Gas Vent #2
72	Physical Plant	Exterior	Snow melting pit
73	Leblanc	Rm. 14	Domestic Hot Water Tank
75	Roger Guindon	Rm. 1130	Steam Condensation Tank
78	Lamoureux Hall	Rm. 03	Expansion Tank
81	Colonel By Hall	E02	Access to water reservoir
84	Colonel By Hall	E023a	Test Engine Pit #3 (below grating)
85	Colonel By Hall	E018 (Enter through CS159)	Ventilation shaft for Combustion Chamber
87	Physical Plant		Prechamber to boiler #3

CS NUMBER	BUILDING	LOCATION	DESCRIPTION
90	Physical Plant	M09	Steam Drum #3
91	Physical Plant	M09	Mud Drum #3
92	Physical Plant	M09	Fire Box #3
93	Physical Plant	M09	Economizer Boiler#3
94	SITE Building	Garage Basement	Storm Sump Pit
95	SITE Building	Garage Basement	Domestic Sump Pit
98	SITE Building	Basement	Storm Sump Pit
99	SITE Building	Basement	Sanitary Sump Pit
100	SITE Building	Basement	Sump pits under South Racan unit
101	Sports Complex	Ground C118	Snow melting pit Zamboni rink #2
102	Sports Complex	Ground C108	Snow melting pit Zamboni rink #1
103	Sports Complex Garage	Parking 00	Elevator Sump Pit
104	Sports Complex Garage	Parking 00	Storm Sump Pit
105	Sports Complex Garage	Parking 00	Sump Pit
107	Sports Complex Garage	Parking 00	Sump Pit
108	Sports Complex Garage	Parking 00	Sump Pit
109	Sports Complex	Roof	Cooling Tower Rink Compressor
110	Sports Complex	Ground C107a	Compressor Cooling Tower
112	Sports Complex	Roof	Cooling Tower
114	D'Iorio	Basement Mech Room 033	Storm/Waste Water Pit
115	D'Iorio	Basement Mech Room 033	Waste Treatment Tank
116	D'Iorio	Basement Men's Washroom 004a	Sanitary Sump Pit
132	New Residence	Basement R020	Sanitary Sump Pit
133	New Residence	Basement R020	Storm Pit
136	D'Iorio	Room 012	Filter Carbon Tanks (A&B)
138	New Residence	R009	Domestic Hot Water Tank

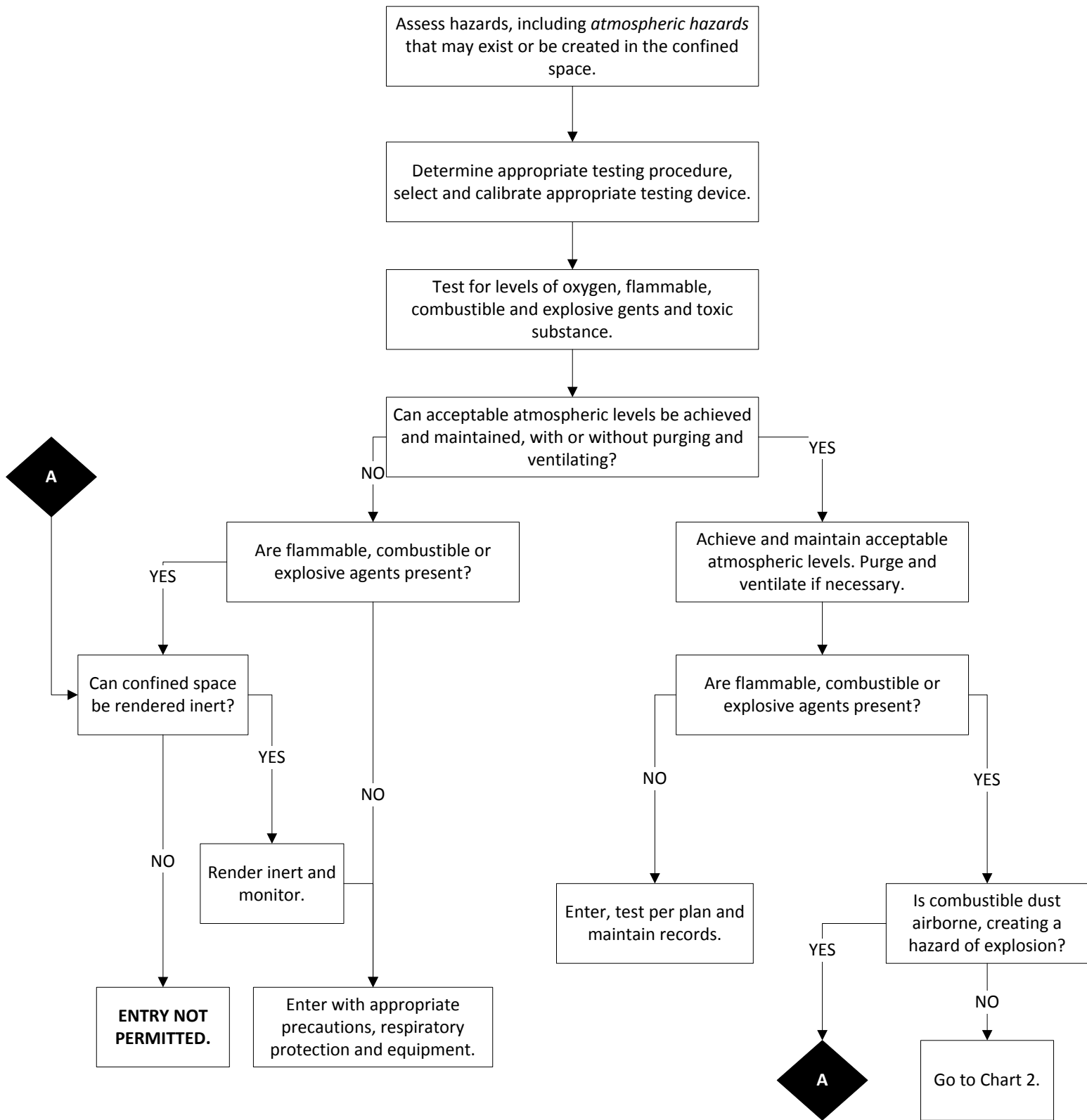
CS NUMBER	BUILDING	LOCATION	DESCRIPTION
139	New Residence	R027	Sanitary Sump Pump
141	Physical Plant		Chimney Stack Boiler #1
142	Physical Plant		Chimney Stack Boiler #2
143	Physical Plant		Chimney Stack Boiler #3
144	Montpetit Hall	R020c	Pool Pit
145	Jock Turcot	Basement Mech Room (beside CS17)	Storm Pit
146	Biosciences	R008	Storm Pit
149	Morrisette Hall	Room 0042	Sanitary Pit
151	Peter Morand	Main Mech Room	Storm Pit
152	Peter Morand	Main Mech Room	Sanitary / Sump Pit
154	Roger Guidon	Room 0505	Storm Pit
155	Roger Guidon	Room 0500A	Sanitary Pump DPE9
156	Roger Guidon	Room 0500A	Elevator sump Pit
157	Perez Hall	Room 015 (garage)	Sanitary/Storm Pit
158	Simard	Room 0012	P1 / P2 Sump Pit
159	Colonel By Hall	E024	Physical Resources Mech. Room
160	Physical Plant	Exterior	Snow melting pit overflow chamber
162	Lees Campus	Block E	Water Tank
163	Lees Campus	Block A	Sump pit Diesel Generator room
164	Desmarais	Parking Garage	Sanitary Pit
165	Desmarais	Parking Garage	Sanitary Pit
166	Desmarais	Parking Garage	Storm Pit
167	Desmarais	Parking Garage	Storm Pit
168	Hyman Soloway Residence	Garage	Sanitary Pit
169	Hyman Soloway Residence	Garage	Storm Pit
170	Hyman Soloway Residence	Garage	Sanitary Pit
171	Hyman Soloway Residence	Garage	Storm Pit

CS NUMBER	BUILDING	LOCATION	DESCRIPTION
172	Hyman Soloway Residence	Garage	Elevator Sump Pit
178	Power Plant	Parking Lot Z	Oil Tank
179	Power Plant	Parking Lot Z	Oil Tank
180	Power Plant	Parking Lot Z	Oil Line Tunnel
183	D'Iorio	Room 129	Chemical Spill Storage Tank
184	D'Iorio	Solvent Storage Room	Solvent Spill Storage Tank
185	Marion Hall	Room 0012	Sewage Pump Pit
186	D'Iorio	D'Iorio Tunnel Mechanical Room	Chemical Waste Tank "Dilution Pit"
188	FSS	Mechanical Room 0015	Sanitary Pit
189	FSS	Mechanical Room 0015	Sanitary Pit
190	FSS	Mechanical Room 0011	Elevator Sanitary Pit
192	Friel Residence	Mechanical Room P207	Sanitary Pit
193	Friel Residence	Mechanical Room P207	Storm Pit
194	Friel Residence	Mechanical Room P224	Storm Pit
195	601 Cumberland	Bathroom 004	Waste Water Sump
196	601 Cumberland	Room 011	Storm Pit
197	601 Cumberland	Room 011	Sanitary Pit
198	ARC	Room 129A	Storm Pit
199	ARC	Room 129A	Check Valve Pit
200	ARC	Room 101	Elevator Sump Pit
201	Henderson Residence	Room 001	Storm Pit
202	Henderson Residence	Room 001	Sanitary Pit
203	Henderson Residence	Room 007	Sanitary (Elevator) Pit
204	Henderson Residence	Room 007	Sanitary (Sprinkler Drain) Pit

CS NUMBER	BUILDING	LOCATION	DESCRIPTION
205a	Rideau Residence	Room 1903	Upper Hot Water Storage Tank
205b	Rideau Residence	Room 1903	Lower Hot Water Storage Tank
206	Rideau Residence	Parking Garage	Sanitary Pit
207	Rideau Residence	Parking Garage	Storm Pit
208	Rideau Residence	Parking Garage	Storm Intercept
212	45 Mann Residence	Parking Garage	Sump Pit 1
213	45 Mann Residence	Parking Garage	Sump Pit 2
214	45 Mann Residence	Parking Garage	Sump Pit 3
215	Power Plant	Mechanical Room	Boiler #4
216	100 Louis Pasteur	Room C043	Sump Pit # 1
217	100 Louis Pasteur	Room C043	Sump Pit # 2
218	150 Louis Pasteur	Room 0040	Laboratory Dilution Tank
219	150 Louis Pasteur	Room 0040	Sump Pit # 1
220	150 Louis Pasteur	Room 0040	Sump Pit # 2
221	150 Louis Pasteur	Room 0040	Sump Pit # 3
222	150 Louis Pasteur	Room 00018	Sump Pit # 1
223	150 Louis Pasteur	Room 00015	Sump Pit # 1
224	150 Louis Pasteur	Room 00012	Sump Pit # 1

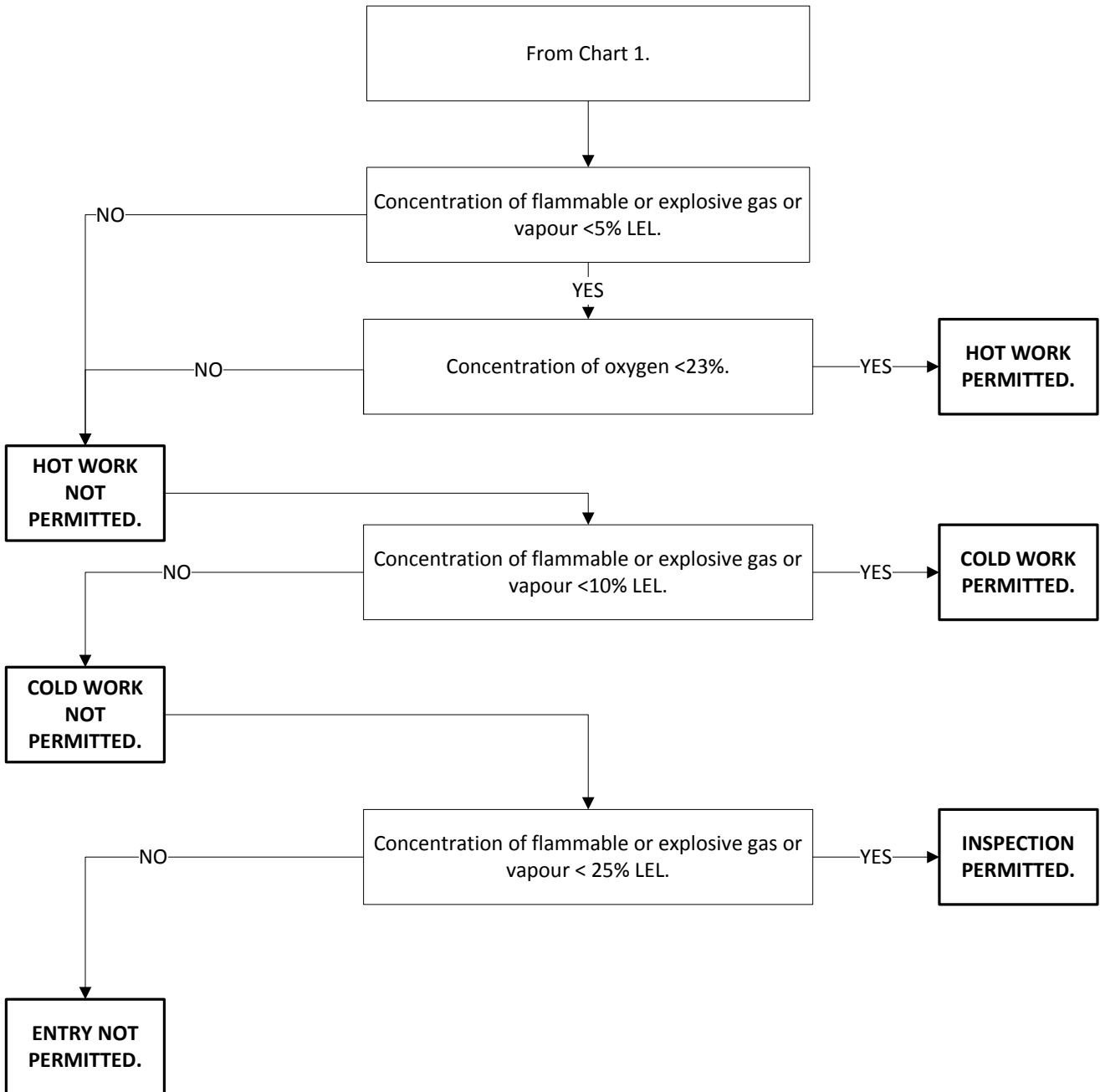
APPENDIX B – ATMOSPHERIC HAZARDS DECISION TREE – CHART 1

Chart 1 – Atmospheric Hazard Decision Tree



APPENDIX B – ATMOSPHERIC HAZARDS DECISION TREE – CHART 2

Chart 2 – Decision Tree for Work in Flammable or Explosive Gas or Vapour



APPENDIX C – HAZARD ASSESSMENT FORMS

Please consult Facilities.

APPENDIX D – ENTRY BASE PLAN AND PERMITS

Please consult Facilities.

APPENDIX E – RESCUE PROCEDURES

Confined Spaces

Rescue Procedures

Office of Risk Management

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This procedure was developed by [Blu-Metric Environmental](#) for the University of Ottawa.

PURPOSE

This procedure describes the Confined Space Entry (CSE) Rescue Procedures to be followed in the event that rescue is required during a CSE at the University of Ottawa. This procedure is a supplement to the CSE Program used by the University of Ottawa and is an emergency procedure within the framework of the University of Ottawa Emergency Management and Recovery Program.

The rescue procedures are established to;

- ensure the most safe and timely removal of a worker from a confined space in the event of an emergency evacuation;
- provide a written rescue procedure that is ready for implementation prior to any entry into a confined space.

SCOPE

This procedure applies to CSE carried out by the University of Ottawa in the confined space areas identified in Appendix A under the CSE Program.

RESPONSIBILITIES

It is the responsibility of those involved in confined space entry and rescue at the University of Ottawa to comply with this written rescue procedure. Only members of the CSE Rescue Team will be directly involved with the rescue of anyone from a confined space.

For the purposes of the CSE Program, the University of Ottawa may contract external rescue services during CSE activities under the CSE Program. In those instances, external Rescue Service personnel will be deemed as part of the CSE Rescue Team and must be immediately available for on-site rescue procedures during CSE by University of Ottawa workers and/or contractors under the CSE Program.

Each member of the Confined Space Rescue Team must:

- a. Have completed a minimum of 1 day confined space awareness course with ½ day practical component
- b. Be trained in confined space rescue procedures, including scenarios
- c. Have received training in confined space rescue equipment
- d. Have undergone respiratory fit testing and be capable of wearing a respirator
- e. Have received training in first aid and cardiopulmonary resuscitation (CPR).

DEFINITIONS

“Atmospheric hazards” – mean:

- a. accumulation of flammable, combustible or explosive agents;
- b. an oxygen content in the atmosphere that is less than 19.5 % or more than 23 % by volume;
or
- c. the accumulation of atmospheric contaminants, including gases, vapours, fumes, dusts or mists, that could:
 - i. result in acute health effects that pose an immediate threat to life; or
 - ii. interfere with a person's ability to escape unaided from a confined space.

“Attendant” – an assigned individual that is stationed outside and near the entrance to a confined space and monitors the safety of the Entrant(s).

“Confined Space” - A fully or partially enclosed space,

- a) that is not both designed and constructed for continuous human occupancy, and
- b) in which atmospheric hazards may occur because of its construction, location or contents or because of the work that is done in it.

“Competent Person” – A person who is:

- a) qualified due to knowledge, confined space awareness training, and experience to organize the work and its performance,
- b) is familiar with all legal requirements of the work, and
- c) has knowledge of any potential and actual dangers to H&S in the workplace or confined space.

A “competent person” is different from a “competent worker” or a person having “adequate knowledge, training, and experience”. There is an added responsibility of also having “to organize the work”, which is associated with supervisory responsibility.

“Competent worker”— in relation to specific work, means a worker who is qualified because of knowledge, training and experience to perform the work, is familiar with all legal requirements that apply to the work and has knowledge of any potential and actual dangers to H&S in the work to be performed.

“Confined Space Rescue team (CSRT)” – All specified persons within the University of Ottawa trained in rescue procedures and any necessary equipment required during confined space rescue, as well as first aid and cardiopulmonary resuscitation (CPR) training. Rescue personnel may be external personnel.

“Entrant” – person entering the confined space for any reason.

“Entry” – action by which a person or part of a person passes through the plane of the opening into a confined space and includes ensuing work activities.

“Entry Supervisor” – In context of this program for the University of Ottawa, is a competent person responsible for verifying the entry permit and other relevant documentation (rescue plan, air monitoring records, etc.) prior to entry and coordinating the confined space entry activities into the space.

“External Confined Space Rescue Team” - All specified persons contracted externally outside the University of Ottawa whom are trained in rescue procedures and any necessary equipment required during confined space rescue, as well as first aid and cardiopulmonary resuscitation (CPR) training.

“IDLH” – Immediately Dangerous to Life or Health. Any condition that poses an immediate threat to health or life of an Entrant or would cause irreversible adverse health effects or would interfere with an individual’s ability to escape unaided from a confined space.

“ORM” – Office of Risk Management of the University of Ottawa

For additional definitions refer to the University of Ottawa CSE Program

TYPES OF EMERGENCIES IN CONFINED SPACES

There are four types of emergency situations typically involved in confined spaces. These are:

- a. **Self-rescue** – Involves the Entrants ability to extract him/herself from the confined space with little or no help from those outside
- b. **Assisted** - Assistance from the Attendant is engaged to remove Entrant from the space by operating a retrieval system, such as a tripod and winch system.
- c. **IDLH** – This situation occurs when the atmosphere is Immediately Dangerous to Life and Health (IDLH) as a result of a toxic gas or oxygen-deficient atmosphere. In this scenario, the rescue team must wear a self-contained breathing apparatus (SCBA) and retrieval should be done within minutes or as soon as possible of Entrant’s respiratory arrest.
- d. **Extrication**-Involves the deliberate packaging and retrieval of an injured Entrant. This situation is typically done under acceptable atmospheric conditions.

Upon being summoned by the Attendant the CSRT will immediately assess the scene to determine whether entry is required, whether the space is IDLH and the nature of any injuries to the Entrant (if applicable).

TYPES OF ENTRY

CSRT should be familiar with the completed confined space Entry Permit prior to accessing an Entrant; details of entry must be known when completing the confined space Rescue Plan. In general, there are five types of access plans that take into account the location of the entry point and the direction in which the Entrant would typically follow. The entries include:

- a. Top access with horizontal travel;
- b. Top access with vertical travel;
- c. Side access with horizontal travel;
- d. Side access with vertical travel;
- e. Bottom access with upward vertical travel.

Based on these typical entry and travel scenarios, a base rescue plan identifying distances, number and size of openings, elevation, primary travel direction, vertical distance and horizontal distance must be identified.

Based on this entry information, the appropriate retrieval system and the location of the appropriate anchor points will be determined.

The rescue plan must be developed and in place prior to the confined space entry.

RESCUE PLAN

A template of the typical Rescue Plan is provided in Appendix B. One member of the Rescue Team is responsible for completing and signing the confined space Rescue Plan. A copy of the confined space Rescue Plan should be attached to the confined space Entry Permit.

A completed confined space Rescue Plan is required for each confined space entry.

ROUTINE RESCUE PREPARATION PROCEDURE STEPS

- a) **Identify Team** – Each CSRT must contain a minimum of two (2) members. If additional CSRT members are required as part of the confined space Rescue Plan the additional number must be clearly marked on the space provided on the Rescue Plan.

The confined space entry Supervisor will ensure that before an entry can occur, rescue procedures are in place and that the members of the Rescue Team are immediately available at the site. In the case of the Power Plant, it is acceptable for the Rescue Team to be within the building and not necessarily at the location of the confined space entry. However, all rescue equipment must be at the site for the duration of the entry and appropriate means of communication must be established between the Rescue Team and the Attendant prior to entry.

- b) **Verify Communication** – Prior to each confined space entry, the CSE Supervisor will ensure that a means of effective emergency communication with each of the Rescue Team members has been identified and will be used, if needed. The Attendant and Entrant will ensure that a means of communication (as identified on the entry permit) has been established for their use to maintain contact with one another, during the entry.
- c) **Rescue Equipment** – Prior to each confined space entry, the CSE Supervisor will ensure that all necessary rescue equipment is at the confined space location, has been inspected, signed off, and is in good working order and otherwise appropriate for the entry being performed. This may include harnesses and lifelines, hoist/retrieval systems, respiratory equipment (either air supplying or self-contained breathing apparatus), fall arrest, safety footwear, protective gloves, personal flotation device and/or hard hats. A first aid kit will be included in rescue equipment.
- d) **Complete Permit Information** – CSE Supervisor is responsible for ensuring that CSRT is available, a confined space Rescue Plan is complete and that rescue equipment for each confined space entry is recorded on each CSE permit.
- e) **During Entry** – Attendant will monitor the CSE, maintain their post and be in communication with the Entrant, at all times during the entry. Attendant must not enter the confined space unless they are released from that duty and another Attendant takes over that duty.

RESCUE PROCEDURE STEPS

The following steps must be implemented in the event that a confined space rescue is initiated. The following procedure applies to both the University of Ottawa confined space Rescue Team and any external contracted confined space Rescue Team.

Emergency Activation (Attendant)

- a) If, at any time, there is questionable action, response or non-movement by the Entrant inside the confined space, the Attendant will make an immediate communication check. If there is no response or a questionable response, the Attendant will order the Entrant in the confined space to evacuate the space immediately.
- b) If possible, the Entrant(s) will initiate self-rescue by climbing out of the confined space.

- c) If self-rescue is not possible, the Attendant will summon the CSRT with the appropriate means of communication identified in the confined space entry permit and attempt to retrieve the Entrant via the connected retrieval line (for vertical entry only).
- d) If retrieval of Entrant is required by means other than a tripod/winch (vertical entry), the Attendant will immediately summon the CSRT with the appropriate means of communication identified in the Entry Permit and call Protection Services at ext. 5411 (613-562-5411). The Attendant must advise Protection Services that the Confined Space Rescue Team was activated and that civic authorities (911) are required for a confined space emergency. The Attendant will describe the nature of the situation to Protection.
- e) If the Entrant is disabled due to falling or impact, the Attendant shall summon the CSRT with the appropriate means of communication identified in the confined space Entry Permit and call Protection Services at ext. 5411 (613-562-5411). The Entrant will not be removed from the confined space until paramedics arrive or unless immediately danger to life or health.

Simultaneous confined space entries may only occur within the same day and timeframe if there are sufficient Confined Space Rescue Team members available for each of the confined space entries and there is adequate rescue equipment available to be placed at each of the confined spaces during entry.

UNDER NO CIRCUMSTANCES SHALL THE ATTENDANT ENTER THE CONFINED SPACE TO PERFORM OR ASSIST IN THE RESCUE.

Protection Services

- a. Following call from Attendant, Protection Services will dispatch Protection Services Officers to the scene of the confined space incident.
- b. Protection Services Dispatch will call 911 and request assistance for a confined space emergency.

The emergency steps to be taken by Protection Services include:

- a. Secure the scene:
 - a. Prevent unauthorized persons from entering area.
 - b. Prevent those involved in incident from leaving the scene.
- b. Assist and support CSE Rescue Team, if required. **Protection Services personnel will not enter the confined space.**
- c. Gather information (when emergency has ended) on precise details about the events before, during and after the emergency, including
 - a. Obtain statements;
 - b. Note signage in area;
 - c. Get preliminary information on cause of incident;
 - d. Take photographs of area;
 - e. Contact Office of Risk Management (ORM) and the CSE Supervisor (as identified on confined space Entry Permit).

Emergency Response (Confined Space Rescue Team)

The emergency steps to be taken by CSRT include:

- a. Assess the scene to determine if entry is required;
- b. Ensure confined space is not IDLH;
- c. Implement confined space specific rescue plan;
- d. If entry is required, the CSE Rescue Team will don all required personal protective equipment (PPE) as outlined in the confined space Rescue Plan prior to entry into the confined space.
- e. The Attendant will remain stationed at the opening of the confined space and be in communication with the CSRT.
- f. Perform first aid or cardiopulmonary resuscitation (CPR), as required, to stabilize the Entrant(s) and allow for extrication and/or evacuation to a medical facility as quickly as possible. If Entrant is disabled due to falling or impact, the Attendant shall summon the CSRT with the appropriate means of communication identified in the CS entry permit and call Protection Services at ext. 5411 (613-562-5411). The Entrant will not be removed from the confined space until paramedics arrive or unless immediately danger to life or health.

PROHIBITION: No person shall enter a confined space under rescue conditions if they are not:

- a. Part of the CSRT or a City of Ottawa Firefighter;
- b. Trained in confined space rescue procedures and equipment;
- c. Trained in the confined space rescue plan for removal of the Entrant from the space.

DOCUMENTATION

The CSE Entry Permit will be completed with information on the emergency evacuation details and then cancelled by the CSE Supervisor.

A confined space Entry Permit can be cancelled by recording the date and time under “General Information” under “Duration of Permit”.

The CSE Supervisor will ensure that an [accident / incident report](#) is completed and sent to Human Resources within 24 hours of the completion of the rescue and rendering of emergency care. The report will include investigation into the circumstances that led to the emergency evacuation of the confined space as well as corrective action and incident follow up.

CONFINED SPACE RE-ENTRY

A confined space shall not be re-entered by any person following an emergency exit and/or rescue procedure application prior to thorough and accurate evaluation of the space in order to determine the cause of the need for evacuation. A new Plan and Entry Permit will be required for re-entry outlining future controls and precautions.

TRAINING

All University of Ottawa personnel identified within this confined space rescue procedure will, as a minimum, receive training and instruction in:

- a. The written confined space rescue procedure,
- b. The requirements of the confined space regulation,
- c. The University of Ottawa CSE Program and appendices, including hazards associated with confined spaces.

Any contracted External Rescue Service contracted will be provided a copy of the referenced

CSE Program and associated Hazard Assessments and Base Entry Permits for the confined space entry to be performed as well as the confined space rescue procedures.

RECORD KEEPING

The University of Ottawa will ensure that the Rescue Team provide documentation that they have executed either a real or mock rescue scenario, at least quarterly, in order to maintain their skills.

APPENDIX F – COORDINATION DOCUMENT

Confined Space Entry (CSE) Coordination Document

Lead Employer: _____

Date: _____

Lead Employer Contact: _____

Phone No.: _____

Contractor(s):

1. _____

4. _____

2. _____

5. _____

3. _____

6. _____

Location of Confined Space to be entered:

Confined Space No.: _____ CS Plan No.: _____

Lead Employer Responsibilities: To ensure that Contractors are provided with information on hazards associated with the confined spaces as well as CSE Program requirements for the CSE being performed.

Contractor Responsibilities: To comply with the requirements of the applicable CSE regulation (e.g., O.Reg. 632/05) and the requirements of the Lead Employer. To ensure that all workers of Contractor are trained in the work to be performed and the relevant regulated confined space requirements. The Contractor and workers of the Contractor, are to be aware of the University of Ottawa CSE Program requirements.

Responsibility:	Lead Employer:	Contractor:
CSE Program**	X	X
Hazard Assessment	X	
Written Entry Plan		
Training*	X	X
Personal Protective Equipment (PPE)*	X	X
Entry Permit		
Isolation of Energy & Control of Materials Movement		
Attendants		
Entering and Exiting Monitoring & Recordkeeping		
Unauthorized Entry Prevention		
Written On-site Rescue Procedure & Equipment		
Atmospheric Testing		
Explosive and Flammable Substances		
Ventilation & Purging of Atmospheric Hazards		
Rescue Plan		
Rescue Team		
Documentation/Records*	X	X

* General training, personal protective equipment (PPE) and documentation/records are individual responsibilities of both the Lead Employer and Contractor(s)

** Both Lead Employer and Contractor are required to have a CSE Program in place

The signatures below indicate that the Contractor(s) and Lead Employer acknowledged that the employer duties with respect to the above subject matters are performed in a way that protects the health and safety of all workers performing CSE or CSE related work at the University of Ottawa:

1. _____
Contractor signature

2. _____
Contractor signature

3. _____
Contractor signature

4. _____
Contractor signature

5. _____
Contractor signature

6. _____
Contractor signature

Lead Employer signature

APPENDIX G – EQUIPMENT REQUIRED FOR CONFINED SPACE ENTRY

- Head protection
- Eye protection
- Hearing protection
- Gloves
- Approved safety harness
- Approved Life-line
- CSA-approved foot protection
- Calibrated direct-reading monitor (with alarm) with sensors appropriate to confined space (O₂, CO, LEL, H₂S)
- Communication equipment
- Ventilation equipment
- Emergency escape respirator
- Portable lighting
- First aid kit
- Ladders of suitable length and construction
- Hand cleaners and paper towels
- Personal lifting device with winch
- Man-hole cover lifting tool
- Emergency rescue equipment
 - Harnesses and lifelines;
 - Hoist/retrieval systems;
 - Self-contained breathing apparatus;
 - Fall arrest;
 - Safety footwear;
 - Protective gloves;
 - Personal flotation device;
 - Hard hats;
 - First aid kit;
 - Other equipment, as applicable.

APPENDIX H – LIST OF POTENTIALLY HAZARDOUS SPACES

A hazard assessment found the following locations not to be confined spaces. However, the work to be performed in these spaces should be evaluated for additional potential hazardous conditions prior to working in these spaces. Proper control measures should be dealt with accordingly, if required.

CS NUMBER	BUILDING	LOCATION	DESCRIPTION
UU	Campus Area	Campus	Elevator Pit
VV	Campus Area	Campus	Access to HVAC Vent Systems W/A
1	Morisset Hall	Rm. 12 (inside room 11)	Elevator Sump Pit
9	Roger Guindon	Rm. 1138 Mezzanine level	Reverse Osmoses Water Tank #1
13	Roger Guindon	Rm. 1138	Reverse Osmosis Water Tank #1
33	Stanton Residence	Rm. 04 Mechanical room	Storm Pit
42	Tabaret	Rm. 0039 Mechanical room	Storm Pit
44	Marion Hall	Rm. 005	Storm Pit
45	Colonel By Hall	Rm. E03B	Storm Pit
46	Colonel By Hall	Rm. E024 in E018	Storm Pit
47	Colonel By Hall	Rm. C06	Storm Pit
48	Colonel By Hall	Rm. C012B	Storm Pit
58	Physical Plant	M09	Air Compressor Tank.
69	Physical Plant	O03	Blow-Down Tank Sump Pit
70	Physical Plant	O 03	Oil Pit
76	Physical Plant		Ceiling Space
77	Physical Plant		Supply air from tunnel to boiler #3 (blue duct)

CS NUMBER	BUILDING	LOCATION	DESCRIPTION
79	Colonel By Hall	E02	Under Rear Hydraulics Lab (open pit)
80	Colonel By Hall	E02 (in CS79)	Sump Pit Hydraulics Lab
82	Colonel By Hall	E020A	Combustion Chamber #1
83	Colonel By Hall	E021a	Test engine pit #2
88	Physical Plant		Tunnel supply air to boiler #1,2,3
97	Colonel By/SITE	Tunnel	Storm Sump Pit
111	D'Lorio	RM 025	Elevator Sump Pit
113	D'lorio	Basement Mech Room 033	Compressed Air Tank
118	Montpetit Hall	Basement	Compressed Air Tank
122	Physical Plant		Access stack for chimneys
134	New Residence	Basement Room 024	Elevator sump Pit
137	D'Lorio	Room 018	Reverse Osmosis Waste Water
140	Colonel By	E022	Walk in Fridge
147	BioScience	Room 008	Clean Water Tank
148	LeBlanc	Room 014	Storm Pit
150	Peter Morand	Room 600	Storm Pit
153	Roger Guidon	Basement (new)	Tank in Pit, holding tank
161	Lees Campus	Block A - D	14 crawlspaces
164	Lees	Block A	Storm Pit
165	Lees	Block A	Storm Pit

CS NUMBER	BUILDING	LOCATION	DESCRIPTION
173	Hyman Soloway Residence	Basement Storage	Sump Pit
174	Hyman Soloway Residence	Basement Storage	Sump Pit
175	Roger Guindon	Room 2212A	ventilation shaft
176	Roger Guindon	Room 2147	ventilation shaft
177	Roger Guindon	Room 2119	ventilation shaft
182	Marion Hall	Rooms 008-0014	ventilation service tunnels
187	Brooks and Fauteux	Garage near CS030; Fauteux Tunnel	CCS Service Tunnel
191	Vanier	Level 0 Corridor 0100K by Stairwell 0155 access	Crawl Space
209	45 Mann Residence	Penthouse Mech. Room	Hot Water Holding Tank
210	45 Mann Residence	Penthouse Mech. Room	Hot Water Holding Tank
211	45 Mann Residence	Penthouse Mech. Room	Hot Water Holding Tank
225	150 Louis Pasteur	Room 00012	Civil Engineering Water Reservoir

APPENDIX I – UNIVERSITY OF OTTAWA CONFINED SPACE SIGNAGE



Entrée interdite sans le permis applicable
No entry without applicable permit

