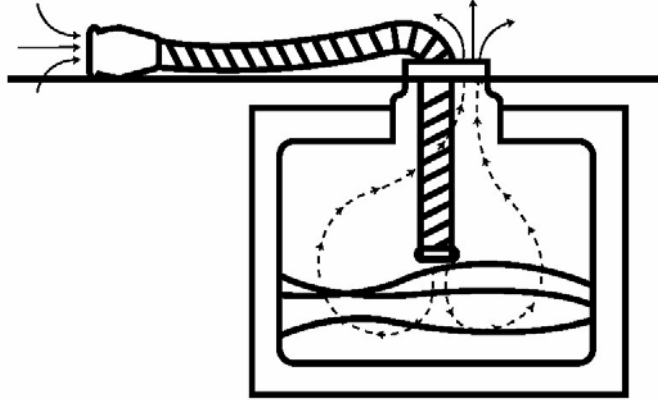


CONFINED SPACE ENTRY WORK STANDARD



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20% Post Consumer Content

TABLE OF CONTENTS

SECTION 100: HOW TO USE THIS DOCUMENT

101	Introduction.....	1
102	Purpose.....	1
103	Scope.....	1
104	Definitions.....	2

SECTION 200: RESPONSIBILITIES

201	Manager	5
202	Supervisor	5
203	Project Engineer	6
204	Employee-in-Charge	7
205	Employees	7
206	Contractors	7

SECTION 300: ENTRY PERMIT

301	Completing the Entry Permit.....	8
302	Verifying Entry Requirements	8

APPENDICES

Appendix A:	Confined Space Code of Practice.....	A-1
Appendix B:	Confined Space Entry Permit.....	A-5
<u>Appendix C:</u>	<u>Gas Detection Equipment (Monitor)</u>	
	<u>Standards</u>	<u>A-6</u>

SECTION 100: HOW TO USE THIS DOCUMENT

101 Introduction

It is imperative that all ATCO Electric employees involved in confined space entry are fully informed prior to entry and equipped to respond to any emergency situation.

The thoroughness and care required for safe confined space entry cannot be overstated – the life of each worker depends on the identification and control of all hazards.

102 Purpose

To provide safe work methods for safe entry into confined spaces.

103 Scope

The Confined Space Entry Work Standard applies to all ATCO Electric employees who manage, specify, design, work in and/or carry out emergency rescues in confined spaces.

104 Definitions

Barricade – A physical obstruction created with tapes, screens or cones to warn of and limit access to a hazardous area.

Confined Space – An enclosed or partially enclosed space that:

- Is not primarily designed or intended for human occupancy except for the purpose of performing work;
- Has restricted means of access and egress; and
- May become hazardous to an employee entering due to its design, construction, location or atmosphere, the materials, substances or work activities within or any other hazards relating to it.

Confined spaces commonly encountered in utility operations include: cable vaults; manholes; meter vaults; transformer vaults; bar screen enclosures; chemical pits; incinerators; pump stations; regulators; sludge pits; wet wells; valve pits; digesters; grease traps; lift stations; sewage ejectors and storm drains. Other confined spaces commonly encountered in isolated generation include: mufflers, tanks, transformers, pits with contaminants, and trenches covered with grating or lids.

Confined Space Code of Practice – A written set of procedures developed to eliminate or control the hazards anticipated in a confined space entry.

Entry – Any action that breaks the plane of the confined space (i.e., complete or partial entry, such as entry of only the employee's head).

Hazardous Atmosphere – An atmosphere that is oxygen-deficient and/or contains explosive gases or toxic contaminants in a concentration that may exceed permissible exposure limits.

Hot Work – Any work involving the use of a flame or a potential source of ignition, including:

- Cutting, welding, burning, air gouging, riveting, heat shrinking, drilling, grinding, chipping, working with explosive actuated tools;
- The use of non-classified electrical equipment;
- The introduction of a combustion engine to a work process; and
- Any other work where a flame is used or sparks are produced.

LEL (lower explosive limit) – The minimum concentration of gas, vapour or dust (or any combination of these) in air at ambient temperatures at which flame propagation will occur in the presence of a source of ignition.

Monitoring – Continuous or periodic testing of an atmosphere in a confined space.

OEL (occupational exposure limit) – The maximum airborne concentration of substances that workers may be exposed to for specific lengths of time, as defined by the Alberta Occupational Health and Safety Code.

Rescue – The process of a person or persons removing an employee from a hazardous environment while protecting their own safety and notifying authorities of an emergency situation.

STEL (short term exposure limit) – *The maximum concentration of substances that workers may be exposed to for 15 minutes continuously.*

Tending Worker – Employee(s) required to stand by outside a confined space and remain in constant communication with employee(s) inside the confined space.

Testing – Atmospheric inspection of a confined space before entry by means of approved visual, sensory or instrument monitoring.

TWA (time-weighted average) – *The time-weighted average concentration of substances that workers may be exposed to in a normal eight-hour workday.*

Vault – An enclosure above or below the ground which employees may enter for the purposes of installing,

constructing, operating or maintaining electrical equipment or cable(s).

Ventilation – The circulation or exhaust of air into or out of a confined space with sufficient flow to remove fumes, vapours or other toxic contaminants. Mechanical ventilation refers to the process of forcing fresh air into the confined space while work is being carried out.

SECTION 200: RESPONSIBILITIES

201 Manager

The **Manager** is responsible to:

- Make sure the Confined Space Code of Practice (Appendix A) and an Entry Permit system is in place for each confined space within their area of responsibility.

202 Supervisor

The **Supervisor (out-of-scope)** is responsible to:

- Make sure the Employee-in-Charge reviews the Confined Space Code of Practice for each confined space in their area of authority, working with other employees, contractors and customers in its review;
- In the event that a confined space is located within a facility not owned by ATCO Electric, ensure the EIC checks that the hazard assessment and the Code of Practice meet the requirements of the facility owner;
- Make sure that all employees required to enter a confined space have received training specific to the type of confined space they will enter;

- When required, contract with knowledgeable third parties to provide confined space entry and emergency response services;
- Provide all equipment necessary for confined space entry;
- Verify that contractors who enter a confined space are able to demonstrate that they meet all regulatory requirements with regard to confined space entry; and
- Maintain all records of confined space entry for three years.

203 Project Engineer

The **Project Engineer** is responsible to:

- Eliminate confined spaces in the design of a project or, if elimination of the hazard is not reasonable, make sure engineering, administrative and personal protective equipment will control the hazard to a safe level ;
- Identify to the supervisor during the design stage of a project all possible confined spaces within their area authority;
- Make sure the supervisor is appropriately equipped to enter and service any new confined spaces (this may require the installation of permanent ventilation systems at the time of construction); and
- If the supervisor does not have the appropriate equipment available, order it as part of the project.

204 Employee-in-Charge

The **Employee-in-Charge** (EIC) is responsible to:

- Review the Confined Space Code of Practice and make sure all requirements are met before work begins;
- Develop and review the Entry Permit (Appendix B);
- Identify any required changes to the Confined Space Code of Practice and/or inabilities to manage the hazards identified, and postpone work until the revisions have been completed and approved by the supervisor; and
- Prior to entry, communicate the Confined Space Code of Practice and Entry Permit to all employees and post the Entry Permit at the main entrance to the confined space.

205 Employees

Employees may enter a confined space only if they:

- Have completed confined space entry training;
- Wear a rescue harness; and
- Comply with the Confined Space Code of Practice and Entry Permit.

206 Contractors

Contractors, Electricians and other Trade Workers are responsible to:

- Ensure their workers are trained in confined space entry and rescue; and
- Communicate to the worker-in-charge their requirement to comply with the Confined Space Code of Practice and Entry Permit.

SECTION 300: ENTRY PERMIT

301 Completing the Entry Permit

An Entry Permit must be completed before any employee can enter a confined space. It must:

- Identify the confined space and the purpose of entry;
- Specify the time period for which it is valid;
- Verify that all entry requirements have been met (see Section 302).

302 Verifying Entry Requirements

The Confined Space Code of Practice, Entry Permit and tailboard must be reviewed and accessible at the work site prior to entry to verify that all requirements have been met.

If changes are required to the Code of Practice due to site conditions or for any other reason, ***entry is not permitted***. The Code of Practice must be updated by the EIC before proceeding.

All written records relating to confined space entry must be retained for at least three years.

APPENDIX A: Confined Space Code of Practice

Scope

This Code of Practice applies to all ATCO Electric employees for entry into all confined spaces, including manholes, transformer vaults, switch cubicles, cable vaults, mufflers, tanks, transformers, pits with contaminants, and trenches covered with grating or lids.

Responsibilities

All employees participating in the confined space entry are required to become familiar with and understand this Code of Practice. The Employee-in-Charge (EIC) is required to review this Code of Practice and the Entry Permit prior to entry into the confined space.

Hazard Identification

The following table identifies the types of hazards that may be encountered during a confined space entry. Refer to the barriers and ensure they are in place prior to entry.

Hazard	Barrier(s)
Difficult Access or Egress	<ul style="list-style-type: none">• Wear full body harness with tag line on D-ring.• Ensure sufficient length of tag line.• Have rescue equipment available, such as tripod or davit arm, rope blocks with anchor point (ie: boom truck).• Training – ensure employees are trained in rescue techniques and confined space entry.• If required remove transformer (job-specific, i.e., 150 kVa or higher with a movable roof).• Have a tending worker on-site.• Have a third person on-site, as part of the rescue team.• Complete Entry Permit and tailboard.
Atmospheric Hazards	<ul style="list-style-type: none">• Where atmospheric hazards are suspected (e.g., LEL, CO, H₂S, O₂), use an approved four-head monitor to sample air conditions (<i>see Appendix C</i>).• Attach a sample pump to the monitor to ensure accuracy.• Use ventilation equipment as indicated by the test results.• Test periodically, as required.• Record readings on the Entry Permit.• Identify any other atmospheric hazards on the Entry Permit.• Training – ensure employees are trained to use the

Hazard	Barrier(s)
	monitors and equipment.
Dust, Hantavirus and Biological Hazards	<ul style="list-style-type: none"> Assess if the confined space needs to be cleaned prior to entry. Wear appropriate respiratory protection and personal protective equipment. Use cleaning solutions to wet and dilute the contaminated area.
Electrical System	<ul style="list-style-type: none"> Isolate and ground if required. Maintain Limits of Approach. Follow Power System Work Standards (PSWS). Follow Isolated Operations Lock Out/Tag Out (LO/TO) Work Standard. Include in the tailboard.
Limited Workspace/ Position	<ul style="list-style-type: none"> Consider the physical size of employees entering the confined space.
Sharp Objects (e.g., ground rod)	<ul style="list-style-type: none"> Wear appropriate gloves or personal protective equipment.
Extreme Temperatures (hot and cold)	<ul style="list-style-type: none"> Follow Safety Standards Manual (SSM) requirements for personal protective equipment, warm clothing, proper nutrition, etc.
Welding, Cutting, Grinding (fumes, gases)	<ul style="list-style-type: none"> Wear a respirator as required. Follow SSM requirements. (ie: Hot Work Permit) Complete a detailed tailboard.
Gravity Fall from heights Falling objects	<ul style="list-style-type: none"> Wear a harness. Keep the work area clean (i.e., housekeeping). Use barricades to prevent the public from entering the work area.
Vehicle Fumes	<ul style="list-style-type: none"> Shut off vehicles in the immediate area.
Traffic Hazards	<ul style="list-style-type: none"> Use barricades/signs as required. Include in the tailboard.

Training

The EIC must ensure that all employees participating in the confined space entry have appropriate training (i.e., Confined Space Entry; Gas Detection Equipment, Use and Maintenance; Rescue Equipment Use and Recovery Techniques; First Aid and H₂S, as required).

Entry Permit System

Before work begins, the EIC must develop a Confined Space Entry Permit that identifies any site-specific conditions or hazards outside the scope of this Code of Practice. The conditions identified on the

Entry Permit must be reviewed and signed to indicate understanding by all involved employees prior to entry.

Personal Protective Equipment Requirements

Follow the SSM requirements regarding the selection and use of personal protective equipment.

Other equipment that must be available on-site: a tripod or davit arm; rope blocks with anchor point (ie: boom truck); harness; monitor and sample pump (field-ready).

Hazardous Atmosphere Testing

Test all existing vaults prior to entry. New construction requires testing only when a hazardous atmosphere is suspected (e.g., oil/gas facility).

Use an approved four-head monitor to sample air conditions. Approved sampling equipment is listed in the Tool Catalogue. Also refer to Appendix C: Gas Detection Equipment (Monitor) Standards. Proper sampling methods include the use of a sampling pump to ensure accuracy.

Test the atmosphere prior to removing a transformer and prior to entry. Record the test results on the Entry Permit. Periodic testing may be required in some confined spaces, as determined at the site, and must be included on the Entry Permit and tailboard.

If exposures above Occupational Health and Safety limits (OEL) are encountered, immediately exit the area. In consultation with the supervisor, identify the source of the hazard and determine a method to eliminate or reduce the hazard prior to re-entry.

Ventilation

If a hazardous atmosphere is detected or is likely to exist, the confined space must be ventilated and air conditions re-tested before entry. If purging is necessary, external resources can provide the knowledge and equipment required for safe entry.

Communication

Have a second employee on-site to maintain ongoing communication with an employee entering a confined space. Utilize handheld radios when entering large transformer vaults where voice audibility may be reduced.

Emergency Response Plan

Use the existing tailboard emergency plan. Ensure that all information is recorded on the tailboard in the appropriate section.

APPENDIX B: Confined Space Entry Permit Form

Confined Space Entry Permit (Transformer Vaults)

Employee Issuing Permit	Print:		Sign:
Employee in Charge:	Print:		Sign:
Permit Issued To:	Print:		Sign:
Location and/or (LSD):			
Facility Owner (if other than ATCO Electric):			
Names of Crew Members:			
Purpose of Entry into Confined Space:			
Permit Valid for:	Date:	Time from:	To:
Asset ID # of equipment involved.			

As per the Code of Practice:			Explanation for both a YES and NO answer
Has the Code of Practice in the SSM been reviewed and understood by all involved?	Yes <input type="checkbox"/>	NO <input type="checkbox"/>	
Has the Tailboard been reviewed and understood by all involved?	Yes <input type="checkbox"/>	NO <input type="checkbox"/>	
Has gas detection equipment been calibrated/bump tested?	Yes <input type="checkbox"/>	NO <input type="checkbox"/>	
Does atmospheric testing need to be completed prior to entry into the Confined Space?	Yes <input type="checkbox"/>	NO <input type="checkbox"/>	
Have crew members completed Confined Space training?	Yes <input type="checkbox"/>	NO <input type="checkbox"/>	
Is all necessary rescue equipment on site?	Yes <input type="checkbox"/>	NO <input type="checkbox"/>	

Are there any additional hazards specific to this site that is not noted in the Code of Practice?	
Yes <input type="checkbox"/> Please Indicate:	Barriers required:
No <input type="checkbox"/> Proceed to next table.	

Continuous Air Monitoring Results <small>Note: If any atmospheric hazards detected, stop work until area can be made safe</small>							
Permissible levels:	(19.5-23%)	Max: (20%)	Max: (25ppm)	Max: (10ppm)			
Time	Oxygen %	LEL %	CO ppm	H2S ppm			
Time	Oxygen %	LEL %	CO ppm	H2S ppm			

Permit Authorization: The area is safe for entry and I have authorized the above personnel to work in the confined space as outlined above.

Employee In Charge or Designate Print Name:	Signature:	Date:
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Name of Safety Watch (Print):	(Sign)									
Confined Space Safety Watch—Check IN and OUT										
Employee Name	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT

Permit Close-out: All confined space work has been completed and all entrants have left the confined space.

Employee In Charge or Designate Print Name:	Signature:	Date:
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**APPENDIX C: GAS DETECTION EQUIPMENT (MONITOR)
STANDARDS**

Bump Test or Field Test

A bump test is required each day, before use of the monitor.

A bump test involves applying a known concentration of calibration gas to the monitor, according to the manufacturer's recommendations. If the monitor responds appropriately, the bump test is complete. The bump test tells the user only that the monitor is responding as it should.

Calibration

Calibration involves applying specific amounts of calibration gas to the monitor to adjust the sensors, so they read properly according to the setpoints. The calibration interval is set at 180 days (6 months). Calibration should also be done whenever a bump test fails.

The setpoints are previously configured by the factory. All of the setpoints match Alberta OHS requirements with the exception of the setpoint for carbon monoxide (CO), which is set to OSHA (American) standards. The low alarm setpoint for CO should be adjusted to 25 ppm to match the Alberta 8-hour occupational exposure limit. As there is no ceiling exposure limit for CO, the high alarm setpoint should remain at 200 ppm.

Note: LEL is read in %LEL mode rather than as percentage of total air volume. %LEL is safer and preferred. Ensure you understand the difference between these readings.

<u>Sensor Disabled</u>	<i>This option should never be selected as it temporarily disables any one of the four sensors.</i>			
<u>Setpoints (factory-configured)</u>	<u>H₂S</u>	<u>CO</u>	<u>LEL</u>	<u>O₂</u>
<u>Calibration Gas (ppm)</u>	<u>25.0</u>	<u>100</u>	<u>50% LEL</u>	
<u>Calibration Interval (days)</u>	<u>180</u>	<u>180</u>	<u>180</u>	<u>180</u>
<u>Bump Interval</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Low Alarm (ppm)</u>	<u>10</u>	<u>35</u> <i>(Change to 25)</i>	<u>10.0 %</u> <u>LEL</u>	<u>19.5</u>
<u>High Alarm (ppm)</u>	<u>15</u>	<u>200</u>	<u>20.0 %</u> <u>LEL</u>	<u>23.0</u>
<u>TWA Alarm (ppm)</u>	<u>10</u>	<u>35</u>		
<u>STEL Alarm (ppm)</u>	<u>15</u>	<u>50</u>		
<u>STEL Interval (minutes)</u>	<u>15</u>	<u>15</u>		

