







**Safe Work Procedure**
**Confined Space Safety Procedures**

RSS 18.09.3

<b>Program/Services</b>	<b>Safe Work Procedures</b>		<b>Department:</b> Risk and Safety Services			
<b>Personal Protective Equipment or Devices Used</b> <ul style="list-style-type: none"> <li>ANSI or CSA approved atmospheric tester (i.e. oxygen, toxic gas, LEL/LFL)</li> <li>Personal Protective Equipment (i.e. respirator, harness and lanyard, gloves, protective clothing (Tyvec suit/coveralls)</li> <li>Communication equipment (i.e. radio, alarm)</li> <li>Rescue equipment (i.e. lifelines, harness, and lifting equipment)</li> <li>Safety glasses</li> <li>Hearing Protection</li> </ul>	<b>Training Requirements</b> <ul style="list-style-type: none"> <li>Confined Space Training</li> </ul>	<b>Applicable Documents</b> <ul style="list-style-type: none"> <li>Confined Space Entry Permit</li> <li>Lock-out Procedure</li> <li>Hot Work Permit</li> <li>A training master log will be maintained by the Supervisor of the confined space entrants.</li> </ul>	<b>Effective Date:</b>			
			April 12, 2019			
			<b>Date Reviewed</b>			
			<table border="1"> <thead> <tr> <th>Revision Date</th> <th>Revision #</th> <th>Authorized</th> </tr> </thead> <tbody> <tr> <td>Aug. 22, 2023</td> <td>3</td> <td>Safety Advisor</td> </tr> </tbody> </table>	Revision Date	Revision #	Authorized
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Aug. 22, 2023	3	Safety Advisor				

<p align="center"><b>HIGH SOUND LEVELS</b></p>  <p><b>HEARING PROTECTION</b> is required when working in designated.</p> <p>Required when Sound levels exceed 85 dB areas.</p>	<p align="center"><b>FIRE</b></p>  <p align="center">Ventilate the CS.</p> <p>WorkSafeBC requires a hot work permit to be completed prior to entering Confined Space</p>	<p align="center"><b>HAZARDOUS ATMOSPHERE</b></p>  <p align="center">Test the atmosphere before entering and continue to monitor.</p>
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CHEMICAL EXPOSURE	ELECTRICAL HAZARD	PINCH POINTS
 <p data-bbox="517 376 902 504">Wear the appropriate PPE for chemicals identified as having been in the Confined Space.</p>	 <p data-bbox="947 376 1294 440">Do not attempt to service electrical wires.</p>	 <p data-bbox="1346 376 1715 536">Use LOCK-OUT procedures when performing maintenance or conducting any work within 12" of an exposed pinch point.</p> <p data-bbox="1346 580 1715 673"><b>NEVER</b> put your hands or feet near an exposed pinch point or gears!</p>

## PROCEDURES AND RESPONSIBILITIES

### Managers / Supervisors will ensure:

- Employees under their supervision, and contractors, who require entry into confined space comply with procedures and are properly trained.
- Personnel receive confined space training.
- That pre-entry inspections and testing is conducted based on this procedure.
- That the confined space procedure is reviewed annually to confirm effectiveness.

### Confined Space Supervisor will:

- Oversee overall entry operations.
- Verify the confined space entry permit is completed.
- Ensure that pre-entry tests and inspections are conducted.
- Ensure that all the provisions of the confined space entry permit are followed and signs the permit to authorize entry.
- Verifies that atmosphere testing is completed as stipulated in the permit and results are entered into logs.
- Verifies the area is properly secured and all required signs posted.
- Those only authorized workers enter a confined space.

**Confined Space Attendant (Standby Person) will:**

- Be equipped with an alarm, radio or other means of communication to immediately summon rescue if needed.
- Know the locations of emergency response equipment (fire extinguishers, safety showers, eye-wash, pull stations etc.) in the immediate area.
- Maintain adequate continuous communication with personnel inside the confined space to monitor their status.
- Update the entry permit whenever a worker enters/exits the confined space.
- Not leave the confined space entry site until it has been vacated and secured, or relieved by another qualified attendant who understands the work being undertaken.
- Not be a person entering the confined space.
- Shall perform air testing every 20 minutes to ensure there is no change in the atmosphere within the confined space.

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**The Confined Space Attendant shall not enter the confined space to attempt a rescue, unless properly relieved of the attendant duty, is trained in rescue procedures, and is part of the pre-planned rescue team.**

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**Additionally at low hazard atmosphere, attendant must:**

- Check on workers inside the confined space at least every 20 minutes.

**Additionally at moderate hazard atmosphere, attendant must:**

- Be stationed at or near the confined space entrance.
- Visually observe or check the well-being of workers inside the confined space at least every 20 minutes or as often as needed by the work being done.

**Additionally at high hazard atmosphere or where there is a risk of engulfment or entrapment, attendant must:**

- Be stationed at the entrance and have no other duties apart from monitoring the well-being of workers inside the confined space.
- Must visually observe or otherwise continuously monitor the well-being of the worker(s) inside the space.
- Be equipped and capable of rescue (using lifting equipment if needed).
- Prevent entanglement of lifelines and other equipment.

**Confined Space Entrant(s) will:**

- Be part of the confined space team for the job and be familiar with the provisions of the Entry Permit and the hazards of the confined space.

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**The CS Team shall consist of a CS Supervisor, CS attendant(s), CS entrant(s), and rescue team (if used)**

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- Sign or initial the entry permit prior to initial entry.
- Confirm that any other appropriate permits, i.e. Hot Work, have been issued and are current before entry into the confined space.
- Maintain adequate communication with the confined space attendant.

**Confined Space Rescue and Emergency Services**

- TRU currently does not have an in house confined space rescue team and in the event of an emergency the Kamloops Fire Rescue will be called.

**An in-house or contracted rescuer will:**

- Be informed of hazards he/she may encounter.
- Provide rescue in an appropriate time frame.
- Be trained, equipped and proficient in performing the needed services.

**In-house rescuers will:**

- Be properly equipped and adequately trained to carry out such duties.
- Hold current first aid and CPR certifications.
- Practice confined space rescues at least once every 12 months. The practice will be within the scope of the types of confined spaces on site.
- Be informed of confined space work prior to work starting.

## **PRECAUTIONS**

- If entrants believe that there is any unsafe condition that exists in the confined space, they should **NOT** proceed with or continue with an entry.
- Air ventilation, including forced-air ventilation, used to control hazardous atmosphere may create an explosive atmosphere by changing the air-to-fuel ratio.
- All access points to a confined space will be posted with signage.
- Unauthorized entry into any confined space is prohibited. Prevention of unauthorized entry will be made through training and posting of signs. Any person observing unauthorized entry or unsafe work in or around a confined space shall warn the workers performing the work of the perceived hazards and immediately notify their supervisor.
- If work is done in a high hazard atmosphere confined space then each person must either carry or have within arm's reach an emergency escape respirator that will allow them to leave without assistance.
- Compressed gas cylinders are not permitted inside a confined space except for compressed air supplying a respirator, medical resuscitation equipment, handheld aerosol sprays and fire extinguishers.
- Torches and hoses used for brazing, cutting or welding must be removed when not in use or when the confined space is vacated when practicable.
- Electrical tools and equipment must be grounded and double insulated and marked as such. An approved ground fault circuit interrupter should be used if wet or damp conditions exist.
- If flammable or explosive gases, vapours or liquids are present, no entry is allowed till conditions change to allow for safe entry into the confined space.

## **HAZARD ASSESSMENT**

### **The worker qualified to conduct the assessment will:**

Consider conditions that may exist in the confined space (before workers enter) due to its:

- Design
- Location
- Use
- Consider hazards that may develop during work in or around the confined space

Give special consideration to the potential for:

- Oxygen enrichment or deficiency
- Flammable gas, vapour or mist
- Combustible dust
- Other hazardous atmospheres

Consider other potential hazards including:

- Materials that may engulf or entrap a worker
- Slipping and tripping hazards
- Drowning
- Noise exposure
- Electrical hazards or lines containing harmful substances that require lockout and isolation
- Thermal extremes
- Radiation

Following the assessment the person will rate the confined space as either:

- Low Hazard Atmosphere,
- Moderate Hazard Atmosphere, or
- High Hazard Atmosphere.

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**Once the assessment has been completed for a specific activity in a particular space or group of like-spaces and the specific procedure completed if there has been no change within the space or to the activity another assessment is not needed.**

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## **IDENTIFICATION AND ENTRY PERMITS**

Confined Space Identification signs will be:

- Posted at unsecured access points indicating the hazard and prohibits entry by unauthorized workers.

Entry permits will be completed and signed by the responsible supervisor before entry into a confined space when:

- The permit requirements have all been met.
- Lockout or isolation procedures have been followed.
- Atmosphere of the confined space has been tested and assessment has been completed.
- When selected entrants are verified as trained for confined space entry.

The entry permit must be posted at designated entry points unless:

- The permit is posted at a minimum of one entry point.
- Other entry points are identified and have up-to-date information on whether it is safe to enter.
- All authorized workers are informed of the location of posted entry permits.

To ensure the safety of workers inside a confined space, permits will be updated by:

- The stand-by worker to update the list of workers inside the confined space.
- The tester to record atmosphere quality test results.

The responsible supervisor who signed the permit will re-authorize and sign the permit when:

- There is a change in the work crew.
- After each shift change.
- After a change of the responsible supervisor.
- Affected workers must be informed of updates to permits that affect precautions or the work activity.

## **LOCKOUT AND CONTROL OF HARMFUL SUBSTANCES**

Lockout

- Before a worker enters a confined space, any material conveyance equipment that transports material to or from the space must be free of material if the material could present a hazard.

Isolation

- Before a worker enters a confined space, adjacent piping which contains, or has contained, a harmful substance must be controlled by one of the following means:
  - ❖ Disconnecting, blanking, blinding or an equivalent engineering system.
  - ❖ If adjacent piping contains a harmful substance that is not a gas, vapour or a liquid of sufficient volatility to produce a hazardous concentration of an air contaminant in the discharge of the piping, double block and bleeding is needed. If adjacent piping contains a harmful substance that is hazardous only because of its pressure, temperature or quantity, before a worker enters the confined space, the pressure must be controlled by de-energizing and locking out the pressure source and depressurizing the line.
  - ❖ Isolation of a confined space from gases found in a gravity-flow municipal or domestic sanitary or storm sewer system may be accomplished by a p-trap provided that the integrity of the trap is ensured immediately upon entry and the atmosphere is continuously monitored and shown to contain clean respirable air.

## **VERIFICATION AND TESTING**

### **Verification:**

- Before a worker enters a CS, pre-entry testing and inspection must be conducted to verify that the required precautions have been effective at controlling identified hazards and that it is safe for the worker to enter.

### **Atmospheric testing will be completed:**

- Not more than 20 minutes before a worker enters a confined space (pre-entry testing),
- When all workers have vacated the confined space for more than 20 minutes,
- When a worker is inside a moderate or high hazard atmosphere additional testing must be done to ensure the worker's continuing safety, and
- Whenever practicable, continuous monitoring must be done and when the worker is in a moderate or high hazard atmosphere if a flammable or explosive atmosphere is in excess of 20% of the lower explosive limit could develop.

### **Procedures and Equipment**

- CS tests must be carried out by an adequately trained worker.
- Test records (section 3 of the permit) will show the date and time of the test, the initials of the tester and the levels or conditions found.
- Test results, other than continuous monitoring results, must be posted without delay at all entry points.
- If a confined space is known to, or is shown by pre-entry testing to contain other than clean respirable air, the hazard must be controlled by cleaning, purging, or venting the confined space. The atmosphere must be re-tested before a worker enters the space.
- During occupancy, testing shall be repeated periodically where there is potential for accumulation of the hazardous atmosphere. Testing frequency shall be determined by the confined space supervisor.
- Pre-entry testing is not required in "low hazard atmospheres" when the location and the control of the space ensure that a more hazardous atmosphere could not inadvertently develop.



## **VENTILATION**

Continuous Ventilation will occur when a worker is inside the confined space except when:

- The atmosphere has been intentionally inerted.
- A low hazard is controlled as noted below.
- Ventilation is not practicable in an emergency rescue.

Mechanical Ventilation:

- For the control of airborne contaminants must be designed, installed and maintained in accordance with established engineering principles and must be included in written procedures.
- Equipment must be located and arranged to adequately ventilate all occupied areas of the confined space.
- Contaminants produced must be controlled at source by local exhaust ventilation (LEV), by general (dilution) ventilation or by a combination of both.

Low Hazard Atmospheres:

- A minimum of 85 m<sup>3</sup> per hr. (50 cfm) of clean, respirable air must be supplied for each worker inside the confined space with a low hazard atmosphere.
- Continuous ventilation is not required in a low hazard atmosphere if
- The atmosphere is continuously monitored and shown to contain clean respirable air, and
- The space is occupied for less than 15 minutes; work inside generates no contaminants other than exhaled air and has a volume greater than 1.8 m<sup>3</sup> (64 cu ft.) per occupant.

Natural Ventilation

- If used the airflow rate must be monitored to ensure airborne contaminant concentrations are maintained below the applicable exposure limits.

Must not be used:

- To ventilate a confined space that has a High Hazard Atmosphere.
- If such ventilation could draw other than clean respirable air into the confined space.

## **RESCUE**

- Rescue services must be provided when a worker enters a confined space. There will be a written agreement showing services provided if a firm or agency such a fire department is used. If an external rescue service agreement indicates they will be available

24 hours/day no notification of entry required.

- Anyone acting as a rescuer must be trained, with a practice drill at least annually, and equipped. Records of training and drills will be maintained by TRU.
- Rescuers must be notified by the responsible supervisor or attendant before anyone enters a confined space and will be notified after work is complete.
- Entry into more than one confined space at the same time requires rescue personnel to be on alert status when work commences.
- Rescuers must monitor the means to summon them in the event of an emergency.
- Rescue will be directed by an adequately trained supervisor or qualified rescue person.
- Voice communication must be maintained at all times between the person directing the rescue and the workers performing the rescue.
- A rescue worker must not enter the confined space unless there is at least one worker outside capable of assisting.
- SCBA or supplied air respirator must be used if the atmosphere is unknown or is IDHL.

### **LIFELINES, HARNESSSES & LIFTING EQUIPMENT**

- A harness of a type to permit rescue is required when entering a high hazard atmosphere, risk of entrapment or engulfment CS or if there is another recognized serious health and safety.
- A lifeline must be attached to the harness unless the risk assessment shows it is unsafe or impracticable and will be tended at all times by the attendant stationed at the entrance to prevent entanglement.
- The attendant must have suitable lifting equipment for rescue.
- If the attendant(s) cannot achieve a rescue using harnesses, lifelines and lifting equipment at least one worker stationed at the CS entrance must be equipped and capable of entering and conducting a rescue.

### SUMMARY OF CHANGES

<b>Revision</b>	<b>Date</b>	<b>Change (include section #)</b>	<b>Issued By</b>
1	09/29/2014	NEW	OHS Officer
2	04/12/2019	Review and Revision & new format	Safety Officer
3	08/22/2024	RSS update	Safety Advisor

**The signed permit must be retained for at least one year!**

## TRU CONFINED SPACE PERMIT

RSS 10.08.3

Date Issued:

Time issued:

Expires:

Note: If the conditions of procedures specified on this permit change, **STOP WORK IMMEDIATELY** and notify the Facilities Supervisor or TRU Safety Department.

### **Part 1 – Hazard Assessment** (to be completed by the entry supervisor)

Confined space description and location:

Description of work to be performed:

**POTENTIAL HAZARDS:** (check all inherent and introduced hazards)      Circle **Level of Hazard**      Low      Moderate      High

<u>Hazardous Atmospheres</u>	<u>Physical Hazards</u>	
<input type="checkbox"/> Flammable (greater than 10% LEL)	<input type="checkbox"/> Temperature/humidity	<input type="checkbox"/> Spark-producing operations
<input type="checkbox"/> Toxic (greater than PEL)	<input type="checkbox"/> Uneven walking surfaces/tripping hazards	<input type="checkbox"/> Noise
<input type="checkbox"/> Irritant/Dust	<input type="checkbox"/> Engulfment	<input type="checkbox"/> Vibration
<input type="checkbox"/> Corrosive	<input type="checkbox"/> Electrical equipment	<input type="checkbox"/> Mechanical equipment
<input type="checkbox"/> Oxygen (less than 19.5% or greater than 23.5%)	<input type="checkbox"/> Obstacles	<input type="checkbox"/> Entrapment
<input type="checkbox"/> Carbon monoxide	<input type="checkbox"/> Fall Hazards	<input type="checkbox"/> Falling debris
<input type="checkbox"/> Asbestos (contact S&EM)	<input type="checkbox"/> Radiation < 1.7 µSv/hr. (greater than 1.7 µSv/hr. contact S&EM)	<input type="checkbox"/> Entry/Exit Limitations

### **Part 2 – Hazard controls** (check required controls)

- |  |  |
|--|--|
| <input type="checkbox"/> Lockout/tag-out required. List isolation points: _____ (i.e. group lock-out box or specific location)   | <input type="checkbox"/> Barriers required (i.e. planking/scaffolding) |
| <input type="checkbox"/> Notification of affected personnel in the area: _____   | <input type="checkbox"/> Communications to summon rescue available     |
| <input type="checkbox"/> Method of communication Attendants and Entrants will use:<br><input type="checkbox"/> verbal <input type="checkbox"/> visual <input type="checkbox"/> radio <input type="checkbox"/> other: |  |

Check required emergency/rescue equipment:

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Safety harness with lanyard             | <input type="checkbox"/> Emergency eyewash | <input type="checkbox"/> Rescue kit (sked/spine board, basket, O <sub>2</sub> , jump bag) |
| <input type="checkbox"/> Winch retrieval system (SRL, UCL hoist) | <input type="checkbox"/> Fire extinguisher |   |

Rescue Procedure: <input type="checkbox"/> Entry <input type="checkbox"/> Non-entry <input type="checkbox"/> Vertical <input type="checkbox"/> Horizontal						
Personal Protective Equipment to be worn/used:						
<input type="checkbox"/> Gloves		<input type="checkbox"/> Hood		<input type="checkbox"/> Barrier cream		
<input type="checkbox"/> Safety harness and lanyard		<input type="checkbox"/> Dust mask <input type="checkbox"/> half mask		<input type="checkbox"/> Radio		
<input type="checkbox"/> Asbestos protective suits (Tyvek)		<input type="checkbox"/> Powered air purifying respirator (full mask)		<input type="checkbox"/> Goggles/face shield		
Other: Specify						
<input type="checkbox"/> MSDS's for all materials in the confined space (or to be brought into the confined space) are attached.						
<input type="checkbox"/> Pre-entry checks and procedures completed as per entry procedure						
Standby Personnel						
<input type="checkbox"/> Low risk: Name of standby person: _____ check every 20 minutes by radio or visual						
<input type="checkbox"/> Moderate risk: Name of standby person: _____ or <input type="checkbox"/> Rotating standby. Check every 20 minutes by radio/visual. Moderate hazard must remain at or near entrance						
<input type="checkbox"/> <b>High risk:</b> Name of standby person: _____ <b>remain at entrance</b>						
<input type="checkbox"/> Special entry and/or work procedures:						
<b>Part 3 – Air sampling results</b>						
<b>Air Monitoring Equipment Used</b>						
Model & Unit #	Bump or Cal Test	Bump/Cal Date	Technician's Name			
<b>Air Monitoring Results</b>						
Date	Time	O <sub>2</sub> % (19.5 – 23.5%)	Combustibles, %LEL (0-10% LEL)	H <sub>2</sub> S	CO	Initials
<input type="checkbox"/> All required air monitoring has been done throughout the confined space.					Test performed by:	

**Part 4 – Authorized entrants & standby personnel**

Entrants and standby personnel shall review the permit and sign next to their name in acknowledgment of their understanding of the contents.

Entrant	Entry/Exit time; initials		Entry/Exit time; initials		Entry/Exit time; initials		Entry/Exit time; initials	
Standby								

**Part 5 – Permit review**

Hazard assessment and controls are appropriate  PPE is appropriate and adequate

Appropriate air monitoring has been identified

Describe any special entry requirements:

Safety certification: I certify that all required precautions have been taken and the necessary equipment is provided for safe entry and work in this confined space:

Supervisor's Name: (Print)	Signature:	Date:	Time:
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# **HOT WORK PERMIT**

This hot work permit is required for any temporary operation involving open flames or producing heat and/or sparks. This includes but is not limited to brazing, cutting, soldering, thawing pipes, torch applied to roof, grinding and welding.

## **PART 1: INFORMATION & CONTACTS**

**Project/Job #**

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**Employee**    **Students**    **Contractor**

Name

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Location/Building/Floor/Equipment of Hot Work

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Nature of Job

---

Date and Time of Hot Work

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**I have read and understood TRU's Hot Work Procedures and will ensure all requirements are met**

Name of Hot Worker \_\_\_\_\_

Signature \_\_\_\_\_

Supervisor/Instructor \_\_\_\_\_

Signature: \_\_\_\_\_

**PART 2: SAFETY CHECKLIST**

**Hot Worker (person performing the work)**

I have completed the required safety checklist attached with this permit, added any additional precautions necessary and have fulfilled all the requirements as they relate to this permit.

Yes  No

**Supervisor/Instructor**

Yes  No

Name of Fire Watch

Person \_\_\_\_\_ Phone \_\_\_\_\_

This area is safe for entry and work as outlined above and I authorize this work

Name \_\_\_\_\_ Emergency Phone  
Number \_\_\_\_\_

Date/Time \_\_\_\_\_  
Signature \_\_\_\_\_

**PART 3: FIRE WATCH**

To be completed and submitted to after fire watch is conducted.

Time hot work began: \_\_\_\_\_ Time hot work  
ended: \_\_\_\_\_



Fire Watch Signoff: the work area and all adjacent areas to which sparks and heat might have spread were inspected after the work was completed and were found fire safe.

Fire Watch for 60 minutes after completion of work Yes

Periodic monitoring for 4 hours after completion of work Yes

Final check of area 4 hours after completion of work Yes

\_\_\_\_\_  
Name  
Date/Time

\_\_\_\_\_  
Phone

#### **PART 4: APPROVAL**

Facilities Management use beyond this point

APPROVED  NOT APPROVED

**Permit Expires (date/time)** \_\_\_\_\_

**Conditions** \_\_\_\_\_