Westwood
MECHANICAL INC.

#2-Confined Space Entry – Safe Job Procedures(Revised Feb./07)

1. PURPOSE:

To ensure the safety of all personnel involved in confined space entry. From time to time, confined space must be entered for purposes of inspecting, repairs and work. Adherence to sound confined space entry procedures is mandatory for all projects. It is the responsibility of each individual to comply with the approved procedures.

2. GENERAL

Any confined space hazard that can be identified can be controlled. These procedures are intended to assist in the recognition of confined spaces. This procedure is designed not only to make the confined space safe for the worker, but also to make the worker knowledgeable of the hazards associated with this work area and the procedures necessary to deal with these hazards.

3. SCOPE AND DEFINITION

Confined space refers to a work area as stated in Manitoba Guidelines For Confined Entry Work .

Confined spaces are work areas where entry and exit are limited by location, design or construction, and where dangerous equipment, operations or atmospheres may pose hazards to health and safety.

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Refers to a work area which meets the following characteristics:

- Is not intended for continuous worker occupancy, except for the purpose of performing work.
- Has by design, structure, location, limited or restricted entry and exit.
- May contain or produce dangerous accumulations of hazardous gases, vapors, mists, lack or enrichment of oxygen and biological agents.and with unfavorable natural ventilation.
- From which immediate escape in an emergency situation is restricted or difficult

Examples of possible confined space entry:

- Storage Tanks
  - -Installations above or below ground
  - -Rail cars
- Underground utility vaults
- Tunnel and pipelines
- Small rooms
- Service tunnels
- Sewage handling systems
- Silos, grain Bins, Hoppers
- Machinery and equipment

To determine whether or not a workspace is a confined space, consider whether all or any of the conditions outline in the definition apply. If only one condition is applicable, the space could still be considered confined; the hazard level would be more significant if more than one condition applies.

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Definitions:

Atmosphere:

Refers to the gases, vapours, mists, fumes, and dusts within a confined space.

Ceiling Level:

The maximum airborne concentration of a toxic agent to which an employee may be exposed for a specified period of time.

Lower Flammable Limit (LFL):

The minimum concentration of a combustible gas or vapour in air (usually expressed in percent by volume at sea level), which will ignite if an ignition source (sufficient ignition energy) is present.

Oxygen Deficiency:

Refers to an atmosphere with a partial pressure of oxygen (PO2) less than 132 mm Hg. Normal air at sea level contains approximately 21% oxygen at a PO2 of 160-mm Hg.

Oxygen Enriched Atmosphere:

Any oxygen concentration greater than 25% (PO2-190mm Hg) at normal atmospheric pressure.

Permissible Exposure Limit (PEL):

The maximum 8-hour time weighted average of any airborne contaminant to which an employee may be exposed. At no time shall the exposure level exceed the ceiling concentration for that contaminant.

Purging: The method by which gases, vapours, or other airborne impurities are displaced from a confined space.

4. CONFINED SPACE CLASSIFICATION TABLE

Parameter	Class A	Class B	Class C	Class D
Characteristics	Immediately dangerous to life - rescue procedures would require the entry of more than one individual fully equipped with life support equipment - - maintenance of communication requires an additional standby person stationed within the confined space	Dangerous, but not immediately life threatening - rescue procedures require the entry of no more than one individual fully equipped with life support equipment - - indirect visual or auditory communication with workers	Potential hazard - requires no modification of work procedures - Standard rescue procedures direct communication with workers from outside the confined space.	- No potential hazard - Requires no modification of work procedures. - - Standard rescue procedures direct communication with workers, from outside the confined space.
Example	A boiler containing hazards chemical with only one means of access a manhole with a depth of more than 2 meters.	A service tunnel with a hazardous atmosphere, access is by a manhole with a depth of between 1 to 2 meters.	A crawlspace with no hazardous atmosphere, but no ventilation, only one access hatch less than 2' X 2' , with a depth of less than 1 meter.	A crawlspace with no hazardous atmosphere, with ventilation, access opening not less than 2' X 2'.
Oxygen	16% or less	16.1 % -19.4%	19.5%- 21.4%	19.5%-21.4%
Flammability	20% or greater of LFL	10%-19% LFL	10 %LFL or less	10% LFL or less
Toxicity	PEL—IDLH	PEL-Greater than contamination level	PEL-less than contamination level	PEL-Less than contamination level

5. Check list of Considerations for entry, working in and exiting confined spaces

No.	Item	Class A	Class B	Class C	Class D
1	**Permit**	X	X	0	0
2	**Atmospheric Testing**	X	X	X	0
3	**Monitoring**	X	X	X	0
4	**Training of personnel**	X	X	X	X
5	**Labeling and posting**	X	X	0	0
6	**Preparation**				
	Purge & Ventilate	X	X	0	0
	Requirement for special tools	X	X	0	0
	Barricade /roped off area	X	X	0	0
7	**Procedures**				
	Hazard /risk assessment	X	X	X	X
	Pre-entry meeting	X	X	X	0
	Attendee	X	X	X	0
	Attendee/Equipment log	X	X	X	0
	Communications	X	X	X	*
	Rescue	X	X	X	0
	Work	X	X	X	0
8	**Safety Equipment & Clothing**				
	Head Protection	X	X	X	X
	Hearing Protection	0	0	0	0
	Hand Protection	0	0	0	0
	Foot Protection	X	X	X	X
	Body Protection	0	0	0	0
	Respiratory Protection	X	X	0	0
	Safety Belts	X	X	0	0
	Life Lines, Harness	X	X	0	0
9	**Record Keeping/Exposure**	X	X	0	0

X – Indicates Requirement
0 – Indicates determination by the qualified person
*-Confirm that the worker has successfully exited the space

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Confined space mainly involves the following types of hazards but not necessarily limited to:

Physical Hazards

- Not intended for continuous occupancy (crawlspace)
- Poor entry or exit (less than 1 meter in depth, access less than (2' X 2')
- Cramped work conditions (less than1 meter of head room)
- Temperature extremes (over +40 C, less than –34 C)
- Moving equipment (working near moving conveyors etc.)
- Reactive or corrosive residues
- Electrical hazards
- Uncontrolled movement of liquids or solids
- Dismantling or assembly of equipment
- Visibility

Atmospheric Hazards

- Explosive
- oxygen –enriched or oxygen –deficient
- toxic
- smoke
- fumes, dusts, mists, fogs
- Biological agents
- Asphyxiation

Work to be Performed

- Hot work/cold work which could produce an atmospheric hazard

Human Factors

- Phobias
- Mental and physical conditions of workers

6. PROCEDURE:

1. Start by doing a hazard/risk assessment of where you intend to work, and prepare a Hazard Analysis as outlined in the safety program. This refers to the identification of all possible potential hazards that may be found in a confined space. Risk assessment must be performed before any workers enters into the confined space:
   - Does it meet any of the hazards listed herein?
   - If so, it's confined entry.
   - Don't enter without the proper precautions.

2. You have established the physical hazards but can you determine the second part- atmospheric hazards-the part you can't see.

3. Atmospherics can only be determined by electronic gas detection equipment.

4. Legislation requires that you must test the atmosphere for the following:

   - Oxygen deficiency
   - Toxic fumes/mixtures
   - Explosive atmospheres

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If your assessment and testing indicates a hazardous condition: **DO NOT ENTER**. At this point you have two choices:

Remove the hazard

Protect against the hazard

Removing the Hazard:

- Flushing with water
- Ventilating with forced air

These are the easiest methods of combating confined entry hazards. This is of course subject to other requirements.

1. You must also consider:
   - Can you honestly say that you are providing enough fresh air for safe, healthy work?
   - If you can't satisfy the criteria for removing any atmospheric hazards your choice must be to:
   - **PROTECT AGAINST THE HAZARD**
   - Protecting against the hazard involves more effort, equipment and training. The essential difference is the use of a supplied air breathing apparatus.

2. Using appropriate detection equipment, test the confined space for hazardous fumes or oxygen deficiency. If the level of any hazard is not within the accepted limits, work shall cease immediately, and the workers shall vacate the confined space. The attendant has the authority to stop work if he/she feels that the safety of the crew is in jeopardy. Immediately after everyone has vacated the confined space he shall properly barricade the entry so that others may not inadvertently enter the space.

3. When tests indicate safe air quality, enter the work area.

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4. Everyone working in the confine space area must be properly trained in safe entry and rescue procedure. They must have a through knowledge and understanding of their equipment and the potential hazards that exist.

5. There must be a pre-entry meeting with all parties involved discussing the following: which must be documented and a copy provided to head office.

    - Known Hazards
    - Rescue plan
    - Communication Signals
    - Emergency alarm
    - Designate one "competent" member of the operation to be the "Crew Chief". This is not to be taken as a designation a s rank; it is a designation of the role to be performed within the "in team".

6. Where possible, ventilate even after atmospheric hazards have been corrected. Monitor the air as long as personnel continue working there. Isolate the confined space from all processes and power sources.

7. Ducts leading to/from ventilation systems shall be sealed; power sources shall be locked/tagged out in accordance with Westwood Mechanical policy.

8. Barricade or rope off the area.

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9. Where ventilation has corrected atmospheric hazards but cannot be continuously provided, worker entering the space must wear rescue harness attached to individual lifelines.

10. An attendee must be posted at the entrance prepared and equipped to provide rescue in case of emergency. In some situations , workers entering the confined space must also wear supplied –air respirators

11. The attendee posted at the entrance must record the time each worker enters the confined space. During the time the workers are in the confined space the watch must communicate with all workers on a regular basis to be satisfied everyone is ok. He shall record all the communications in the log. It should be agreed upon before entering the confined space the maximum length of time each worker may stay in the space before exiting. Use a communication system to advise the worker to exit the space, The watch mustn't leave his post without another watch being present. Where possible, the attendant shall maintain visual contact with the "in team". The attendant shall maintain voice contact with the "in team" at regular intervals (i.e. every 5 minutes). This contact schedule shall be documented. The potential hazard level shall determine the frequency of contact.

12. A confined space work area form shall be completed and made available to workers entering the space, the form shall provide information on the space to be:

    - Identified
    - Potential hazards note
    - Required precautions stated
    - A copy shall be filed at the job site and also to head office filing.

13. The attendant shall ensure that only "Authorized Personnel" are permitted in the immediate vicinity of the confined space operation.

14. The attendant shall ensure that no hazard is developed in the immediate vicinity of the confined space operation.

15. If the attendant cannot enforce the proceeding two items he shall immediately order the " in team" to stop work and evacuate the confined space.

16. **The attendant's primary objective is to ensure the safety of the " in team" The attendant shall not be assigned any duties, which negatively impacts his/her attendant obligations. The attendant shall not leave his/her post unless an approved substitute attendant assumes the operation and the "in team" are advised of the change. This change shall be noted in the confined space work area form. (This also includes leaving to relieve oneself or any other reason.)**

17. Upon completion of the confined space operation, the attendant shall ensure that all materials taken into the space are also removed.

18. A confined space entry work permit shall be completed on the form enclosed herein. The purpose of the permit is to ensure that existing hazards of a confined space have been properly assessed and that necessary preventative and protective measures and procedures have been taken to ensure the health and safety of workers involved in confined entry work.
Work permits shall be dated and have an expiration date that will be valid for only one shift; each shift shall have the permit updated with the same requirements. Copies shall be filed at the job site and also to head office files.

7. EQUIPMENT/MATERIALS REQUIRED

Some of the equipment that may be required is as follows:

- Gas detection equipment (Equipment service log books shall be maintained on each piece of equipment as per The Monitoring Equipment Log herein)
- Retrieval device (man winch)
- Breathing apparatus-either S.C.B.A. or remote bottled air with airline
- Full body harness
- Personal Protective equipment
- Communication system (to summon help)
- Training of employees
- First aid and CPR training
- Emergency response plan
- Written safety work procedure
- Ventilation system
- Approved heaters

8. SPECIAL CONSIDERATIONS

8.1 Training

All workers entering and involved with any confined space entry must receive proper training prior to entry, the training shall cover the following: as a minimum:

1. Fundamentals of hazard/risk assessment
2. Lockout/blanking off procedures
3. Monitoring equipment and use
4. Use of applicable respiratory equipment
5. Safety equipment use
6. Emergency entry exit (rescue) procedures
7. Communications
8. First Aid and cardiopulmonary resuscitation(CPR)

9. Westwood Mechanical work procedures for confine space entry.
10. Fire protection
11. Rescue and training drills
12. Permit system.

8.2 Rescue

In the event of an emergency the attendant shall sound the alarm to summon the "rescue response team", usually the local fire department.

Only qualified rescue personnel may enter a confined space in an emergency.

- Rescuers must have the applicable equipment described for the class of confined space.

- Confined space is considered to be Immediately Dangerous to Life and Health unless demonstrated otherwise. Emergency rescue procedures must be planned and in place for confined space entry. The standby worker (attendant) must be equipped to immediately effect a rescue He can only enter the confined space if the lifting of the workers with the safety harness and lifeline is impossible.

- Communications must be available at the work site to emergency response organizations (Fire Department, Ambulance)
- One member of the emergency rescue team shall function as the rescue coordinator.

- The rescue coordinator shall ensure that the appropriate rescue equipment is in the immediate vicinity of the confined space operation, and is ready for use.

- The rescue coordinator shall communicate to all rescue members, and their respective supervisors, the existence, nature and location of any confined space operation to be undertaken.

- Following a rescue operation, the rescue coordinator shall review their response internally and with the safety coordinator to evaluate the program effectiveness and identify potential areas for improvement.

9. Summary

1. Identify the spaces and the hazards .
2. Define the nature of the work to be performed-hot work or cold work.
3. Use qualified testers to conduct initial and periodic atmospheric testing.
4. Conduct visual inspection of all spaces for hazards- atmospheric as well as physical or mechanical.
5. Establish safe work practices for entry work and other work (SUCH AS HOT WORK, LOCKOUT/TAGOUT).
6. Train all workers involved in confined space activities (entrants, attendant, entry supervisor and qualified tester) on recognition, evaluation and control.
7. Develop emergency procedures and provide necessary equipment.

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CONFINED SPACE ENTRY PERMIT

Section 7

Location of work:	
Description of work (trades):	
Employee assigned:	
Entry Date:	Entry Time:
Outside Contractors:	

Isolation Checklist

	Blanketing and/or disconnecting
	Electrical
	Mechanical
	Other

Hazardous work:

	Burning
	Welding
	Brazing
	Open Flame
	Other

Hazards Expected:

	Corrosive Materials
	Hot Equipment
	Flammable Materials
	Toxic Materials
	Drains Open
	Cleaning (e.g. chemical or water lance)
	Spark Producing Operations
	Spilled Liquids
	Pressure Systems
	Other

Vessel Cleaned:

Deposits
Method
Inspection
Neutralised with

Fire safety precautions:

CONFINED SPACE ENTRY PERMIT

Section 7

Personal Safety:

	Ventilation Equipment		Communication (employee qualified)
	Respirators		Clothing
	Head, hand, foot protection		Shields
	Life line and harness		Buddy System
	Atmospheric tests		Stand-by person -emergency egress procedure training signed off (supervisor or qualified person)_____
	Lighting		

Test Performed	Location	Reading

Remarks:
Test perfomed by: SIGNATURE
Time:

Authorization:

Supervisor:
Project Co-ordinator:
Safety Co-ordinator:
Etc:

Entry and emergency procedure understood:

Stand-by person:
Rescue:
Telephone:

Permit expires:
Classification:
Distribution: 1) Supervisor (site file) 2) Safety Co-ordinator (head office) 3) Project File (head office)

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CONFINED SPACE WORK AREAS

Section 7

CONFINED SPACE	PRECAUTIONS

Distribution:
1) Supervisor (site file)
2) Safety Co-ordinator (head office)
3) Project File (head office)

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MONITORING EQUIPMENT LOG

Section 7

1. Make	
2. Model Number	Serial Number
3. Type of Monitor	
4. Date of Purchase	
Date Calibrated	Calibrated by

Distribution:
1) Supervisor (site file)
2) Project File (head office)
3) Inventory Control (head office)

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Confined Space Entry

Section 7

Location of Work: _____

Description of Work: _____

Stand-By Person: _____

Date: _____

CONFINED SPACE ENTRY TEAM

	Name	Entry Time	Name	Exit Time
1				
2				
3				
4				
5				
6				

EQUIPMENT/MATERIALS

Name	Equip/Material out	Equip/Material In	Consumed	Confirmed

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