NOTICE!

The following procedure is currently under revision.

If you need to refer to this procedure and have questions regarding applicability, please contact the Safety Office at 425.388.3549.

CONFINED SPACE ENTRY PROGRAM

I. PURPOSE

A. The purpose for the confined space entry procedure is to establish protective measures to ensure employees' safety and health when they enter, work in, and exit from confined spaces.

B. This Confined Space Entry Program will comply with the requirements of Washington Administrative Code, WAC 296-809.

Note: refer to the appropriate WAC 296-809 or WAC 296-155 for additional requirements specific to the operation, e.g. sewer entry, excavations, etc..

II. DEFINITIONS

A. "Confined Space" means a space that;
1. Is large enough and so configured that employees can enter and perform work,
2. Has limited or restricted means for entry or exit.
3. Is not designed for continuous employee occupancy.

Confined spaces include but are not limited to storage tanks, process vessels, bins, boilers, ventilation or exhaust ducts, sewers, underground utility vaults, tunnels, pipelines, pits, tubes, vaults and vessels, cells, digesters, tank cars, and plumbing access areas.

B. “Permit-Required Confined Space” means a confined space with one or more of the following characteristics;

1. Contains or has the potential to contain a hazardous atmosphere.
2. Contains a material that has the potential to engulf an entrant.
3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward to a smaller cross-section.
4. Contains any other recognized serious safety or health hazard.

C. “Hazardous Atmosphere” means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self rescue, or acute illness from one or more of the following conditions;

1. Atmospheres having concentration of airborne chemicals in excess of the permissible exposure limits as set for that particular chemical in WAC 296-841-200.
2. Flammable gas, mists, or vapors in excess of 10% of the lower explosive limit.
3. Airborne combustible dusts at a concentration that meets or exceeds the LFL
4. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.
5. Any other atmospheric condition that is immediately dangerous to life and health.

D. "Authorized Entrant" an employee that enters a confined space to perform work. These employees shall receive specific training in the requirements of this policy.

E. "Attendant" an individual capable of maintaining communication with the entrant(s) at all times and monitors the acitivity. The attendant shall be located outside the confined space whenever the space is occupied, and have respiratory protection available when indicated. The attendant must know existing and potential hazards of the space as well as the procedure to summon rescuers and perform non-entry rescue during an emergency.

F. "Entry Supervisor" the employee that is responsible for ensuring acceptable entry conditions are present in the confined space, the confined space entry permit is properly filled out, all necessary/required safety measures are followed during all phases of the confined space work. Note: an entry supervisor may also serve as an attendant or as an authorized entrant.

III. AUTHORITY/RESPONSIBILITIES

A. It is mandatory that each person working in confined spaces or those personnel who have direct involvement around confined spaces, be trained in confined space entry procedures. Managers and supervisors, or their designees, responsible for crews working in confined spaces shall be familiar with all aspects of these requirements and are responsible for their employees' safety. Before anyone enters a confined space, the supervisor will:

1. Confirm that all employees involved in the work are trained in the safe entry procedures and ensure that procedures are followed.

The Entry Supervisor will:

1. Make certain that all necessary safety equipment is on hand and working properly.

2. Ensure a confined space entry permit is filled out, perform all necessary air testing or assign qualified person to perform testing, discuss possible hazards and safety precautions with all affected employees.

3. Report to their supervisor any malfunction of gas detectors, ventilation equipment, tripods, harnesses, safety lines, self-contained breathing apparatus (SCBA), and other air supplies, or any other related equipment used for confined space entry.

4. Have a current certification in First Aid/CPR.

B. If the Entry Supervisor deems a situation to be serious enough, they shall cease all operations until corrective action has been taken, and promptly report the situation to their supervisor.

C. All employees entering confined spaces are responsible for fully understanding and strictly observing the safety standards, regulations and procedures applicable to such work. Employees are responsible for reporting to their Entry Supervisor or immediate supervisor any condition, procedure or equipment considered unsafe and for reporting any injury or evidence of impaired health occurring in the course of work which may affect the safe performance of their duties.

D. If anyone feels this procedure is being violated, they shall immediately notify their supervisor first, then the County Safety Office.

E. Each department/division should develop a list of known confined spaces as an addendum to this procedure.

IV. TRAINING

A. All employees that perform work in confined spaces or serve as entrants, attendants or entry supervisors shall have received confined space training and shall be familiar with all aspects of this program. Retraining is required whenever there is a change in permit space operations or as deemed necessary by the supervisor and/or County Safety Office.

1. The supervisor is responsible for scheduling the training of the employees.

2. The County Safety Office is responsible for providing and updating the county's confined space entry procedure program.

3. Refresher training will be done upon request of the supervisor or manager or as deemed necessary by the County Safety Office. The Safety Office will coordinate training as needed.

V. GENERAL GUIDELINES

A. Each permit-required confined space shall be identified through use of a sign or marking system, or by any other equally effective means, to inform employees that the space is a permit-required confined space.

B. Each confined space shall be tested for atmospheric hazards prior to entry and before any ventilation is started. The atmosphere shall be tested for those contaminants that are most likely to be present. At a minimum the confined space shall be tested for Oxygen, LEL, H2S, and CO. If using single function monitors the atmosphere shall be tested in the following order; for Oxygen concentration, LEL, and for potential toxic air contaminants.

C. Employees shall not enter atmospheres which are Immediately Dangerous to Life and Health (IDLH): Oxygen deficient, less than 19.5% or oxygen enriched 23.5%, contain flammable gases or vapors that are above the 10% Lower Explosive Limit (LEL) or contaminated with a toxic material. Entry may be made after all procedures are in place and hazards reduced to a safe level for entry. Safe entry level may be accomplished by the use of ventilation or in combination with personal protective equipment (PPE).

D. Atmospheric testing equipment shall have the alarm points set as follows: Oxygen 19.5% and 23.5%, explosive gases 10% of the lower explosive limit (LEL), Hydrogen Sulfide (H^2S) 10 parts per million (PPM), Carbon Monoxide (CO) 35 PPM. Alarm levels for other toxic materials may be found in the Washington Administrative Codes (WAC).

E. All workers shall immediately exit the space when the gas detector's audible alarm is heard.

F. Use of toxic and/or flammable materials in confined spaces:

1. Quantities of toxic or flammable materials brought into confined spaces for use shall be limited to the smallest amount necessary to complete the work.

2. Containers shall be designed to minimize the evaporation and spillage. Safety cans or small squeeze bottles are preferable when applicable.

3. Continuous forced ventilation shall be provided using explosion proof equipment.

4. Spraying of toxic or flammable substances such as paint is not authorized without the entry supervisors' approval.

G. Employees may enter confined spaces without respiratory protection only when the atmospheric conditions have been determined to be within acceptable limits. Confined spaces shall be ventilated to remove the contaminated atmosphere. Ventilation shall be maintained to control contamination below the threshold limit values and maintain oxygen at the normal level of 20.9%.

H. If ventilation cannot remove contaminants or maintain a safe atmosphere; the County Safety Officer or Entry Supervisor may authorize entry with respiratory protection and personnel protective equipment on a case by case basis.

VI. GENERAL REQUIREMENTS FOR ENTRY OR WORK WITHIN CONFINED SPACES

A. Permit Required Entry

1. Entry to a confined space shall be by permit only. The permit, authorized in writing, specifies the location and type of work to be done. It certifies that all existing hazards have been evaluated by the entry supervisor and necessary protective measures have been taken to ensure the safety of each worker.

2. The Entry Supervisor shall be responsible for getting the permit and shall sign off when the areas and actions listed on the permit have been reviewed. See Appendix B for an example of the confined space entry permit.

3. The entry permit shall be posted at the confined space entry point while work is occurring in the space.

4. Original copies of all confined space entry permits shall be sent to the County Safety Office.

5. When there have been any work interruptions such as breaks, lunch periods, etc., the confined space atmosphere shall be retested prior to entry to ensure compliance with permit requirements.

6. The space shall be continuously monitored whenever workers are in the confined space. When there is an operation that can contaminate the space (spray finishing, welding, solvent cleaning, etc.) additional air monitoring may be required.

7. If a hazardous condition is detected by continuous monitoring, stop all work immediately and remove personnel from the space.

8. Immediately notify the supervisor of the conditions found and do not re-enter space or resume work until all unsafe conditions have been removed and retesting and re-certification completed.

9. Personnel shall not work alone. Constant communications or observation is required in all confined spaces. The entry supervisor will determine the type of communication (voice, signal line, etc.), based on the nature of the space, operations, and degree of hazard.

VII. RECORDKEEPING

A. The Entry Supervisor shall fill out a confined space entry permit for all confined space entry applications. They shall post a copy at the site, and send the original to the Safety Office.

B. The County Safety Office shall keep a file of all original issue permits.

C. The County Safety Office will review all permits that have taken place during the preceding year.

D. A copy of the training record shall be kept in the employee's training file. A list of all trained personnel shall be kept on file in the assigned department and Safety Office.

E. Instrument/Detector Maintenance

1. Instruments used to evaluate life-threatening conditions shall be maintained in working condition.

2. Each department shall assign a person to maintain the instruments located in that department. This person must be trained in the operation of the equipment and be thoroughly familiar with the instruction manual and maintenance procedures.

3. A calibration and maintenance log shall be kept with each instrument at the department or location.

VIII. SAFETY EQUIPMENT REQUIRED FOR CONFINED SPACE ENTRY

A. Proper safety equipment and clothing are essential in confined space work. The Entry Supervisor shall determine the attire necessary for the space being entered and ensure that it is worn.

1. Only those personnel authorized to wear respirators per the Respiratory Protection Program (Safety & Health Procedure #14) will be allowed to wear respirators.

2. Persons required to wear respirators shall not have facial hair which may interfere with the fit of the facemask, and adhere to all other requirements of the Respiratory Protection Program.

IX. PRE-ENTRY PROCEDURES

A. Prior to leaving the County shop or main location, all specified safety and health equipment needed for confined space entry shall be available. Appendix A "Safety Equipment Checklist" can be used as a guide. All equipment must be examined, tested, and calibrated to ensure the correct operating condition and transported to the worksite. **No job shall be attempted unless all required personnel and equipment are on-site and ready for use.**

B. Post or barricade the area to prevent unauthorized entry.

C. Ensure control of all sources of ignition where a potential fire hazard exists.

D. If vehicles are involved, park vehicle, set the parking brake, work area, block the wheels if needed, turn on flashers and strobes; set up cones and provide for flagging, if necessary.

E. Mechanical hazards: Employees will not enter confined spaces containing parts which may move or which contain motors, fans, or other power-driven moving parts of potential hazard until they are sure such parts cannot move to injure them. Tagging of controls without other means of control will be satisfactory only if the control is barricaded an/or is under constant observation during occupancy of the space. Isolation of a confined space is a process in which the space is removed from service by:

* Locking out electrical sources

* Blanking and bleeding pneumatic and hydraulic lines

* Disconnecting belt and chain drives or mechanical linkages on shaft-driven equipment where possible

* Securing mechanical moving parts within confined spaces with latches, chains, chocks, blocks, or other devices.

F. Electrical hazards: Employees shall disconnect, lockout, and tag electrical circuits in the confined area that may present a hazard. They shall protect all temporary lights against damage. They shall use heavy-duty cords and keep these cords clear of working spaces and walkways. Finally, they shall use only low voltage, battery operated or ground fault protected equipment in all confined spaces.

G. Electric lighting or circuits used where potentially hazardous concentrations of flammable vapors, gases, or dusts are present, or may develop, shall conform to the National Electric Code. Also, employees shall ground portable electric tools or use isolation transformers, ground fault interrupters, or double insulated tools.

X. TESTING THE ATMOSPHERE OF A CONFINED SPACE

A. It is necessary to test all areas **(top, middle, and bottom)** of the confined space with properly calibrated testing instruments to determine what gases are present and whether enough oxygen is present. If testing levels reveal oxygen-deficiency or the presence of toxic gases or vapors, employees must purge the spaces by forced ventilation and retest it before any

workers enter. If ventilation is not possible, and entry is necessary, workers must have appropriate respiratory protection. If doors and covers contain vents, employees must make the test with doors and covers in place. This allows a true test of the conditions in the confined space before it has been disturbed. If the cover or door is un-vented, employees will open it only enough to admit the test hose or their equipment.

B. When moving the cover, use only non-sparking tools and do not stand directly over cover or opening. Employees must not smoke while working in or around confined space.

C. The Entry Supervisor will evaluate the area immediately prior to entry and during the work at intervals dependent on the possibility of changing conditions.

D. Re-test every confined space that has been closed for any period of time to determine air quality and re-evaluate for the presence of mechanical hazards.

E. To maximize the ventilation, open any other access direct to the confined space, add more fans if possible. Direct the airflow to eliminate any pockets of hazardous gases. Workers in the surrounding area shall be protected from hazardous exhaust gases by distance or by respirators.

XI. VENTILATION

A. Confined spaces shall be ventilated with clean air, to ensure a safe working environment for employees.

1. A minimum of five (5) complete changes of air are needed where oxygen deficiency exists or is likely to exist. A minimum of ten (10) complete changes of air are needed where a toxic and/or flammable material is involved. In no case shall ventilation time be less than fifteen (15) minutes immediately prior to entry. No entry shall be conducted unless acceptable atmospheric conditions are present, as specified on permit, or other protective measures are taken.

2. Continuous forced air ventilation must be used as follows: an employee must not enter the space until the forced air ventilation has eliminated any hazardous atmosphere; and forced air ventilation must be directed to ventilate the immediate areas where

an employee is and continue until all employees have left the space.

3. Care shall be taken to ensure that the source of ventilation air is free of contaminants, such as CO from vehicle or equipment exhaust, or flammable/toxic vapors from chemical use.

XII. HOT WORK/WELDING IN CONFINED SPACES

A. Hot work permits must be issued by the supervisor before employees may enter any area where hot work occurs. Local exhaust and/or respiratory protection shall be required where hot work involves the generation of toxic gases, fumes, or vapors.

B. Generally compressed gas cylinders are not allowed in confined spaces. If they are required to be placed inside the confined space, the compressed gas cylinder and lines shall be protected from rupture or damage. An attendant shall monitor outside compressed gas cylinders and electric generators at all times, and immediately turn off sources of energy when an emergency arises, work is interrupted or completed.

XIII. CONFINED SPACE ENTRY PROCEDURE

A. Obtain the equipment required for entry if not on-site. Use the checklist if necessary.

B. Complete a confined space entry permit. All the line items must be completed prior to entry. The Entry Supervisor shall certify by signature that the requirements have been reviewed and completed.

C. Set up rescue equipment at the confined space entry point.

D. Equip all confined space workers with:

1. Harness and safety line
2. Combination gas/oxygen detector

Exception: Where all confined space workers are located within ten (10) feet of each other and on the same level, only one combination gas/oxygen detector is required. It shall be carried by the worker farthest into the confined space.

3. Proper respirator for the job

4. Non-sparking tools

E. Respiratory protective equipment shall be available for rescue use (i.e. airline respirator with an escape provision, SCBA).

F. Hold crew meeting and discuss:

1. Safety procedures.

2. Communication signals.

3. Evaluation results.

4. Rescue procedures.

G. Attach the safety line to the confined space worker's harness; attach the other end to the rescue tripod where applicable.

H. No matches or lighters are to be used or carried into confined spaces. Explosion-proof drop lights or extension cords connected to a Ground Fault Circuit Interrupter (GFCI) shall be used in all confined spaces. Use only air-driven power tools when working in the areas which could contain an explosive atmosphere.

I. Continue to ventilate as long as workers are in the confined space.

J. Attendant must remain in constant communication with entrant while in the confined space.

K. Upon loss of communication with the confined space entrant(s) or upon receipt of an emergency signal (such as three (3) sharp tugs of the safety line), the attendant shall immediately implement the rescue plan.

L. Departure from Confined Space:

1. Routine Exits - Upon notification that the confined space entrant(s) is ready to exit the confined space, the attendant shall take in the slack on the safety line. The attendant shall remain in constant communication with the entrant(s) until all tools, and materials are completely removed and entrant(s) are out of the confined space.

2. Emergency - The confined space entrant(s) shall immediately evacuate the confined space if the ventilation system fails or an audible or visual alarm warning is emitted from the gas detector. The attendant can order the entrant(s) to evacuate for other suspected or known hazards.

M. Rescue Plan:

1. Pre-Plan:

a. All personnel assigned duties directly involving a confined space entry; either as an entrant, attendant, or as the entry supervisor; shall be trained in confined space entry procedures. All other personnel in the work area/job site shall be advised that there is a confined space entry in progress and follow any other instructions given by the entry supervisor. The primary rescue plan is nonentry rescue by use of a retrieval system and notifying local emergency services.

b. Supervisors are responsible for developing rescue procedures. This shall be established according to the individual confined space and location.

c. Not all emergency service agencies have the capability of confined space rescue; therefore, it is required that each department/division develop and implement their own rescue plan.

NOTE: When utilizing an outside rescue agency, careful consideration should be given to the length of time it will take for responders to arrive. If the time is excessive other means of rescue will need to be developed. If utilizing an outside rescue/emergency service, the agency should be informed of the hazards they may confront at the facility or worksite, and should be provided appropriate information regarding the confined spaces so the rescue service can develop rescue plans and practice operations.

d. All equipment shall be inspected, tested and/or calibrated prior to entry into the confined space.

e. Rescue equipment shall be in place and ready for use, including a tripod and winch approved for fall arrest, ladders when appropriate and supplied air respiratory protection equipment with escape pack.

N. Rescue Procedures:

1. Initiate rescue operation upon:
   a. Declaration of an emergency by a confined space entrant in the confined space.
   b. Loss of communication with an entrant in a confined space.

2. The attendant shall call for assistance within your department by breaking into any existing communication, declare an emergency stating "worker down in a confined space". Send rescue assistance to (address)." and call 911 and declare an emergency stating "worker down in a confined space". Send rescue assistance to (address)."

3. The **attendant shall not enter a confined space**. The attendant shall ensure positive clean ambient air ventilation. Secure all energy and gas sources. Starts the rescue by hoisting the entrant(s) in a vertical rescue or pulls the safety line in a horizontal rescue as long as the entrant does not become entangled in structural parts or equipment.

4. When rescue personnel arrive, the attendant shall brief them on the situation of the entrant(s) and hazards of the confined space. The attendant shall assist the rescue personnel as directed. Once rescue personnel have arrived, the attendant (if necessary and qualified) can put on the air line respirator and prepare to enter space **ONLY AFTER BEING RELIEVED OF THEIR ATTENDANT DUTIES BY ANOTHER PERSON.**

5. The attendant may assist the rescue personnel with the injured worker as they exit the confined space.

O. Post Rescue

1. Secure the hazard by closing the confined space. Provide barricading and posting as applicable.
2. Make full report to the supervisor and the County Safety Office.

APPENDIX A
Safety Equipment Checklist

Not all of the equipment on this list is required for every job. Equipment depends upon the type of space, location and hazards.

- ____ First Aid cards
- ____ First Aid kit
- ____ Fire Extinguishers
- ____ Safety harness & life line
- ____ Hoist
- ____ Air blowers and ducts
- ____ Electrical generator and long extension cord
- ____ Air testing equipment for
  - ____ Flammable gases
  - ____ Oxygen deficiency
  - ____ Hydrogen Sulfide
- ____ Lockout & tagout devices
  - ____ Warning signs and cards
  - ____ Padlocks
- ____ Non-sparking tools
- ____ Portable ladder
- ____ Personal protective equipment
  - ____ Rubber gloves
  - ____ Rubber boots or chest waders
  - ____ Rain gear
  - ____ Hard hats with chinstrap
  - ____ Orange vests
- ____ SCBA respirator
- ____ Airline respirator
- ____ Traffic control devices
  - ____ Rotating beacon on vehicle
  - ____ Barricades
  - ____ High level flags
  - ____ Signs and traffic cones
- ____ Radio transceiver
- ____ Confined space entry permits
- ____ Explosion proof lighting where required

APPENDIX B
Snohomish County Confined Space Entry Permit

A. Location of Work and Type of Confined Space:_____

_____

B. Purpose of Entry:_____

C. Entry Date:_____ Entry Time:_____

D. Isolation, Lockout and Tagout Checklist:

1. Blanking and/or disconnecting _____
2. Electrical _____
3. Mechanical _____
4. Other: (Explain) _____

F. Personal Safety Checklist

Continuous Ventilation Before and During Occupancy	_____
Respirator Requirements Discussed	_____
Protective clothing	_____
Life Lines, Harness and Tripod	_____
Lighting (Explosion proof)	_____
Communications	_____
Employees Qualified and Trained	_____
Attendant (2nd person)	_____
Emergency Egress Procedures Explained	_____

G. Atmospheric Tests:

Sampling Equipment to be used:

Model Serial # Date of Calibration

_____ _____ _____

Tests Conducted: Tests performed by _____

Location	Time	(%LEL)	% Oxygen	Other: _____(specify)
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

H. Entry and Emergency Procedures Understood: (Signature)

Confined Space Worker(s) _____

Attendant(s)_____

I certify I have evaluated the situation and assigned personnel and the procedures to be followed are in compliance with the confined space entry program.

_____

Signature of Entry Supervisor or Authorized Entrant

_____

Printed Name of Entry Supervisor or Authorized Entrant