

POLICY/ADMINISTRATIVE PROCEDURE/ADMINISTRATIVE DIRECTIVE

SECTION: FINANCE	REFERENCE NUMBER: 409.02
SUBJECT: FINANCE/RISK MANAGEMENT	INITIAL EFFECTIVE DATE: 12/31/90
TITLE: CONFINED SPACE ENTRY	LAST REVISION DATE:

POLICY STATEMENT:

It is the City's policy to enforce nationally recognized standards to assure that any employee entering a confined space will not be unnecessarily subjected to conditions that may cause injury, illness, or death. All employees whose duties require that they enter a confined space shall be trained annually in the proper procedures for entry, work, observation, and rescue activities. Employees in this category shall follow all steps of the procedures set forth in this policy. This policy applies to vendors and visitors as well as City employees at all City locations and facilities.

ADMINISTRATIVE PROCEDURES:

I. DEFINITIONS

Confined Space means any space which has limited openings for entry and exit, unfavorable natural ventilation which could contain or produce dangerous air contaminants, and which is not intended for continuous employee occupancy.

Typical Hazards of Confined Spaces are:

- Oxygen Deficiency
- Toxic Vapors
- Flammable Vapors
- Electric Shock
- Hot Surfaces
- Elevated or Slippery Surfaces
- Hazards associated with welding, grinding, metal cutting, and the use of solvents
- Other Operations in the Immediate Area.
- Contact with Chemicals
- Excess Heat
- Moving Equipment
- Open Top Spaces Greater than Four Feet in Depth

Examples of *Confined Spaces* at City facilities include but are not limited to the following examples:

- Sewers
- Water Storage Vessels
- Boilers
- Containerized Welding

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- Meter Vaults
- Tunnels
- Manholes
- Trenches
- Lift Stations
- Air Handlers
- Small Equipment Rooms
- Excavations

II. RESPONSIBILITIES

Management Personnel - Have responsibility for training personnel and enforcing this policy equally for vendors, service representatives and visitors, as well as City employees. Department and Division Heads, in conjunction with the Risk Manager, shall identify the confined spaces in which their personnel work and shall ensure compliance with this policy.

Supervisors - Have primary responsibility for preparing the confined space for entry and preparing the permit.

Personnel Entering and Their Supervision - Have the obligation to critique the preparation and to safely implement the work activity within the confined space, and to sign the permit upon each entry.

Risk Manager - Has responsibility to periodically review and update this policy and to serve as a resource to answer or resolve questions or problems concerning this policy. Additionally, he shall assist in developing bid specifications for all safety equipment and devices, and to review and approve same prior to final purchase.

III. APPLICATION AND TRAINING

It is essential to train all employees who enter and work in confined spaces in the use of lifesaving equipment because of the hazards that might be encountered. The training program—to be conducted by the individual department or division—should be specifically designed for the types of confined spaces involved and the problems associated with entry and exit. Training should be conducted by someone who is knowledgeable in all relevant aspects of confined space entry and exit, such as emergency exit procedures, hazard recognition, use of respiratory and safety equipment, First Aid and CPR, lockout and equipment isolation procedures, rescue, fire protection, and communications. Testing of employees should take place to evaluate competency and determine the need for any re-training.

IV. PHYSICAL AND MEDICAL REQUIREMENTS OF CONFINED SPACE ENTRANTS

A. Management personnel are responsible for anticipating the hazards associated with entry

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into confined spaces and formulating physical and medical requirements for workers expected to enter confined spaces. In doing so, consideration must be given to physical and medical requirements which would allow the worker to effectively cope with emergencies.

1. Management personnel are responsible for forwarding these requirements to the Human Resources Department for inclusion within the minimum qualifications for these affected positions.
 2. Management personnel are responsible for re-training, re-assigning or terminating personnel who fail to meet these requirements.
 3. Management personnel who have responsibility for confined spaces in which respirators will be required shall state as an additional requirement the ability of a confined space entrant to maintain a facial seal under emergency conditions.
- B. Supervisors shall not assign workers to enter confined spaces who fail to meet the physical and medical criteria applicable to the task.
1. Supervisors shall exercise their best judgment in assigning workers to enter confined spaces and may prescribe additional physical and medical requirements on the permit if warranted by particular conditions.
 2. Supervisors shall additionally check workers for signs of intoxication and fatigue before assigning workers to enter confined spaces.
 3. Supervisors shall not assign workers to enter confined spaces unless the supervisor is satisfied with the worker's ability to safely cope under adverse conditions.
- C. Workers whose job duties require entry into confined spaces shall be responsible for continuously meeting the physical and medical requirements of their jobs.
1. Workers shall notify supervisors of any conditions or circumstances which would impair their ability to meet these requirements or which would otherwise make entry into a confined space unreasonably hazardous.
 2. Workers whose job duties require the use of respirators shall periodically demonstrate their ability to maintain a facial seal under adverse conditions.

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V. PROCEDURE

Preparation of the confined space for entry shall address the following subjects and, at a minimum, contain the requirements indicated.

- A. *Barricades and Warning Signs.* In order to warn others from coming near the confined space, supervisors shall ensure that barricades and warning signs are placed at conspicuous locations in accordance with the City's Barricade Policy 200.01, whenever there is an excavation, open manhole, or suspected toxic substance present.
- B. *Decontamination.* Supervisors and workers shall make a maximum effort to safely drain, clean, or otherwise eliminate flammable, toxic, or corrosive chemicals or vapors from the confined space. The objective of decontamination procedures is to allow personnel to work safely in the confined space without the need of special ventilation or personal protective equipment.
- C. *Isolation.* Workers and supervisors shall provide maximum separation of the work area to prevent entry of hazardous substances from surrounding areas.
- D. *Lockout/Tagout.* Workers and supervisors shall physically de-energize and immobilize all equipment and sources of potentially hazardous energy release in accordance with appropriate lockout/tagout procedures.
 - 1. Detailed Lockout/Tagout Guidelines are at Attachment I.
- E. *Ventilation.* Workers and supervisors shall liberally employ the use of mechanical air movers or blowers and strategically located venting to help assure that sufficient fresh air passes through the enclosure.
 - 1. The supervisor shall determine whether fresh air should be blown into the confined space or drawn in, depending upon the circumstances.
 - 2. Forced ventilation shall be maintained throughout the entry period.
 - 3. Ventilation shall be sufficient to provide a normal air exchange equivalent to three times the volume of the enclosure prior to entry; 6 to 12 times per hour thereafter.
- F. *Testing.* Prior to initial entry, after each interruption, and during the entire job sequence, workers and supervisors shall test for oxygen, flammable gas or vapor, and suspected toxic

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substances (e.g., H₂S).

1. Testing shall be performed by a person trained in the use of the test equipment, familiar with the suspected hazards, and authorized to perform the tests.
 2. Testing instruments shall be used only within the calibration period specified and must be field checked for a qualitative response prior to testing the confined space.
 3. Final testing shall be performed with mechanical ventilation systems operating.
 4. No person shall enter or allow any subordinate employee to enter any confined space unless final testing reveals that the oxygen level is at 19.5–23.5 percent, flammability is less than 10 percent of the lower explosive limit (LEL), and the concentration of toxic gas is less than the permissible exposure limits (PEL) established by OSHA. Test results outside these limits require additional clean-up or special equipment and procedures before entry.
 5. **ANY** untested atmosphere shall be assumed to contain all hazards. No person shall enter or allow a subordinate employee to enter an untested confined space.
- G. *Confined Space Entry Permit.* No person shall enter or allow a subordinate employee to enter a confined space unless an approved permit has been issued. The permit shall provide information relative to the work assignment including, but not limited to, the following:
- Description of the confined space and work to be performed.
 - Location of confined space.
 - Preparations made for a safe entry with respect to decontamination, ventilation, isolation, lockout/tagout.
 - Employees assigned to the job.
 - Testing requirements and results.
 - Date and time.
 - Precautionary measures.
 - Required safety and rescue equipment.
 - Proper signatures of all personnel involved in inspection, testing, and compliance prior to entry.
 - Duration of permit.
1. The supervisor shall be responsible for posting the permit at the point of entry.

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2. Permits shall be signed by the foreman/crew leader of the confined space and the tester. A minimum of **TWO** signatures is required to assure that proper levels of communication are achieved.
 3. No permits shall be issued for a period of time longer than one shift. For succeeding shifts, or if the work area is left unattended for more than one hour, the persons responsible for signing the permit shall again check all conditions of the permit, re-test the area, and appropriately sign the permit. If left unattended for a shorter period, re-testing before re-entry may be required by the permit, depending upon the nature, location, and surrounding conditions of the confined space. Situations involving toxic materials, flammable gases or corrosive materials shall require re-testing after any unattended period, regardless of length.
 4. Upon completion of the job, the permit shall be returned to and retained by the department for a minimum of thirty days after completion of the entry if no deaths, injuries, or serious adverse health effects resulted from that entry. The supervisor is responsible for reporting any accidents involving injury to the Risk Manager in conformance with the Occupational Injury Benefit Policy.
 5. A sample entry permit is depicted in Attachment II. Individual departments or divisions may utilize a revised version with written approval of the Risk Manager.
- H. *Special Safety Equipment.* Supervisors shall document on the permit any requirements for special safety equipment, such as harnesses, lifelines, breathing air, tripods, rescue winches, safety glasses, hearing protection, explosion-proof lighting, and protective clothing.
1. All persons entering a confined space that would require a vertical lift to make a rescue shall wear safety harnesses equipped with backup lifelines. A tripod, hoist, and retrieval winch with supplemental fall protection shall also be utilized.
 2. All persons entering a confined space shall wear self-contained breathing apparatus in contaminated or dusty environments, where toxic concentrations are outside the limits set forth in Section V.F.4., where ambient conditions are subject to change, or where oxygen concentrations may drop below 19.5 percent. In areas classified by OSHA standards as Immediately Dangerous to Life environments (IDLs), breathing air shall be provided by the supervisor and used by the worker.
 3. Communications systems (e.g., hand-held walkie-talkies) must be operable from within

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the confined space and suitable for use in such areas.

- I. *Special Work Practices.* Supervisors shall give consideration to the nature of the work associated with each confined space entry permit with necessary precautionary measures specified on the permit.
1. Supervisors shall notify others in the work area that a permit has been issued for personnel to work in a specified confined space.
 2. A ground fault interrupter is required when electric tools or extension lights requiring voltages greater than 24 volts are to be used in a confined space.
 3. Compressed gas cylinders, other than breathing air, shall not be taken into a confined space.
 4. Special additional ventilation and/or breathing air shall be required when torch cutting or welding is done within a confined space. Workers shall carefully check hoses and nozzles of cutting or welding equipment before use in a confined space. Any potential fire hazard must also be reviewed by the supervisor and the appropriate action taken.
 5. No worker shall operate any pneumatic tool with any substance other than compressed air.
- J. *Rescue Plan.* Supervisors shall ensure that permits for confined space entry specify a rescue plan and provide for an attendant to effectively and safely remove the individual(s) from the enclosure in the event of an emergency.
1. Supervisors shall station at least one standby person outside the confined space when internal work is being performed. This person's primary duties are to maintain constant verbal or visual contact with those inside the confined space and to summon emergency assistance if necessary.

The standby person shall be familiar with the permit procedure, be alert for changing conditions, know how to summon assistance immediately, know how to use all rescue equipment specified for the job, and be currently certified in CPR/First Aid. He or she is expected to take all emergency actions short of entering the confined space until emergency assistance arrives.

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Supervisors shall assign no duties to the standby person which would take him or her away from the point of entry. However, he or she may be assigned duties pertaining to the confined space, such as:

- assisting in checking safety equipment;
 - handing tools to workers inside confined space;
 - assisting personnel in and out of confined space;
 - keeping lifelines free of entanglement.
2. Minimum safety and rescue equipment for ANY confined space entry requiring a vertical lift is as follows:
- lifeline and harness (attached);
 - emergency breathing air supply of five minutes;
 - mechanical hoist;
 - First Aid equipment.

VI. VIOLATIONS OF POLICY

Any employee who knowingly violates the mandatory requirements of this policy shall be subject to the full range of disciplinary action.

VII. EXCEPTIONS

Any exceptions to this policy can be made **ONLY** by approval of the Division or Department Head AND the written concurrence of the Risk Manager.

ATTACHMENT I

LOCKOUT/TAGOUT OF ENERGY SOURCES

Introduction

There are many situations in the workplace where unexpected application of energy, machinery, and equipment startup—or release of stored energy—would endanger personnel or property. These unexpected events could occur during routine operations as well as during installation, maintenance, repair, shutdown, or mothballing operations.

Many fatalities, serious injuries, and property damage have occurred as a result of these unexpected events. Therefore, specific procedures are necessary to ensure protection of personnel and property in, on, and around machines or equipment where such unexpected events could occur.

Standards, Regulations, and Guidelines

Several safety-related documents address the problem of unexpected application or release of energy and how LOCKOUT/TAGOUT procedures can help eliminate or at least minimize the hazard. A partial listing follows. These documents should be reviewed for details in implementing LO/TO procedures.

ANSI Z244.1-1982: Minimum Safety Requirements for Personnel Protection - Lockout/Tagout of Energy Sources.

NFPA 70 E: Electrical Safety Requirements for Employee Workplaces.

NIOSH 83-125: Guidelines for Controlling Hazardous Energy During Maintenance and Servicing.

OSHA Standard 1910.147: Control of Hazardous Energy Sources (Lockout/Tagout), Effective date: 10/31/89. (Note: This standard supplements other related standards, e.g., 1910.178, 1910.213, 1910.217, etc.)

Definitions

1. *Energy Isolation Device (EI)*: A physical device that prevents transmission or release of energy, including manual circuit breakers, switches, valves, gates, slip blinds, and similar devices.
2. *Lockout/Tagout (LO/TO)*: The placement of one or more locks or a tag on an EI device in accordance with an established procedure, indicating that the EI device shall not be operated until the lock(s)/tag is removed according to the procedure. **NOTE:** Tagout alone does not offer the positive

protection of lockout, and therefore the lockout procedure should be used if at all possible.

3. *Tag*: A warning device which can be securely attached to the EI device to forbid its operation and to identify the person applying the tag or the procedural control authority.

Lockout/Tagout Procedures - Preplanning

The following steps must be accomplished prior to using the LO/TO procedure:

1. Identify all energy sources and exposures to determine if energy isolation is possible. If not possible, modify as necessary to allow positive isolation.
2. Identify EI devices as to function, labeling, and applicable LO/TO method.
3. Obtain LO/TO materials and hardware, including padlocks, chains, multiple-lock hasps, and tags. These items should be of a distinctive, standardized design and appearance, and should be issued or made available to appropriate persons. Employees must not be required to purchase or furnish their own devices.
4. Assign duties and responsibilities to knowledgeable persons who will be implementing LO/TO procedures.
5. Develop checklists or other step-by-step procedures for each de-energizing or energy-applying process. It is recommended that all such procedures be pre-cleared through the Risk Manager.

Lockout/Tagout Procedures - Implementation

1. Notify all personnel who will be affected by the LO/TO procedure through work permits, special briefings, attention to special problems, and review of plans as necessary.
2. Turn off or shut down equipment and processes, including computerized starting systems or timers, using appropriate procedures. This must be done only by authorized personnel.
3. All involved EI devices shall be located and operated so as to isolate the equipment or process from potential energy sources.
4. Attach or apply appropriate LO/TO devices to the EI device(s). This must be done only by authorized personnel. Lockouts shall hold the energy isolating device in a safe position, and tagout devices shall be attached so as to **forbid** operation of EI devices.

5. Verify isolation by either:
 - a. attempting to operate the equipment or process controls (e.g., start buttons, switches, etc.), or
 - b. testing the equipment or process for isolation by using test equipment or visual inspection.
NOTE: Be sure to return start controls, etc., to the off or neutral position after verification.
6. Stored energy must be relieved, disconnected, restrained, or otherwise rendered safe.
7. LO/TO procedures must include provision for notification and protection of outside personnel, such as service representatives or contractor employees who may be exposed to energy-related incidents in their work.
8. When crew, craft, or other group LO/TO devices are used, they shall afford affected employees the same level of protection as a device applied by a single individual.
9. Supervisors shall ensure that LO/TO will continue during shift or personnel change.
10. If there is need for testing or positioning of energy-isolated equipment, follow these steps:
 - a. Inspect and clear the equipment of tools and materials.
 - b. Clear employees from the area.
 - c. Clear the control of locks/tags according to a prearranged procedure.
 - d. Energize the equipment and proceed with the test or positioning.
 - e. De-energize the equipment, reapply LO/TO as previously done, then continue the work.

Lockout/Tagout Procedures - Release

1. Before energy is restored to the equipment or process, an authorized person must:
 - a. inspect the area to ensure all nonessential items have been removed and that all components are operationally intact, and
 - b. conduct a personnel count or similar procedure to ensure that all personnel are safely positioned or removed.
2. Each LO/TO device must be removed only by the person who applied it or by another person as authorized by the established procedure.

Specific Recommendations

In order to ensure protection of employees who might be exposed to unexpected application or release of energy, the following recommendations are made.

1. Develop, document, and implement a Lockout/Tagout procedure for your operations.

(This policy should be applicable to employees engaged in erecting, installing, constructing, repairing, adjusting, inspecting, operating, or maintaining equipment/processes, and should outline purpose, responsibility, scope, authorizations, rules, definitions, and application measures. A generalized policy is contained in ANSI Z244.1-1982 and OSHA Standard 1910.147.)

2. Procure appropriate lockout/tagout equipment and issue or assign it to appropriate personnel.

(This equipment must be used only for LO/TO purposes. Durability, standardization [type, color, etc.], substantial strength, and ease of identification are important features to be considered.)

3. Develop, implement, and document an appropriate training program for persons affected by the LO/TO procedure.

(Training must address the purpose and use of the LO/TO procedure, designation of authority, specific steps in LO/TO, and equipment usage and maintenance. Periodic retraining in safety meetings or by personal contact is important.)

4. Conduct and document inspections to ensure compliance with the established LO/TO procedure.

(Such inspections must be conducted by persons authorized to halt operations not in compliance with the procedure.

Appropriate reporting and disciplinary measures should be included.)

Conclusion

LO/TO is a relatively inexpensive and easily applied procedure that can pay large dividends in the protection of employees and property. It is imperative that it be used to protect against unexpected application or release of energy.

Information contained herein is based upon sources deemed reliable.

This information should not be interpreted as insurance requirements nor used when contradictory to any

applicable legal requirements.

ATTACHMENT II
Confined Space Entry Permit

Location/Description of Space: _____

Purpose of Entering Space: _____

Employees Performing Work:

Department:

Precautions to be Taken:

YES NO

Employees Qualified	_____	_____
Safety Observer? Name: _____		
Space Cleaned?	_____	_____
Atmosphere Tested?	_____	_____

Results:

Oxygen Content: _____	Must be 19.5% - 23.5%
Flammable Vapors: _____	Must be < 10% of LEL
Toxic Gases: _____	Must be < PEL of gas

Periodic or Continuous Monitoring Required?	_____	_____
Lines to space blanked or disconnected?	_____	_____
Lock-out Devices?	_____	_____
Safety Lights/Illumination?	_____	_____
Communication Devices?	_____	_____

Miscellaneous Precautions Needed:

Protective Equipment Used?	_____	_____
Belt/Harness/Lifeline	_____	_____
Winch/Tripod?	_____	_____
Breathing Apparatus?	_____	_____
Warning Signs?	_____	_____
Protective Gear?	_____	_____
Fire Equipment?	_____	_____
Forced Ventilation?	_____	_____
Rescue Gear on Site?	_____	_____
Lighting Equipment	_____	_____

Misc. Equipment: _____

Permit Valid:

From:

_____ (date)

_____ (time)

Until:

_____ (date)

_____ (time)

Approved By

_____ (date)

_____ (time)