

Standard Operating Procedures Manual
City of Poquoson Fire and Rescue



**City of Poquoson
Fire and Rescue**

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SPECIAL OPERATIONS

SOP#: SO 1.00

Title: Confined Space Rescue

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Fire Chief's Signature


City Manager's Signature

CONFINED SPACE RESCUE

I. PURPOSE

To provide guidelines during entry and rescue operations in a confined space.

This SOP is not all-inclusive and cannot encompass all situations that may be encountered.

II. APPLICABILITY

All career and volunteer personnel

III. SCOPE

This policy is designed to establish guidelines for conducting confined space rescue operations. Confined spaces include caverns, tunnels, pipes, tanks, and any other locations where ventilation and access are restricted by the configuration of the space. These factors may also apply to basements or attics. Confined space incidents may involve injured persons, persons asphyxiated or overcome by toxic substances, cave-ins or fires occurring

within the space. Pre-incident planning is an important factor in dealing with these situations.

IV. DEFINITION

A confined space is “any space which is not intended for continual occupancy, has limited means of egress,” and has the potential for physical, chemical, or atmospheric engulfment.

V. PROCEDURES

PHASE I: ARRIVE ON SCENE. TAKE COMMAND. SIZE UP.

The Poquoson Fire/Rescue Department shall assume command and control of any incident involving confined space entry and rescue within the City of Poquoson. They shall follow the guidelines set by OSHA’s Confined Space 1910.146 and NFPA CS 1670 – 1999.

Primary Assessment

- Command should attempt to secure a site foreman or witness to the accident to determine exactly what happened.
- An immediate assessment of the hazards present to rescuers should be done.
- If no witness is present, Command may have to look for clues on the scene that may indicate what has happened.
- An assessment of the victim(s) should be done.
- Command should determine how many victims have been affected.

- Command should determine how long the victims have been down, the mechanism of injury, and the survivability profile of the victim.
- **An early decision must be made as to whether the operation will be run in the rescue or recovery mode.**
- Establish communications with the victim as soon as possible.
- Locate confined space permit and all other information about the space.

Secondary Assessment

The Confined Space

- Command should determine what type of confined space this is. This can be done by consulting with the site foreman.
- What type of products are stored in this space.
- What known hazards are present; mechanical, electrical, etc.
- Location and number of victims affected.
- Diagram of confined space, including entry and egress locations.
- Structural stability of the confined space.
- Hazardous material size-up.
- Obtain copy of permit.

On-Scene Personnel and Equipment

- Command should determine if there is an adequate number of trained personnel on scene to do the rescue/recovery
- Determine whether a Technical Rescue Team is needed. If needed, call York County first for availability, then Newport News, then Hampton.

Note: For any rescuer to perform rescue in a confined space they must have completed the Virginia Department of Fire Program Heavy and Tactical Rescue Standard 16-hour course.

- Assure adequate air supply, bottles, request a cascade truck, if needed.
- Assure sufficient rehab area is established.
- Assure visible Incident Command and/or Operations section is established.

Make the General Area Safe

- Establish a perimeter with tape and assign police to assure an access point. Assure that an access control officer is assigned.
- Ventilate the general area if needed.
- Ventilate the space with positive pressure from Electrical Fans Only. There may be times when positive pressure will not work as needed. Continually assess the effectiveness of your ventilation process by:
 - Atmospheric monitor readings
 - Assessment of type and configuration of the space

- If possible, open all additional openings into the space to assist with the ventilation process. Monitor the opens during the operation and report any evacuee's. i.e.:
 - Manholes
 - Hatches
 - Natural openings
 - Doorways and Windows
- Assure fire control measures if needed.
- Do not allow sources of ignition on site.

PHASE II: ENTRY PREPARATION

- Assure the following has been done:
 - All fixed mechanical devices and equipment capable of causing injury shall be placed in a zero mechanical state. (ZMS)
 - All electrical equipment (excluding lighting) shall be locked out in the open (off) position with a key-type padlock.
 - The key shall remain with the person who places his/her lock on the padlock.
 - In cases where lockout is not possible, equipment shall be properly tagged and physical security provided.
 - All locked-out utilities shall also be tagged.

- Post non-essential personnel at those areas tagged.
 - Assure that all personnel who enter the site are equipped with SCBA or SABA Units. If you must remove your standard SCBA to fit in the opening or move in the space, **DO NOT ENTER!!!**
 - If you enter with standard SCBA, go no more than 25 feet from the entrance. Entrance with standard SCBA should be limited to reconnaissance only, unless the victim is easily accessible.
- Assure one qualified backup team for every entry team.
- No one shall enter a confined space alone, always work in teams (two minimum).
- No team shall enter a space with pagers or other “non-intrinsically safe devices” unless approved prior to entry, based on atmospheric monitoring.
- Each entry team shall be equipped with the following items:
 - One member shall have a communications, worn with the SCBA or SABA Unit.
 - Explosion-proof lighting or explosion-proof light.
 - Atmospheric monitor, personal units preferred.
 - Proper protective gear as deemed necessary by the Incident Commander.
 - An entry/egress line shall accompany the first entry team and be anchored at their furthest point of penetration.
 - Some form of rapid extrication/retrieval harness for a victim.
 - If the entry team must enter a vertical shaft of greater than 8 feet, each member shall wear a personal harness and be attached to a fall-arresting system upon entering.

PHASE III: ATMOSPHERIC MONITORING

- Atmospheric monitoring shall occur prior to and during all entries into a confined space. It should be stressed that the lack of positive or alarm level readings does not eliminate the requirement for proper respiratory protection!
- Atmospheric monitoring should be accomplished at high and low areas of the space.
- All atmospheres shall be tested for:
 - Oxygen deficiency
 - Oxygen excess
 - Toxicity
 - Flammability
- The following levels shall be considered as immediately dangerous to life and health (IDLH) environments:
 - Oxygen Deficient < 19.5%
 - Oxygen Enriched > 23.0%
 - Flammability at 10% of Lower Flammable Limit (LFL).
 - Toxicity shall be any limit whose numerical value exceeds the Permissible Exposure Limit (PEL).
- Atmospheric monitoring shall occur during occupancy at intervals dependent on the possibility of changing conditions, but in no case less than hourly.
- In the event that, in the opinion of the incident commander designee, the atmospheric readings become unsafe to continue operations, all entry teams shall be removed from the space immediately until such time as the atmospheric conditions are corrected.

PHASE IV: ENTRY

- Once the best method and location for entry has been determined, teams shall begin entry and reconnaissance / rescue / recovery operations in the space.
- Entry decisions shall be made based on known locations of the victims, safety of the opening, atmospheric readings, and ease of recovery points.
- If possible, attempt a two-prong attack to reach the victim (s) if their location is known or suspected.
- Prior to entry, each team member shall have his or her time of entry logged. This function shall be assigned to one technician who shall keep the IC or Operations Officer apprised of the status of each team.
- Teams shall be limited to thirty (30) minutes in any space.
- Each team shall be assigned to rehab upon removal from the space until re-hydrated and vital signs are within normal limits.
- Once inside the space:
 - Assure adequate interior team communications.
 - Assure adequate communications with the operations exterior.
 - Mark if necessary with chalk or other method entry and movement patterns to assure egress.
 - Move towards the suspected victim location as a team.
 - Beware of elevation differences and unstable footing.

- Once the victim has been located, decide:
 - Is this a rescue or recovery?
 - If rescue, can a SCBA or SABA unit be placed on the victim?
 - Can the victim be easily moved towards the opening with current equipment carried by the team?
 - Is an additional team needed to make the move?
 - Communicate your decision to the outside command.

- Once the victim has been attached to a removal device and is in the process of being rescued/recovered. Assure that if the victim is to be moved through an opening either vertical or horizontal which presents team members the only way out, that the following guidelines are followed.
 - Whenever possible, assure that all team members are stationed to the egress side of the hole/opening in the event the victim becomes lodged.
 - Always try to avoid being blocked in by a victim.
 - If this is not possible, assure the following:
 - When the move is made, assure it is made quickly and smoothly, leaving the time the space is blocked for egress as minimal as possible.
 - Assure that the exterior personnel as well as interior teams are aware of the move and a plan is agreed upon prior to blocking the space.

- Assure that all air lines and connections are clear of the victim and his movement path to assure that no air line problems develop as a result of the entangled or pinching off the lines.

PHASE V: VICTIM REMOVAL

- Once the victim is set for removal, assure the following:
 - Assure as much c-spine control as is possible based on the space and the victim's condition.
 - Use removal systems on the exterior, which are applicable to the size and weight of the victim.
 - Mechanical advantage systems are much preferred over manual hauling.
 - Do not use electric winches, etc., to remove victims; these allow little control and could result in dismemberment or additional injury.
 - Decide if the victim is to be removed head first or feet first.
 - Avoid the use of wristlets on patients with burns to the extremities.
- Once the victim is clear from the space, remove all entry team personnel and equipment.

PHASE VI: SAFETY CONSIDERATIONS

- If rigging, hauling, or use of rope hardware is needed in the space, assure only aluminum carabineers and hardware are used to avoid sparks.

- In the event of an air line failure on a SCBA, the entire team shall IMMEDIATELY leave the space insuring that the rescuer with the problem is assisted.
 - Notify the exterior immediately of the problem and identify the line and the specific problem.
 - Never leave a partner in trouble unless you must clear the way for his exit.

PHASE VII: TERMINATION

- Double check personnel list and assure all personnel are accounted for.
- Inventory all equipment.
- Place any equipment damaged or potentially unfit for further confined space use out-of-service until repaired.
- Have contractor or responsible party seal entry points to assure no additional entry.
- Remove all Lockout Tag-out systems once the area has been cleared and deemed safe and/or replace it with the Contractor or Responsible Party system.