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**PHOENIX REGIONAL
STANDARD OPERATING PROCEDURES**

CONFINED SPACE RESCUE

M.P. 204.08

07/11-R

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SCOPE

This procedure establishes a standard structure and guideline for all fire department personnel operating at incidents involving confined space rescues. The procedure outlines responsibilities for first-responders, TRT units, Command Officers, and other fire department personnel responding to such incidents. All other Phoenix Fire Department procedures shall apply to confined space rescue operations where applicable.

PURPOSE

The purpose of this procedure is to establish guidelines for the response of fire department personnel and equipment to confined space rescue incidents. Because confined space rescue operations present a significant danger to fire department personnel, the safe and effective management of these operations require special considerations. This procedure identifies some of the critical issues which must be included in managing these incidents.

TACTICAL CONSIDERATIONS

OSHA Regulations Standard 29 CFR 1910.146 Permit-Required Confined Spaces regulates entry into confined spaces for general industry and the rescue service and shall be considered the basis for confined space rescue operations. For the purpose of emergency response, a confined space is defined as:

- A space large enough for personnel to physically enter.
- A space not designed for continuous employee occupancy.
- An area with limited entry and egress.

Confined spaces include caverns, tunnels, pipes, tanks, mine shafts, utility vaults, and any other location where ventilation and access are restricted by the configuration of the space. These factors may also apply to basements and attics. Confined space incidents may involve injured persons or persons asphyxiated or overcome by toxic substances. Pre-incident planning is an important factor in preparing to handle these types of incidents.

Due to the inherent dangers associated with these operations, the Phoenix Fire Department *Risk Management Profile* shall be applied to all confined space rescue operations and shall be continuously re-assessed throughout the incident. A phased approach to confined space rescue operations which include; Arrival, Pre-entry operations, Entry operations, and Termination, can be utilized to safely and effectively mitigate these high-risk / low-frequency events.

Additional technical information is available in the issued *Technical Rescue Field Operations Guide*.

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Phase I Arrival.

I. ESTABLISH COMMAND

- A. First arriving company officer shall assume *Command* and begin an immediate size-up of the situation while isolating the immediate hazard area and denying entry to all non-rescue personnel.
- B. First arriving TRT unit that is staffed with a TRT Company Officer should be assigned *Rescue Sector*. The TRT Company Officer assigned as Rescue Sector should remain with his crew. Rescue Sector responsibilities include:
- Assuming technical rescue operations control.
 - Identifying hazards and critical factors.
 - Developing a rescue plan and back-up plan.
 - Communicating with and directing TRT resources assigned to Rescue Sector.
 - Informing Command of conditions, actions, and needs during all phases of the rescue operation.
- C. Designate a *Safety Officer*. Considerations for Safety Officer include:
- One of the Regional Special Operations qualified Safety Officers.
 - A Special Operations qualified Battalion Chief and/or FIT.
 - Any experienced TRT Company Officer assigned to the incident.

A Safety Officer shall be established prior to the implementation of any rescue plan proposed by Rescue Sector.

- D. Following the transfer of Command to a Command Officer, a *Technical Advisor* should be assigned to join the Command Team at their location to assist in managing personnel and resources engaged in the technical aspects of the incident. The Technical Advisor is responsible for ensuring that the rescue plan developed by Rescue Sector and communicated to Command is a sound plan in terms of the safety and welfare of both victim(s) and rescuers. Considerations for the Technical Advisor include:
- A Special Operations qualified Battalion Chief and/or FIT.
 - One of the Regional Special Operations qualified Safety Officers.
 - Any experienced TRT Company Officer assigned to the incident.

The Technical Advisor position within the Command Team should be filled prior to the implementation of any rescue plan proposed by Rescue Sector.

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II. Size-Up

- A. Secure a witness or responsible party to assist in gathering information to determine exactly what happened. If no witnesses are present, Command may have to look for clues on the scene to determine what happened.
- B. Assess the immediate and potential hazards to the rescuers.
- C. Isolate immediate hazard area, secure the scene, and deny entry for all non-rescue personnel.
- D. Establish communications with victim(s) and determine if non-entry retrieval can be made.
- E. Assess on-scene capabilities and determine the need for additional resources.

III. SECONDARY ASSESSMENT

- A. Secure the entry permit and any other information about the confined space including diagrams showing entry and egress locations.
- B. Determine what products may be stored in the confined space and conduct a HazMat assessment.
- C. Determine known hazards present in the confined space; atmospheric, mechanical, electrical, etc.
- D. Assess the structural stability of the confined space.

Phase II Pre-entry Operations

It must be determined if this will be a RESCUE operation or a RECOVERY operation based on the survivability profile of the victim(s) which include factors such as the location and condition of the victim(s), and elapsed time since the accident occurred.

Pre-entry operations shall be conducted under the direction of Rescue Sector by trained Technical Rescue Technicians.

I. INITIATE FIRE DEPARTMENT CONFINED SPACE RESCUE PERMIT

- A. A confined space permit is required if the space has one or more of the following hazards:

Atmospheric hazards
Engulfment Hazard

Configuration hazard
Any other recognized hazard

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II. MAKE THE GENERAL AREA SAFE

- A. Establish a perimeter determined by factors such as atmospheric conditions, wind direction, structural stability, etc.
- B. Consider establishing Lobby to control rescue personnel entering the hazard zone.
- B. Stop all unnecessary traffic and park all running vehicles downwind.
- C. Provide for ventilation to general area if necessary.

III. MAKE THE RESCUE AREA SAFE

A. Hazard Assessment / Atmospheric Monitoring

- Determine exactly what hazards and products are present and conduct atmospheric testing for oxygen level, flammability, and toxicity within the confined space. The hazards identified and the results of atmospheric testing will determine the proper level of PPE to be worn by rescuers.
- Atmospheric monitoring shall be done continuously and readings shall be communicated to Rescue Sector at least every 5 minutes. Readings must be obtained by personnel with a thorough knowledge of atmospheric monitoring. This function shall be assigned to a Hazardous Materials response unit.
- Implement Lock-Out / Tag-Out procedure if applicable.
- Take appropriate measures to ensure the structural stability of the confined space.
- Any product that is in or flowing into the confined space must be secured and blanked off if possible.

B. Ventilation

- Rescue Sector should assign personnel to establish the proper type of mechanical ventilation of the confined space considering the effects that positive and/or negative pressure ventilation will have on the atmosphere.
- Consider positive and negative ventilation together in a push-pull configuration to obtain the greatest effect from ventilation. Consider negative pressure ventilation if there is only one entry point.
- Ventilation personnel shall work closely with air monitoring personnel to ensure safe atmospheric conditions in the confined space as well as the exhaust area and the general working area.

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C. Equipment

- Personal Protective Equipment (PPE) shall include helmet, gloves, proper footwear, goggles, turnouts / Nomex or PBI jumpsuit, and a class III harness at a minimum. Additional PPE may be indicated by the hazard and atmospheric assessment.
- Supplied Air Breathing Apparatus (SABA) or Self-Contained Breathing Apparatus (SCBA) shall be utilized by all entry and back-up personnel. SABA is the breathing apparatus of choice however, if SCBA must be used, personnel shall maintain line of sight and exit the confined space prior to low air alarm activation, following the 75%-25% rule.
- Air monitoring device that monitors oxygen levels, flammability, and toxicity for the entry team.
- Intrinsically safe communication equipment shall be available for entry personnel. If this equipment is not available, entry personnel may use a tag-line for communication or a message relay person.
- Intrinsically safe lighting equipment shall be available for entry personnel. If this equipment is not available, entry personnel may use cyalume type lighting sticks.
- A retrieval system with a back-up system shall be readied and in place. This may include a vertical or horizontal haul system constructed of ropes, pulleys, and other hardware, with a minimum of a 2:1 mechanical advantage.

Phase III Entry Operations

Entry operations shall be conducted under the direction of Rescue Sector by trained Technical Rescue Technicians.

I. MAKE A SAFE ENTRY

Rescue Sector shall be responsible for entry operations. The rescue plan will be discussed by Rescue Sector, Safety, Command and the Technical Advisor. Rescue Sector shall ensure that all personnel operating in the confined space and the area immediately surrounding the confined space are accounted for and wearing appropriate PPE.

- A. Conduct a system safety check prior to entry into the confined space.**

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- B. Prior to entry, Rescue Sector shall ensure that an entry team and a back-up team are in place and have been briefed on:
- Anticipated hazards within the confined space.
 - The space being entered including the configuration (if known).
 - The rescue plan.
 - The back-up plan.
 - Emergency procedures.
 - Time limits for the rescue operation.
- C. Consider the use of rescuer tag-lines with the understanding that tag-lines may create an entanglement hazard.
- D. Maintain constant communication with the entry team.
- E. Entry personnel shall continually monitor atmospheric conditions inside the confined space in regards to oxygen level, flammability, and toxicity.
- F. Locate victim(s).

II. VICTIM REMOVAL

- A. Upon reaching victim, conduct a primary survey and initiate C-spine precautions.
NOTE: due to the configuration of the confined space, optimum C-spine precautions may not be possible and should be addressed as soon as possible.
- B. When possible, provide respiratory protection for the victim(s). Rescuers shall not administer pure oxygen to a victim(s) in a confined space that has a potentially flammable atmosphere and rescuers shall not remove their breathing apparatus and give it to the victim(s).
- C. Conduct a secondary survey of the victim(s) looking for immediate life threatening injuries. If conditions permit, entry personnel should attempt to treat serious injuries prior to removal, while considering that it may be more appropriate to remove the victim(s) from danger prior to treatment.
- D. Properly package the patient for removal from the confined space. This may include using a backboard, stokes basket, KED board, LSP halfback, or similar device designed for extrication. Secure any loose webbing buckles, straps, or device that may hinder the extrication process.

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- E. Rescuers should not allow the victim between the rescuer and the point of egress except in situations where it is necessary for one rescuer to pull the victim while another rescuer pushes the victim.

III. TREATMENT

- A. Immediately upon egress, the victim(s) shall be transferred to treatment personnel for ALS level examination.
- B. If the victim has been contaminated from product inside the confined space, a thorough decontamination of the victim should be conducted prior to transporting to the hospital.
- C. Provide ALS level treatment and transportation to a hospital as indicated.

Phase IV Termination

- A. Ensure personnel accountability.
- B. Remove all tools and equipment used in the rescue/recovery and return to proper apparatus. In cases of a fatality, consider leaving everything in place until the investigative process has been completed.
- C. If entry personnel and/or equipment have been contaminated, proper decontamination procedures shall be followed prior to returning to service.
- D. Consider a Post Incident Critique (may be more appropriate at a later date).
- E. Return to service after turning the scene over to the responsible party and ensuring the scene is secure.

ADDITIONAL CONSIDERATIONS

I. COMMAND STRUCTURE

- A. The first arriving unit shall assume *Command* of the incident. This unit shall remain in Command until Command is transferred to improve the quality of the Command organization. A Command Team shall be assembled to include, at a minimum, a Chief Officer and a Technical Advisor.
- B. Considerations for the *Technical Advisor* include:
- A Special Operations qualified Battalion Chief and/or FIT.
 - One of the Regional Special Operations qualified Safety Officers.
 - Any experienced TRT Company Officer assigned to the incident.

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- C. The first arriving TRT unit that is staffed with a TRT Company Officer should be assigned *Rescue Sector*. Rescue teams, Lobby, Ventilation, Air monitoring, Shoring, Cut teams, and any other such functional team operating in the hazard zone shall be under the direction of Rescue Sector. Rescue Sector will communicate directly with TRT units assigned to these functions within Rescue Sector and shall keep Command informed during all phases of the rescue operation.
- D. Air monitoring within Rescue Sector shall be assigned to a Hazardous Materials response unit.
- E. Considerations for Safety Officer include:
- One of the Regional Special Operations qualified Safety Officers.
 - A Special Operations qualified Battalion Chief and/or FIT.
 - Any experienced TRT Company Officer assigned to the incident.
- F. Treatment Sector should be assigned to any ALS company assigned to the incident.

II. OTHER CONSIDERATIONS

- A. Consider the effects of inclement weather on the hazard profile, the victim(s), and the rescuers.
- B. Maintain awareness of the time of day and ensure sufficient lighting is available on the scene if operations extend into the night.
- C. Confined Space rescue incidents attract the news media; consider assigning a P.I.O.
- D. Request OSHA response if there has been a serious injury or death.