

ABC's of Establishing and Evaluating A Great Confined Space Rescue Team

**Marianne Thomas, CSP, CPEA, REA, MBA
Safety Manager
Paramount Petroleum Corporation
Paramount, CA**

Introduction

It is estimated by the Occupational Safety and Health Administration (OSHA) that 238,000 establishments had permit-required confined spaces. These establishments employed approximately 1.6 million workers, including contractors, who entered 4.8 million permit-required confined spaces annually. OSHA further estimates that 63 fatalities and 13,000 lost workdays and non-lost workday cases involving permit-required confined space entries occurred annually. In addition, 480 workers died on the job in a ten-year period related to permit-required confined space work, and 60% of those killed were would-be rescuers.

A fully equipped and trained confined space rescue team (CSRT) is now far improved and assists in reducing fatalities. Confined space rescue is outlined and reviewed by OSHA 1910.146 and National Institute of Occupational Safety and Health (NIOSH) and considered a potentially hazardous operation if not handled correctly. ANSI Z117.1-2009 has released a new standard on confined spaces that significantly changes confined space policies and procedures. Implementation of the new 2009 edition of the ANSI 117.1-2009, *Confined Spaces Standard*, recommends all employers that have employees working in confined spaces to immediately comply with the new standard to reduce the risk of injury to employees and reduce legal liability of the company and responsible employees.

Key Elements of Confined Space Rescue

When permit-required confined space entry is required on your site, a trained and equipped CSRT must be provided. The rescue-and-emergency team is to provide onsite service that can be summoned in the event of an emergency occurring within a confined space. Federal OSHA requires that an emergency rescue team is provided on site or has the capability to be summoned to perform and respond to the emergency in no more than 10 to 15 minutes. CSRT shall be established by the employer or arranged for an outside CSRT, which will respond promptly to a request for rescue service.

The CSRT must be in communication with confined space entrant(s) and attendant so that they can respond should an emergency occur. The CSRT is to have required equipment, such as personal protective equipment (PPE), atmospheric monitoring and testing equipment, communication equipment, alarm systems, and rescue equipment to meet compliance. It is essential to verify that pre-rescue plan check sheets are established, used, and filled out by the CSRT prior to permit-required confined space work to start.

The CSRT is made up of a combination of individuals trained, equipped, and available to respond to permit-required confined space emergencies. The CSRT must be competent and capable of identifying existing and predictable hazards in the working conditions that could pose hazardous or dangerous situations to employees and must be authorized to take prompt action if and when an emergency occurs. The CSRT is to be familiar with the permit system, understand the hazards associated with the confined space entry they are overseeing, and have completed a pre-confined space entry plan that was reviewed by the rescue team leader prior to allowing work to proceed.

Confined Space Identification, Evaluation, Classification, and Risk Assessment

Each employer is required to evaluate and classify any confined spaces on site. The following elements of a confined space should be used to evaluate: it has limited or restricted means of entry or exit; it is large enough to enter and perform assigned work; and it is not designed for continuous occupancy by the employee. In addition to confined space, permit-required confined space has additional requirements: it contains or has the potential to contain a hazardous atmosphere; it contains materials that have the potential for engulfing an entrant; it has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section; and it contains any other recognized serious safety or health hazards.

What is not known or identified, and cannot be seen, smelled or tasted, can hurt all entrants. The best safety strategy for confined space work activities is to develop a working knowledge of portable gas detectors and their essential accessories: a bump test/calibration kit, a docking or recharging station, and a confined space communication device. Monitoring the confined space atmosphere will assure safety in the unknown zone of confined spaces.

It is the employer's responsibility to identify all the confined spaces and inform affected employees. This includes having a written confined space program set up and entry permit system prepared. All individuals with active roles in confined spaces (i.e., entrants, attendants, entry supervision, and rescue and emergency personnel) are required to be trained.

Any facility with permit-required confined spaces must meet classification standards and list them by category; common facilities are mines, tunnels, and refining. If the facility is required to perform work within a permit-required confined space, then a CSRT must be established before work can begin. The required number of the team must be considered. The mining industry requires a five (5) person rescue team or 1 rescuer for 10 workers. Other types of facilities such as refineries require three (3) CSRT members as a minimum for permit-required confined space rescue. It is important to calculate what will work for the facility and if the

facility has enough personnel to support an active CSRT. In addition to the primary CSRT, it will be necessary to maintain a backup team to cover for vacations and illness.

Considerations to review, such as asbestos entry, inert entry, high-angle and low-angle practices, response time, retrieval systems for in-house and for outside rescue service must be planned thoroughly. Evaluation of rescue and emergency services is necessary to provide accurate information to decide whether onsite CSRT is best for the company. Take a close look at accessibility: Can additional service be obtained when needed? How can it be summoned in a reasonably timely manner? Will the emergency equipment be easily available to support their activities? Establishing an emergency response vehicle, stocked with all the necessary emergency response gear and ready to respond in an emergency, is a plus. This is definitely a proactive approach in addressing confined space activities; having everything ready for action and staging at the site is a best practice approach.

Confined Space Rescue Requirements

There are three basic types of confined space rescue: self rescue, non-entry rescue and entry rescue. We will be dealing with permit-required confined space entry rescue. Each confined space has unique characteristics; therefore, a risk analysis must be used to determine potential exposure, best practices, and the most effective program for safe rescue support during permit-required confined space entry. The frequency of permit-required confined space entry is important in considering the need for in-house or outside rescue services.

Determining how often a CSRT is needed can be a major factor; infrequent need may indicate outside rescue service is best. Is the team needed on site at all times or can it be planned ahead of time? What is the best approach in meeting the requirements of individual companies? Considering an outside contractor that performs confined space rescue requires a clear breakdown as to the contractor's skill level, availability and capabilities. The facility must review the contractor's qualifications in advance to assist in evaluation and decision making whether or not to use an outside rescue service at the facility or as backup support.

If the facility arranges to use an outside rescue service, they must inform the rescue service of the hazards they may confront while performing confined space rescues on site. The company hiring the outside confined space rescue service must provide the confined space rescue service with access to all permit-required confined spaces so that they can develop appropriate rescue plans and practices needed for rescue operations.

Rescue planning is critical; an unplanned rescue could be the attendants' last one if it is not thoroughly planned. Therefore it is required that an emergency response plan be prepared prior to anyone entering a confined space. A plan shall be written and established by the CSRT to address the response, to identify potential emergencies, and to provide for timely evacuation, retrieval, or rescue of entrants in a permit-required confined space. The plan must include: the known hazards identified; tools, lighting, communications and atmospheric monitoring and test equipment that will be used in hazardous or classified locations; limited room and access or configuration; personal protective equipment (PPE); ground fault circuit interrupters (GFCI); permits; and retrieval equipment.

Confined Space Rescue Categories

Determining the need to have onsite CSRT or contracted out rescue service is evaluated by the amount of confined spaces on site, and the amount of required entries experienced during normal work activities. If this is a common and routine need, then an onsite CSRT should be considered. The next step is determining which, or if all, levels of rescue teams are needed. Many times having a low-angle rescue team in-house and contracting out the more advanced, high-angle, asbestos rescue team, and inert rescue teams, may be a better plan. The following are the basic breakdown of the CSRT levels:

Asbestos High-Risk Rescue:

- Asbestos high-risk rescue team is required to have asbestos clearance training, as well as all permit-required confined space training. Recommended asbestos training consists of Asbestos Hazard Emergency Response Act (AHERA) knowledge and asbestos contractor supervisor training. Asbestos training is required whether the rescue team performs low-angle or high-angle rescue.
- These contractors are very highly qualified and must be planned for well in advance. They are very vital during asbestos abatement that is performed and required in permit-required confined spaces.

Inert High-Risk Rescue

- Inert- or nitrogen-purged (oxygen-deficient or oxygen-eliminated atmosphere), permit-required confined space rescue is one of the highest risks of any permit-required confined space entry tasks. This is considered immediately dangerous to life and health (IDLH). IDLH is any condition that would pose an immediate or delayed threat to life, cause irreversible adverse health effects, or interfere with an individual's ability to escape unaided from a hazardous environment. The common reason for an inert atmosphere is catalyst change-out operations, generally at refineries.
- The CSRT must have specialized training with backup-supplied breathing air hookups to avert any potential for failure. The CSRT must have the same equipment the entrants will be using and receive equal training.
- Communication enhancements shall be provided; these include radio, visual, internal camera surveillance, and voice contact.
- Trained backup CSRT is to be readily available, which is considered stand-by support.

High-Angle Rescue

- High-angle rescue is considered any rescue that requires an over 45-degree vertical rescue, such as rappelling, ascending or descending outside a structure, such as a tower, tall heater, inside stairwells, and so on.
- The load is predominantly supported by the rope rescue system.

- Rope manipulation and access training is required.
- Knowledge of applicable knots (fastening made by tying together lengths of rope in a prescribed way) used in the operation and routine rope and knot practice is required.
- Restricted, obstructed, or difficult interior configuration and access is involved. This includes complicated entries, such as tower trays, multi-levels, or scaffolding inside vessels.

Low-Angle Rescue

- Low-angle rescue refers to an environment in which the load is predominantly supported by itself and not the rope rescue system. Any horizontal rescue is considered, such as simple tank entries that do not require rappelling, but not merely entry into the vessel with unobstructed direct limited access, flat land or a mild, sloping surface.

Rescue Team Leader

- The rescue team leader is the designated person within the CSRT that is responsible for direct supervision of the CSRT operations. This person will evaluate, and direct the operation.
- The rescue team leader oversees and reviews the confined space rescue plan prior to permit-required confined space work to start.

Confined Space Rescue Personnel Selection

If the facility has determined an in-house CSRT is needed, careful evaluation should be considered in the selection of the personnel. Work in confined spaces may involve a variety of stressors, which must be evaluated by a physician or licensed health care professional (HCP). The physical and psychological suitability of persons to adequately perform CSRT activities must be carefully considered. Each CSRT member must have a full physical by a physician or HCP. The company must set up a general protocol of guidelines with a designated physician or HCP so they are clear on the requirements expected. Meet with the physician or HCP and agree to what needs to be covered. Verify that the job description is clear and will assist in the physical evaluation of the person. These physicals must be repeated every two years or, if a CSRT member has any physical changes that could pose a potential issue, re-examination is recommended right away.

Several items must be considered during the physical examination, including but not limited to the following: thermal extremes (hot or cold); vertigo; claustrophobia; physical and psychological stressors associated with specific confined space environment; and physical ability, as well as heart condition testing by completing an EKG. The physician's report is to be sent back to the employer, which will make the final decision regarding medical suitability of the employee, considering the recommendations and observations.

Confined Space Rescue and Emergency Response Training

If it is evaluated and determined to move ahead with the need to create a CSRT for the facility site, training will be a key element. Training for rescue team members shall be equivalent to the

requirements of 30 CFR Part 49.8, except initial training shall consist of at least 24 hours, and the 16-hour refresher training shall be given annually and shall include wearing and use of self-contained breathing apparatus (SCBA). Training and PPE familiarization of the equipment includes:

- Practice in donning and using SCBA and airline breathing apparatus (i.e., hose line from an outside source).
- Assigned rescue duties and authorized entrant training.
- Proper use of atmospheric monitoring and test equipment.
- Knowledge of ropes and knots, anchoring, care, handling, storage and inspection of all equipment will be reviewed.
- All equipment that is used and provided shall be maintained in accordance with the manufacturers' instruction.
- Proper use, acquisition, and selection of PPE and rescue equipment necessary for making rescues from permit-required confined spaces shall be reviewed. This includes process analysis techniques needed to support the CSRT.
- Basic first aid and cardiopulmonary resuscitation (CPR) training (at least one member of the CSRT holding current certification in first aid and in CPR shall be available at all times). Recommended best practice is to have all members trained in CPR and first aid.
- Making permit-required, confined space rescues at least once every 12 months, by means of simulated rescue operations in which the CSRT removes dummies, mannequins or actual persons from the existing permit spaces or from representative permit spaces. Representative spaces shall, with respect to opening size, configuration and accessibility, simulate the types of permit spaces from which rescues are to be performed.
- Each person shall be trained in inspection, use, and limitations of the rescue devices, and routine equipment before being permitted to enter a confined space.
- Every quarter the CSRT participates in refresher training or drills. These exercises are to be provided and documented for all CSRT members. The training records are to be kept on file.

Regardless of who provides the rescue team, only qualified employees or authorized contractors can perform emergency rescue activities.

Confined Space Rescue Equipment

Retrieval equipment or methods shall be appropriate and shall be used whenever a person enters a permit-required confined space. If the retrieval equipment increase the overall risks of entry or does not contribute to the rescue, it shall not be used. All rescue equipment shall be inspected, by a qualified person, periodically and prior to use, to ensure that it is operable. All rescue devices

shall be inspected, tested and maintained in accordance with the manufacturer's requirements. Particular attention shall be given to insure the established service life is not exceeded.

Confined Space Rescue Economy

Because the cost of putting a program together for a company can be quite costly, it is essential to analyze the company's needs completely. Create a checklist and obtain some bids from outside companies. This will assist in selecting an effective process in creating an in-house CSRT or clear evaluation of using outside rescue services. It is important to determine which option is better for the facility, addressing cost factors, available personnel, and creating an effective and practical operation.

In-house CSRT may not be the best approach for your facility. If, after careful evaluation, it is decided to use outside rescue services, special considerations must be evaluated. Evaluating outside CSRT contractors that will enhance the program is critical. Conduct an audit of the prospective contractor CSRT you are selecting to determine whether they have all key elements to follow for an effective process that meets regulations. The facility must have a required written procedure for permit-required, confined space system, including CSRT requirements. Review CSRT contracting company's procedures and policies. Verify that a pre-rescue plan sheet is established with the contractor and their permit-required confined space rescue procedures are in place. Review their guidelines in selection, checklists, training, implementation and practical application. When all parties are clear on what is expected, and each has clear procedures concerning permit-required confined space entry, the skills of the outside rescue services will match and meet the company's needs. This will enhance both programs and build a strong relationship to work together as a team.

Maintaining an Effective Confined Space Rescue Team

Whether the company determines that an in-house CSRT is needed, outside contractors are to be used, or the use of both in-house and outside as a combination is more effective, maintaining an effective CSRT is a challenge. Be prepared to make necessary changes as the need arises. Stay up on changing regulations. Keep up training and exercise drills. Having an effective program is needed to protect all employees from the hazards of entry into work within, and escape from, permit-required, confined spaces in general industry. Failure to establish and follow proven written and safe work procedures, inadequate preparation, failure to inspect and maintain equipment, or provide proper training and drills is a formula for disaster.

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