

2006-04

Fatalities in Oxygen-Deficient Atmospheres

November 2006

Events

Site/Facility: Valero Energy Corporation, Delaware City, Delaware
3V Inc., Georgetown, South Carolina

Reference: CH2MHILL Hanford Group Just-in-Time Report No. 06-024

On November 5, 2005, two workers died due to nitrogen asphyxiation at the Valero Energy Corporation, Delaware City, Delaware. One person entered an oxygen deficient space (a refinery reactor) to retrieve a roll of tape and collapsed. His coworker died while attempting to rescue him. **Note: the full case report and a video recreating this event are available on the U.S. Chemical Safety and Hazard Investigation Board (CSB) web site.**



Access to the Valero reactor

On November 4, 2006, a worker died and another was injured inside an oxygen-deficient confined space (a dryer) at 3V Inc., a chemical manufacturer in Georgetown, South Carolina, northeast of Charleston. The CSB has initiated an accident investigation.

Reference: U.S. Chemical Safety Board (www.csb.gov)

<p>Important Points:</p>	<ul style="list-style-type: none"> • The agreed-upon scope of work at the Valero facility was for “set-up” only. • An oxygen-deficient atmosphere rapidly overcomes the victim without warning. • An oxygen-deficient atmosphere could exist outside a confined space opening. • The powerful human instinct to help someone in distress, especially a friend or co-worker, which all too frequently results in multiple confined-space incident victims. Rescuers must strictly follow safe rescue procedures.
<p>Contributors:</p>	<ul style="list-style-type: none"> • The nitrogen purge status was marked “N/A” on the Valero work permit even though the reactor continued to be purged with nitrogen. • Although the Valero workers had been trained on the hazards associated with confined spaces and oxygen-deficient atmospheres, the training did not address the possibility that an oxygen-deficient atmosphere might be present outside the confined space near the access opening.

Important Considerations for Confined Spaces (Lessons Learned)

Managers or Supervisors:

- Have the facilities under your control been evaluated for the presence of confined spaces?
- Are all permit-required confined spaces posted in accordance with site confined space procedures?
- Are your employees aware of the requirements associated with entry into confined spaces?

- Do you ensure that pre-job planning and walkdowns with the work team emphasize confined-space entry restrictions, especially when unsecured confined space access points are in the work area?

Training: Does training on confined spaces include the following?

- Oxygen-deficient atmospheres in confined spaces can be deadly in only a few breaths.
- Entering oxygen-deficient atmospheres should never be attempted under any circumstances without training and proper air-supplied breathing equipment.
- Pre-job planning and walkdowns with the entire work team should emphasize confined-space entry restrictions, especially when unsecured confined-space access points are in the work area.
- Confined-space hazard warnings must be maintained at all times while the access opening is not secured.
- Pre-job walkdowns should accurately identify all equipment where inert gas purging may be venting into the work area.
- An oxygen-deficient atmosphere could exist outside the confined space near the access opening
- Barriers and warnings should be maintained around open purge vents at all times during purging activities.

Workers

- Are you aware of the confined spaces in your work area?
- Do you have the training necessary to safely work in confined spaces?