



U. S. Chemical Safety and Hazard Investigation Board RECOMMENDATIONS STATUS CHANGE SUMMARY

Report:	Valero Refinery Asphyxiation Incident
Recommendation Number:	2006-2-I-DE-R6
Date Issued:	November 2, 2006
Recipient:	American Petroleum Institute (API)
New Status:	Closed – Acceptable Action
Date of Status Change:	September 25, 2017

Recommendation Text:

Revise Guidelines for Safe Work in Inert Confined Spaces in the Petroleum and Petrochemical Industries (API, 2005) to clearly address the following:

- *An oxygen-deficient atmosphere rapidly overcomes the victim.*
- *There is no warning before being overcome.*
- *An oxygen-deficient atmosphere might exist outside a confined space opening.*
- *Rescuers must strictly follow safe rescue procedures.*

Board Status Change Decision:

A. Rationale for Recommendation

On November 5, 2005, two contractors were overcome and killed by nitrogen gas which displaced the oxygen while they were working near a hydrocracker unit reactor at the Valero Energy Corporation (Valero) refinery in Delaware City, Delaware. The workers were assigned to install a pipe assembly connected to a reactor that was purged with nitrogen. As one of the contractors was preparing the area for work, he tried to retrieve a roll of duct tape that had fallen inside the reactor and was overcome by the oxygen-deficient atmosphere. His co-worker went in after him and also succumbed to oxygen deprivation.

As a part of the investigation, the United States Chemical Safety and Hazard Investigation Board (CSB) reviewed applicable industry standards and guidelines that applied to this incident. The American Petroleum Institute (API) publishes Standard No. 2217A, *Guidelines for Safe Work in Inert Confined Spaces in the Petroleum and Petrochemical Industries*. The CSB reviewed the third edition (2005), which was in effect at the time of the incident, and concluded that it did not adequately address four critical elements with respect to inert gas purged confined spaces:

- An oxygen-deficient atmosphere rapidly overcomes the victim
- There is no warning before being overcome
- An oxygen-deficient atmosphere might exist outside a confined space opening.
- Rescuers must strictly follow safe rescue procedures

Consequently, the Board issued a recommendation to API to address these concerns in the next revision of standard 2217A.

B. Response to the Recommendation

In August of 2017, API advised the CSB that the fifth edition of API Recommended Practice (RP) 2217A, *Safe Work in Inert Confined Spaces in the Petroleum and Petrochemical Industries*, was issued in July 2017 and that it was extensively revised to address the CSB recommendation. Namely:

- Oxygen-deficient atmospheres are addressed in Section 1.2, Special Circumstances; Section 3, Definitions; Section 7.1, Control of Work; and Annex A, Hazard Scenarios
- Lack of warning properties are addressed in the Foreword; Section 1.2, Special Circumstances; and Section 7.1, Control of Work
- Oxygen-deficient atmospheres existing outside of confined spaces are addressed in Section 3, Definitions; and Section 7.1, Control of Work
- Safe rescue procedures are addressed in Section 1.2, Special Circumstances and Section 4.3.6, Rescuers

C. Board Analysis and Decision

As the fifth edition of API RP 2217A addresses all the elements listed in the recommendation, the Board voted to change the status of CSB Recommendation No. 2006-2-I-DE-R6 to: “**Closed – Acceptable Action.**”