



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

Report:	Motiva Enterprises Sulfuric Acid Tank Explosion
Recommendation Number(s):	2001-05-I-DE-R8
Date Issued:	August 28, 2002
Recipient:	Motiva Enterprises, LLC
New Status:	R8: Closed – Acceptable Action
Date of Status Change:	March 31, 2015

Recommendation Text(s):

In light of the findings of this report, conduct periodic audits of storage tank mechanical integrity and design, Unsafe Condition Reports, hot work, management of change, and accountability systems at Motiva oil refineries. Ensure that the audit recommendations are tracked and implemented. Share the findings with the workforce.

Board Status Change Decision:

A. Rationale for Recommendation

On July 17, 2001, an explosion occurred at the Motiva Enterprises refinery in Delaware City, Delaware. A work crew had been repairing a catwalk above a sulfuric acid storage tank farm when a spark from their hot work tool ignited flammable vapors that were released from a corroded tank. One worker was killed and eight others were injured, and the tank released 264,000 gallons of spent sulfuric acid which quickly overcame secondary containment. Environmental damage was significant; approximately 99,000 gallons of acid reached the Delaware River, killing fish and other aquatic life. After discovering significant corrosion in the tank shell and holes in its roof, CSB investigators concluded that Motiva had not properly maintained the tank to prevent the release of flammable vapors.

Motiva used the tanks to store spent sulfuric acid, which contains small amounts of hydrocarbons that float in the head space of the tanks, creating a fire/explosion hazard if not managed properly. Motiva controlled this hazard on its tanks by inerting with carbon dioxide through a hard pipe, controlled with a pressure regulator valve and two local pressure gauges, a conservation vent, and a flame arrestor. The incident tank, though, had carbon dioxide supplied from a flexible rubber hose, which resulted in only a fraction of the inert gas needed to prevent a flammable atmosphere in the tank.

The CSB noted the following shortcomings in Motiva's storage tank, safety management and accountability programs as a result of this incident:

- Motiva failed to follow-up on recommendations made by its tank inspectors to do an internal inspection of Tank 393;
- Motiva did not shorten tank inspection intervals based on the corrosive nature of the material being stored;
- Motiva investigated *Unsafe Condition Reports*, but noted deficiencies were not corrected
- Motiva did not use its Management of Change (MOC) system for the conversion of Tank 393 from fresh to spent acid service;

- Motiva allowed hot work to be conducted above and around tanks that held flammable vapors and had known holes;
- Motiva's management oversight system failed to detect and hold Motiva refinery management accountable for deficiencies in the refinery's mechanical integrity, engineering management, and MOC systems.

As a result of these findings, the CSB issued a recommendation to conduct periodic audits of the storage tank, safety management and accountability programs at all Motiva oil refineries.

B. Response to the Recommendation

In its responses to the CSB, Motiva provided sufficient documentation, such as audit protocols, audit reports, and verification of audit finding corrective actions to show that it was conducting periodic audits at all its U.S. refineries pertaining to all the items listed in CSB Recommendation No. 2001-05-I-DE-R8.

C. Board Analysis and Decision

Based on the information supplied by Motiva, the Board voted to change the status of CSB Recommendation No. 2001-05-I-DE-R8 to: "**Closed – Acceptable Action.**"