



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

Report:	Williams Olefins Plant Explosion and Fire
Recommendation Number:	2013-3-I-LA-R5
Date Issued:	October 19, 2016
Recipient:	American Petroleum Institute (API)
New Status:	Closed – Acceptable Alternative Action
Date of Status Change:	November 18, 2024

Recommendation Text:

To help prevent future major incidents such as pressure vessel rupture from ineffective or failed administrative controls, clarify API Standard 521, Pressure-relieving and Depressuring Systems, to require a pressure relief device for overpressure scenarios where internal vessel pressure can exceed what is allowed by the design code. Although some portions of API Standard 521 already require a pressure relief device for these scenarios, other areas, such as Section 4.4.12 Hydraulic Expansion, are not as protective. Section 4.4.12 Hydraulic Expansion (the failure mode that caused the Williams overpressure incident) permits omitting a pressure relief device and allows the exclusive use of administrative controls.

Board Status Change Decision:

A. Rationale for Recommendation

On June 13, 2013, a fire and explosion occurred at the Williams Olefins, Inc. (Williams), Plant located in Geismar, Louisiana, when a reboiler, which supplied heat to a propylene fractionator column, ruptured due to an over pressurization event while it was isolated from its pressure relief device. Two Williams employees were killed and 167 employees were injured. The 167 injured employees consisted of three Williams employees and 164 contractor employees.

As a part of its investigation, the U.S. Chemical Safety and Hazard Investigation Board (CSB) examined the plant's process safety management program as well as the plant's process safety culture. The CSB found significant weaknesses in the Williams process safety culture that were demonstrated by a series of deficiencies in implementing the plant's process safety management programs as well as weaknesses in the written programs themselves. These deficiencies included: (1) poorly conducted Management of Change and Pre-Startup Safety Reviews; (2) ineffective safeguard selections, insufficient safeguard evaluation requirements, and poor implementation of action items in Process Hazard Analyses; (3) inadequate focus on development and maintenance of operating procedures; and (4) uncontrolled field equipment manipulations without a hazards assessment prior to the development of a procedure. The CSB also noted areas of improvement for industry guidance related to pressure-relieving and depressing systems.

Consequently, the CSB Board issued two recommendations to the API to revise its standards pertaining to pressure-relieving and depressuring systems (CSB Recommendation Nos. 2013-3-I-LA-R4 and 2013-3-I-LA-R5). This status change summary addresses CSB Recommendation No. 2013-3-I-LA-R5.

B. Response to the Recommendation

The API published the 7th Edition of API 521, *Pressure-relieving and Depressuring Systems* (API 521). Sections 4.2.1 and 4.4.12.1 of API 521 caution against relying solely on administrative controls to address overpressure hazards especially where the risk of failure of the administrative control is unacceptable. Section 4.4.12.1 also brings attention to the fact that block valves have the potential to leak and cautions that this may lead to hydraulic expansion and overpressurization of isolated heat exchangers such as occurred at Williams.

While the update to API 521 does not create a requirement for pressure relief devices when hydraulic expansion can lead to an overpressure event it does address the recommendation. The API's actions have accomplished the objective of the recommendation by cautioning against reliance on administrative controls to control over pressure events both in general and specific to hydraulic expansion. They have also given warning to the specific set of circumstances which may have caused the Williams incident.

C. Board Analysis and Decision

Based upon the information above, the Board voted to change the status of CSB Recommendation No. 2013-3-I-LA-R5 to: "Closed – Acceptable Alternative Action."