



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

Report:	Caribbean Petroleum Refining Tank Explosion and Fire
Recommendation Number:	2010-02-I-PR-R8
Date Issued:	October 21, 2015
Recipient:	American Petroleum Institute (API)
New Status:	Closed – Acceptable Action
Date of Status Change:	July 28, 2021

Recommendation Text:

Develop detailed guidance on conducting a risk assessment for onsite and offsite impacts of a potential tank overflow during transfer operations involving one and multiple tanks and for determining the Safety Integrity Level¹ of the required overflow prevention safeguard to replace Annex E of ANSI/API 2350, Overflow Protection for Storage Tanks in Petroleum Facilities (2012).

Board Status Change Decision:

A. Rationale for Recommendation

On October 23, 2009, explosions and fire occurred at the Caribbean Petroleum Corporation (CAPECO) facility in Bayamon, Puerto Rico. While offloading the contents of the tanker ship, *Cape Bruny*, into the CAPECO onshore tank farm, an estimated 200,000 gallons of gasoline overflowed from an aboveground storage tank into a secondary containment dike that had an open drain.

During the overflow some of the gasoline, which sprayed from the tank's roof vents and hit the tank's wind girder as it fell, aerosolized forming a large vapor cloud (estimated to encompass an area of about 107 acres) that subsequently ignited after reaching an ignition source in CAPECO's wastewater treatment facility. The ensuing blast, multiple secondary explosions and fire resulted in significant damage to 17 of the 48 petroleum storage tanks. The blast created a pressure wave that registered 2.9 on the Richter scale and damaged approximately 300 homes and businesses up to 1.25 miles from the site. Although there were no fatalities and only three people experienced minor injuries off site as a result of the initial blast, the fires burned for almost 60 hours. Petroleum products leaked into the soil, nearby wetlands and navigable waterways in the surrounding area.

As a part of its investigation, the U.S. Chemical Safety and Hazard Investigation Board (CSB) analyzed relevant regulatory, industry, and consensus standards for safety and management of bulk aboveground storage facilities. The CSB noted in its investigation report that a number of industry trade groups, professional associations, and code officials, such as the American Petroleum Institute (API), National Fire Protection Association (NFPA), and International Code Council (ICC), publish national consensus standards that apply to aboveground storage tanks.

¹ Safety Integrity Level is defined as a relative levels of risk-reduction provided by a safety function, or to specify a target level of risk reduction

In its review of API's national consensus standards, the CSB determined that API Standard 2350, *Overfill Protection for Storage Tanks in Petroleum Facilities* (2012) only required an automatic overfill prevention system for remotely operated facilities and did not offer substantial guidance on conducting a risk assessment that considers the complexity of site operations, the type of flammable and combustible liquids stored at the facility, or proximity to nearby communities when considering the necessary safeguards to protect the public.

Consequently, the CSB Board issued three recommendations to the API to revise its standards pertaining to storage tank overfill protection systems, risk assessment and tank terminal operations (CSB Recommendation Nos. 2010-02-I-PR-R7 through 2010-02-I-PR-R9). This status change summary addresses CSB Recommendation No. 2010-02-I-PR-R8.

B. Response to the Recommendation

In December of 2020, API, informed the CSB that in September 2020 API published the 5th edition of Standard 2350, *Overfill Protection for Storage Tanks in Petroleum Facilities*. In its response, API explained how it revised and expanded Annex E to address the provisions contained in the CSB Recommendation.

CSB purchased the fifth edition of API 2350 and reviewed Annex E in to verify the information provided in API's response.

C. Board Analysis and Decision

As the revisions made to Annex E in API 2350 (2020) appear to meet the intent of CSB Recommendation, the Board voted to change the status of CSB Recommendation No. 2010-02-I-PR-R8 to: "Closed – Acceptable Action."