



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-6
Date Issued:	October 21, 2015
Recipient:	National Fire Protection Association (NFPA)
New Status:	Closed – Reconsidered/Superseded
Date of Status Change:	July 26, 2023

Recommendation Text:

Revise NFPA 30, Flammable and Combustible Liquids Code, Section 21.7.1.1 (2015) for bulk aboveground storage tank terminals storing gasoline, jet fuel, other fuel mixtures or blendstocks, and other flammable liquids having an NFPA 704 flammability rating of 3 or greater. This modification shall meet the following requirements:

- a) *More than one safeguard to prevent a tank overflow, all within an automatic overflow prevention system as described in ANSI/API Standard 2350 (2015) Overflow Protection for Storage Tanks in Petroleum Facilities with an independent level alarm as one of the safeguards. The safeguards should meet the following standards:*
 1. *Separated physically and electronically and independent from the tank gauging system;*
 2. *Engineered, operated, and maintained for an appropriate level of safety based on the predetermined risk level after considering part b of this recommendation; and*
 3. *Proof tested with sufficient frequency in accordance with the validated arrangements and procedures.*

- b) *Specified to achieve the necessary risk reduction as determined by a documented risk assessment methodology conducted in accordance with Center for Chemical Process Safety Guidelines for Hazard Evaluation Procedures, 3rd Edition, accounting for the following factors:*
 1. *The existence of nearby populations and contamination of nearby environmental resources;*
 2. *The nature and intensity of facility operations;*
 3. *Realistic reliability for the tank gauging system; and*
 4. *The extent/rigor of operator monitoring.*

- c) *Ensure that the above changes not subject to grandfathering provisions in the code.*

Board Status Change Decision:

A. Rationale for Recommendation

On October 23, 2009, an above ground storage tank at the Caribbean Petroleum Corporation (CAPECO) tank farm facility in Bayamón, Puerto Rico was overfilled. The overfill occurred during the offloading of the tank ship, *Cape Bruny*. An estimated 200,000 gallons of gasoline was spilled during the overfill.

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 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. Fortunately, there were no fatalities and only three people experienced minor injuries offsite 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. While certain requirements in the *Flammable & Combustible Liquids Code* (NFPA 30 – 2015) apply to bulk aboveground storage terminals, such as CAPECO, the CSB determined that these code requirements do not offer sufficient protection to prevent catastrophic explosion and fire incidents due to overfilling that may occur at such facilities that store gasoline, jet fuels, blendstocks, and other flammable liquids having an NFPA 704 flammability rating of 3 or higher. As a result of this finding, the CSB issued one recommendation to the National Fire Protection Association (NFPA). This status change summary addresses **CSB Recommendation No. 2010-02-I-PR-R6**.

B. Response to the Recommendation

The NFPA has been very responsive specific to this recommendation. In addition to correspondence and meetings, the NFPA offered CSB staff the opportunity to present their findings and conclusions relative to this recommendation to the appropriate NFPA committee members. In August of 2022, following the CSB's presentation, the NFPA's Technical Committee on Tank Storage and Piping Systems provided a detailed response to the recommendation where they pointed out that though the CAPECO incident report identifies a significant history of non-compliance with safety and environmental standards and regulations, it does not demonstrate that the additional safeguards identified in the recommendation would have prevented this incident or eliminated or mitigated its consequences. Additionally, they informed us that the hazard evaluation required in subparagraph b) of the recommendations was already required in chapter 6 of NFPA 30.

C. Board Analysis and Decision

The NFPA presented a lot of information to support their general disagreement with the recommendation. Upon a comprehensive review, the Board concurred with the NFPA's assertion that the investigation report does not demonstrate that additional safeguards described by the recommendation would have prevented this incident or eliminated or mitigated its consequences.

The Board also concurred with the NFPA's assertion that that the risk assessment recommended by the Board is already required by chapter 6 of NFPA 30.

The Board appreciates the cooperation and professionalism demonstrated by the NFPA's leadership and staff throughout the recommendation closure process. Based upon the NFPA's rationale for their disagreement with the recommendation and the Board concurring with that rationale, the Board voted to change **CSB Recommendation No. 2010-02-I-PR-R6** to: "**Closed – Reconsidered/Superseded.**"