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-R4
Date Issued:	October 21, 2015
Recipient:	Occupational Safety and Health Administration
New Status:	Closed – Reconsidered/Superseded ***(Superseded by* 2019-01-I-TX-R7**)
Date of Status Change:	June 26, 2023

Recommendation Text:

a) *Revise the Flammable and Combustible Liquids standard (29 CFR§ 1910.106) to require installing, using, and maintaining a high-integrity automatic overfill prevention system with a means of level detection, logic/control equipment, and independent means of flow control for bulk aboveground storage tanks containing gasoline, jet fuel, other fuel mixtures or blends tocks, and other flammable liquids having an NFPA 704 flammability rating of 3 or higher, to protect against loss of containment. At a minimum, this system shall meet the following requirements:*

1. Separated physically and electronically and independent from the tank gauging system.

2. Engineered, operated, and maintained to achieve an appropriate level of safety integrity in accordance with the requirements of Part 1 of International Electro-technical Commission (IEC) 61511-SER ed1.0B-2004, Functional Safety - Safety Instrumented Systems for the Process Industry Sector. Such a system would employ a safety integrity level (SIL) documented in accordance with the principles in Part 3 of IEC 61511-SER ed1.0B-2004, accounting for the following factors:

i. The existence of nearby populations and sensitive environments;
ii. The nature and intensity of facility operations;
iv. The extent/ rigor of operator monitoring.

3. Proof tested in accordance with the validated arrangements and procedures with sufficient frequency to ensure the specified safety integrity level is maintained.

b) *Establish hazard analysis, management of change and mechanical integrity management system elements for bulk above ground storage tanks in the revised 1910.106 standard that are similar to those in the Process Safety Management of Highly Hazardous Chemicals standard (29 CFR § 1910.119) and ensure these facilities are subject to Recognized and Generally Accepted Good Engineering Practices (RAGAGEP).*

Board Status Change Decision:

A. Rationale for Recommendation

On the night of October 23, 2009, while offloading the contents of a tanker ship, the *Cape Bruny*, into the Caribbean Petroleum Corporation (CAPECO) tank farm facility in Bayamón, Puerto Rico, an estimated 200,000 gallons of gasoline overflowed from an aboveground storage tank into a secondary containment dike with 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 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 part of its investigation, the CSB analyzed relevant regulatory, industry, and consensus standards for safety and management of bulk aboveground storage facilities. While the Occupational Safety and Health Act and some OSHA standards apply to bulk aboveground storage tank terminals, such as CAPECO, the CSB determined that these standards do not offer adequate protections to prevent catastrophic explosion and fire incidents that may occur due to overfilling 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 the investigation, the CSB issued one recommendation to the Occupational Safety and Health Administration (OSHA). This status change summary addresses **CSB Recommendation No. 2010-02-I-PR-R4**.

B. Response to the Recommendation

OSHA acknowledged receipt of the recommendation in a letter dated February 12, 2016. In this letter OSHA stated that they would not be implementing the recommendation because there were no plans at the time to revise the Flammable and Combustible Liquids standard (29 CFR 1910.106). No further response to this recommendation has been received from OSHA.

This recommendation was superseded by **CSB Recommendation No. 2019-01-I-TX-R7** from the CSB's Intercontinental Terminals Company (ITC) Tank Fire Investigation Report (2023).

C. Board Analysis and Decision

CSB policy allows a recommendation to be superseded when it is replaced by a new more appropriate recommendation to the same recipient and covering the same or similar issues. **CSB Recommendation No. 2010-02-I-PR-R4** directed OSHA to add specific requirements for a particular safeguard to aboveground storage tanks storing some of the materials covered by 29

CFR 1910.106, but not all of them. It also required OSHA to piecemeal in several, but not all, elements of its PSM standard (29 CFR 1910.119), into 29 CFR 1910.106. **CSB Recommendation No. 2019-01-I-TX-R7** is a more appropriate recommendation in that targets a better regulation, it will be less complicated to implement and enforce, and will result in a higher level of protection than the original recommendation when implemented.

The Board looks forward to OSHA's cooperation in implementing the superseding recommendation. Based upon the information above, the Board voted to change **CSB Recommendation No. 2010-02-I-PR-R4** to: "**Closed –Reconsidered/Superseded**."