



U. S. Chemical Safety and Hazard Investigation Board

RECOMMENDATION STATUS CHANGE

SUMMARY

Report:	Husky Energy Superior Refinery Explosion and Fire
Recommendation Number:	2018-02-I-WI-R13
Date Issued:	December 29, 2022
Recipient:	American Petroleum Institute (API)
New Status:	Closed – Acceptable Alternative Action
Date of Status Change:	May 13, 2025

Recommendation Text:

Using API's processes to determine the appropriate safety product, develop a publicly available technical publication for the safe operation of fluid catalytic cracking (FCC) units. The document should be applicable to both new and existing units. Include the following topics at a minimum:

- a) Description of typical FCC unit hazards, including air leaks into hydrocarbon systems or hydrocarbon leaks into air systems that could form a flammable mixture during transient operation (startup, shutdown, standby, and the actions required to transition between these modes). If needed, include differences between possible reactor/regenerator configurations;*
- b) Recommended practices for safeguards to control FCC unit hazards;*
- c) Recommended monitoring for process safety during FCC unit transient operations;*
- d) Recommended emergency operating procedures for FCC-specific scenarios;*
- e) PHA guidance for key FCC-specific scenarios, including transient operation;*
- f) Recommended FCC-specific field and board operator process safety training topics and methods;*
- g) Guidelines for process safety assessments of FCC units; and*
- h) Incorporate lessons learned from this CSB investigation and the CSB's ExxonMobil Torrance Refinery Electrostatic Precipitator Explosion investigation throughout the document and include references in the document's bibliography.*

Board Status Change Decision:

A. Rationale for Recommendation

On the morning of April 26, 2018, the primary and sponge absorber of the Husky Energy Superior Refinery exploded during the planned shutdown of the facility's fluidized catalytic cracking (FCC) unit. Debris from the explosion struck an asphalt storage tank approximately 200 feet away. Asphalt leaked from the damaged tank and over the containment wall spreading into the FCC and crude unit operating areas before eventually catching fire. Husky Superior Refinery reported that 39,000 pounds of a flammable hydrocarbon vapor mixture as well as approximately 17,000 barrels of asphalt were released during the incident.

36 refinery and contract workers received medical treatment as the result of the incident. Of those 36 injuries, 11 met the criteria to be considered OSHA recordable. None of the injuries suffered were deemed life-threatening. It was reported that the explosion shook buildings up to a mile away. The plume from the burning asphalt was visible from neighboring communities. An evacuation order was issued by county officials to protect the public from the smoke plume and as a precaution for fear the incident would escalate.

As a result of the incident the facility was destroyed. The incident resulted in \$550 million of on-site and \$110,000 of off-site property damage. This incident was recorded as having the 33rd largest adjusted property damage loss in the hydrocarbon extraction, transport, and processing industry since 1974¹. In September 2019 a permit was issued to rebuild the refinery and construction began soon after. Husky Energy merged with Cenovus Energy, Inc., a Canadian oil and natural gas company, on January 1, 2021. The refinery is expected to resume operations in 2023 as Cenovus Superior Refinery.

The U.S. Chemical Safety and Hazard Investigation Board (CSB) investigated the incident and found several safety issues including ineffective transient operation safeguards, a lack of process knowledge, ineffective process safety management systems, a lack of available industry knowledge and guidance, and failures in emergency preparedness. As a result of these findings, the CSB issued three recommendations to the American Petroleum Institute (API). This status change summary addresses CSB Recommendation No. 2018-02-I-WI-R13 (R13).

B. Response to the Recommendation

In response to several high-profile FCC incidents, the FCC Process Technology Committee of American Fuel and Petrochemical Manufacturers (AFPM) developed a series of regional workshops addressing the safe operation of FCC units and, additionally, customized the information to address the information requirements of R13 issued to API. These workshops have been held at many of the refineries in the US that have FCC units and have been well received by participants. AFPM continues to offer these workshops across the country with dates into Fall 2025.

The CSB attended one of these workshops held in Richmond, CA during March of 2025. The information presented addressed the requirements of the recommendation in an engaging manner and offered practical solutions and insights into the real-world challenges faced by the refining industry. AFPM has also established a webpage dedicated to FCC process safety which contains substantial resources and is available to the public for free. It can be accessed at:

<https://www.afpm.org/issues/safety-health/fcc-process-safety>

C. Board Analysis and Decision

AFPM addressed the recommendation, as opposed to API, the recommendation recipient. The Board commends AFPM's FCC Process Technology Committee for their excellent work developing and conducting these workshops. Based on the success of these workshops and the

¹ Marsh JLT Specialty, "100 Largest Losses in the Hydrocarbon Industry," 2022.
<https://www.marsh.com/us/insights/research/100-largest-losses-hydrocarbons-industry-html>.

practical benefits of bringing this information directly to the people who work in the facilities where these hazards exist, the Board considers the actions of AFPM as successfully implementing all of the requirements of the recommendation.

CSB policy states that a status of “Closed – Acceptable Alternative Action” may be applied if a recommendation is successfully implemented by an entity other than the recommendation recipient. Based upon the information above, the Board voted to change CSB Recommendation No. 2018-02-I-WI-R13 to: “Closed – Acceptable Alternative Action.”