



U. S. Chemical Safety and Hazard Investigation Board

RECOMMENDATION STATUS CHANGE

SUMMARY

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| Report: | Philadelphia Energy Solutions (PES) Refinery Fire and Explosions |
| Recommendation Number: | 2019-04-I-PA-R3 |
| Date Issued: | October 11, 2022 |
| Recipient: | Environmental Protection Agency (EPA) |
| New Status: | Closed – Reconsidered/Superseded <i>(Superseded by 2023-02-I-LA-R4)</i> |
| Date of Status Change: | May 23, 2025 |

Recommendation Text:

Per the requirements in EPA Rule Procedures for Prioritization of Chemicals for Risk Evaluation Under the Toxic Substances Control Act, initiate prioritization to evaluate whether hydrofluoric acid is a High-Priority Substance for risk evaluation. If it is determined to be a High-Priority Substance, conduct a risk evaluation of hydrofluoric acid to determine whether it presents an unreasonable risk of injury to health or the environment. If it is determined to present an unreasonable risk of injury to health or the environment, apply requirements to hydrofluoric acid to the extent necessary to eliminate or significantly mitigate the risk, for example by using a methodology such as the hierarchy of controls.

Board Status Change Decision:

A. Rationale for Recommendation

On the morning of June 21, 2019, a pipe elbow in the Philadelphia Energy Solutions (PES) hydrofluoric acid (HF) alkylation unit ruptured. A large vapor cloud—composed of about 95% propane, 2.5% HF, and other hydrocarbons—engulfed part of the unit. The vapor cloud ignited, causing a large fire. Three explosions then occurred in the unit. The third explosion was the largest and occurred when a pressure vessel violently ruptured and flew across the Schuylkill River. Two other pressure vessel fragments, one weighing about 23,000 pounds and the other 15,500 pounds, landed in the PES refinery.

PES estimated that 5,239 pounds of HF and 676,000 pounds of hydrocarbons were released during the incident. The HF alkylation unit was severely damaged resulting in an estimated property damage loss of \$750 million. Five workers and a firefighter experienced minor injuries during the incident and response. On June 26, 2019, PES announced that the refining complex would be shutting down.

The U.S. Chemical Safety and Hazard Investigation Board (CSB) investigated the incident and found several safety issues to include process safety management and other safety related standards. There were issues with PES's mechanical integrity program and their verification of safety of equipment when new safety information is discovered and published in Recognized and

Generally Accepted Good Engineering Practices (RAGAGEP). Additionally, the CSB identified gaps regarding standards or regulations that address remotely operated emergency isolation valves, safeguard reliability in HF alkylation units, as well as inherently safer design considerations specific to the use of HF. As a result of these findings, the CSB issued three recommendations to the EPA. This status change summary addresses CSB Recommendation No. 2019-04-I-PA-R3.

B. Response to the Recommendation

The EPA first acknowledged receipt of the recommendation in a letter dated February 7, 2023. In their letter EPA stated that their formal response would be forthcoming. The CSB received the EPA's response letter dated April 14, 2023. In their response letter the EPA described the requirements of TSCA and explained the EPA's process for meeting those requirements.

Since the EPA's response, HF has been added to the EPA's list of candidate chemicals substances for prioritization under TSCA. The EPA has also updated their rule at 40 CFR 716.120 to add HF to the list of chemical substances for which health and safety study data reporting is required.

This recommendation was superseded by **CSB Recommendation No. 2023-02-I-LA-R4** from the CSB's Honeywell Geismar Chlorine and Hydrogen Fluoride Releases Investigation Report (2025).

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. 2019-04-I-PA-R3** stemmed from a release of hydrofluoric acid that resulted from a loss of containment and explosion at an oil refinery. It directed the EPA to initiate prioritization to evaluate whether hydrofluoric acid is a "High-Priority Substance" under TSCA and to determine if it presents an unreasonable risk of injury to health or the environment. **CSB Recommendation No. 2023-02-I-LA-R4** is a more appropriate recommendation in that it directs the EPA to address HF, including its anhydrous and aqueous acid forms, under TSCA. The superseding recommendation will result in a more comprehensive evaluation of HF than the original recommendation when implemented.

The Board looks forward to the EPA's cooperation in implementing the superseding recommendation. Based upon the information above, the Board voted to change CSB Recommendation No. 2019-04-I-PA-R3 to: "Closed –Reconsidered/Superseded."