



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

<b>Report:</b>	Arkema Inc. Chemical Plant Fire
<b>Recommendation Number:</b>	2017-08-I-TX-R1
<b>Date Issued:</b>	May 24, 2018
<b>Recipient:</b>	Arkema Crosby facility
<b>New Status:</b>	Closed – Acceptable Action
<b>Date of Status Change:</b>	January 17, 2023

### Recommendation Text:

*Reduce flood risk to as low as reasonably practicable (ALARP). Ensure that any safeguards for flooding meet independent layer of protection requirements.*

### Board Status Change Decision:

#### A. Rationale for Recommendation

On August 24, 2017, Hurricane Harvey, a Category 4 hurricane, made landfall in southeast Texas. Extensive flooding caused by heavy rainfall from the hurricane exceeded the equipment design elevations and caused the plant to lose power, backup power, and critical organic peroxide refrigeration systems. Consequently, Arkema used its standby refrigerated trailers to keep the organic peroxide products cool. On August 31, 2017, organic peroxide products stored inside a refrigerated trailer decomposed, causing the peroxides and the trailer to burn. Twenty-one people sought medical attention from exposure to fumes generated by the decomposing products when the vapor travelled across a public highway adjacent to the plant. Emergency response officials initially decided to keep this highway open because this road served as an important route for hurricane recovery efforts. Over the next several days, a second fire and a controlled burn conducted by the Unified Command consumed eight more trailers holding Arkema's remaining organic peroxide products that required low-temperature storage. Over the course of the three fires, in excess of 350,000 pounds of organic peroxide combusted. As a result, more than 200 residents living within 1.5 miles of the facility who had evacuated the area could not return home for a week.

As a part of its investigation, the U.S. Chemical Safety and Hazard Investigation Board (CSB) examined the design criteria and physical conditions at the Arkema Crosby facility and determined that the measures taken to prevent flooding from the heavy rainfall resulting from hurricane Harvey were inadequate and consequently the Board issued a recommendation to the Arkema Crosby facility to reduce flood risk as low as reasonably practicable and ensure that safeguards for flooding meet independent layer of protection requirements.

## B. Response to the Recommendation

In October 2022, Arkema advised the CSB that it had completed improvements to the Crosby facility that met or exceeded the Harris County Engineering Department 500-year flood elevation standard, which was substantially revised after Hurricane Harvey, and installed sufficient subgrade detention storage to ensure that the 100-year flood flow off the property did not exceed what the 100-year flood flow would be if the Arkema Crosby facility was undeveloped property.

Arkema also took additional steps to ensure that its emergency generators and liquid nitrogen cooling system would remain operational in the event of a power loss due to flooding.

Substantial documentation of these improvements were submitted to the CSB for evaluation.

## C. Board Analysis and Decision

Based on Arkema's response and review of documentation submitted, the Board determined that the requirements of the CSB Recommendation were met. Therefore, the Board voted to change the status of CSB Recommendation No. **2017-08-I-TX-R1** to: "**Closed - Acceptable Action**"