



U.S. Chemical Safety and Hazard Investigation Board

CSB Public Meeting

April 27, 2023

Trichloroisocyanuric Acid Reaction,
Decomposition, and Toxic Gas Release at
Bio-Lab Lake Charles

Westlake, Louisiana

August 27, 2020



Executive Director's Introduction

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Investigation Team

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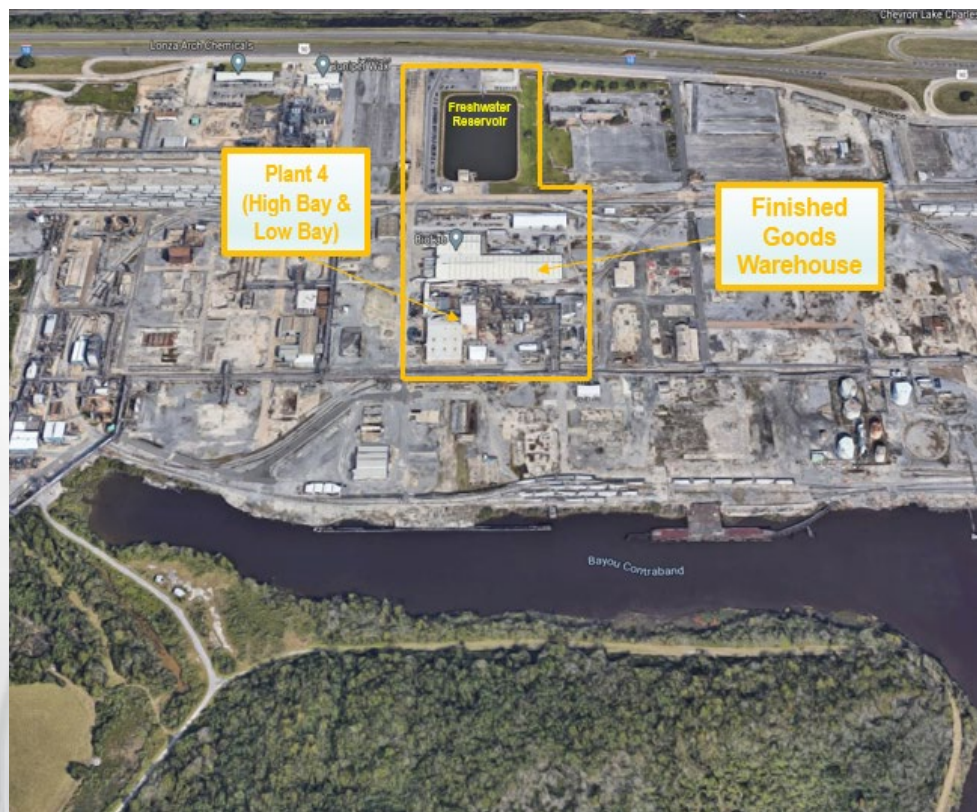
Bio-Lab Lake Charles Background

- **Location:**
Calcasieu Parish in Westlake, Louisiana
(Southwest Louisiana)
- **Built:** 1979
- **Current owner:** KIK Custom Products
- **Manufactures and supplies pool and spa chemicals**
 - Trichloroisocyanuric acid (TCCA) is one of those chemicals and was involved in the incident
 - TCCA is a chlorinating agent often used as a sanitizer to kill algae and bacteria in large volumes of water, predominantly swimming pools and hot tubs



Incident Overview

- On August 27, 2020, extreme winds from Category 4 Hurricane Laura tore through the Bio-Lab facility, severely damaging multiple buildings storing TCCA
- Rainwater contacted the stored TCCA, initiating a chemical reaction, decomposition, and fire
 - One destroyed production building
 - Additional structures damaged
 - Local community put at risk of being exposed to toxic chlorine
 - Shelter-in-place order issued
 - I-10 (near the facility) closed for over 28 hours
- No reported injuries





Safety Issues

1. Extreme Weather Preparation

Bio-Lab did not implement industry guidance for extreme weather preparation that was updated and published after the 2017 Arkema incident and, as a result, was unprepared for the winds produced by Category 4 Hurricane Laura.

2. Process Hazard Analyses Implementation

TCCA is not covered by OSHA's Process Safety Management (PSM) Standard; however, Bio-Lab Lake Charles voluntarily implemented some elements of the standard, including periodically conducting Process Hazard Analyses (PHAs). Bio-Lab's 2010 PHA recommended the facility to "consider evaluating warehouse roof structure for hurricane conditions; verify warehouse is built to withstand high winds," but the company did not implement the recommendation.



Safety Issues (continued)

3. Emergency Preparedness and Response Preparation

Bio-Lab experienced serious delays (approximately five and a half hours) in responding to the TCCA decomposition and fire due to an inadequate and largely nonfunctional fire protection system and the absence of automated sprinkler systems.

4. Adherence to Applicable Hazardous Materials Codes

The Bio-Lab Lake Charles facility, built in 1979, did not conform to the safeguards identified in the National Fire Protection Association (NFPA) *101 Life Safety Code* for high-hazard industrial occupancies, which required automatic extinguishing systems or other protection to minimize danger to occupants before they have time to evacuate. Bio-Lab also did not conform to NFPA 400 *Hazardous Materials Code*, which Louisiana requires adherence to for structures built or remodeled after July 1, 2017.



Safety Issues (continued)

5. Regulatory Coverage of Reactive Chemicals Hazards

OSHA and the EPA currently use predefined chemical lists to identify the processes subject to coverage under the PSM Standard and Risk Management Program (RMP) Rule. In 2002, the CSB concluded that these regulations did not adequately consider reactive chemical hazards when developing its chemical lists, and, as a result, many reactive chemicals, including TCCA, are not covered by either. This regulatory coverage gap (1) points to a weakness in relying on fixed chemical lists to determine regulatory coverage, (2) contributed to this incident, and (3) contributed to many other reactive chemical incidents over the past three decades.

Cause

The CSB determined that the cause of the accidental release of chlorine gas from the Bio-Lab Lake Charles facility was rainwater contacting stored TCCA, which initiated a chemical reaction, decomposition, and fire after Category 4 Hurricane Laura winds damaged portions of the facility's building roofs that were not built to current wind design requirements.

Contributing to the incident and its severity were:

- Inadequate preparation for extreme weather;
- Deficient process hazard analysis action item management system;
- Insufficient regulatory coverage of chemicals with reactive hazards;
- Inadequate and largely nonfunctional fire protection system; and
- Absence of automatic extinguishing systems.





Recommendations

To Bio-Lab Lake Charles

1. Evaluate the hazards to the facility from extreme weather and implement processes and safeguards for protection against those hazards.
2. Develop and implement an improved process hazard analysis action item management system.
3. Perform PHAs on all buildings and units processing or storing TCCA. Ensure that the PHAs are revalidated at least every five years.
4. Revise the facility's emergency response plan to require (1) proper maintenance/repair and routine test of the fire protection system, (2) regular checks of emergency equipment to ensure good working condition, and (3) training.



Recommendations (continued)

To Louisiana Governor and Louisiana State Legislature / Secretary of the Louisiana Department of Environmental Quality

Under existing statutory or regulatory authority or through the establishment of new authority by executive or legislative action, for all existing chemical manufacturing and storage facilities that:

- 1) Are located in a hurricane-prone region as defined by the International Building Code, and
- 2) Manufacture or store or can inadvertently or otherwise produce (e.g., by chemical reaction) regulated substances inside equipment or building(s) built before more current wind design requirements came into effect

Require the facility operators to evaluate the hazards to their facilities from extreme weather and implement processes and safeguards for protection against those hazards.



Recommendations (continued)

To Occupational Safety and Health Administration (OSHA)

Reiterate **2001-01-H-R1**

(from the 2002 CSB Reactive Hazard Study)

Amend the Process Safety Management Standard, 29 CFR 1910.119, to achieve more comprehensive control of reactive hazards that could have catastrophic consequences.



Recommendations (continued)

To U.S. Environmental Protection Agency (EPA)

1. Reiterate **2001-01-H-R3**

(from the 2002 CSB Reactive Hazard Study)

Revise the Accidental Release Prevention Requirements, 40 CFR 68, to explicitly cover catastrophic reactive hazards that have the potential to seriously impact the public, including those resulting from self-reactive chemicals and combinations of chemicals and process-specific conditions

- ### 2. Implement the five open recommendations issued in the 2022 U.S. Government Accountability Office Report titled *Chemical Accident Prevention: EPA Should Ensure Regulated Facilities Consider Risks from Climate Change*



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