



U.S. Chemical Safety and Hazard Investigation Board

20  
Years of Driving Chemical Safety Change  
1998 2018



CSB  
U.S. Chemical Safety and  
Hazard Investigation Board

# IMPACT REPORT

FY 2017



## U.S. Chemical Safety and Hazard Investigation Board



## ABOUT THE CSB

Independent Federal agency charged with investigating the root cause of industrial chemical incidents. The CSB advocates for the implementation of safety recommendations to better protect workers, the public and the environment. The vision of the CSB is to create a nation safe from chemical disasters. This report highlights the CSB's activities undertaken in FY 2017 to achieve this vision.

### MISSION

Drive chemical safety change through independent investigations to protect people and the environment.

### VISION

A nation safe from chemical disasters.

### INVESTIGATIONS

The CSB conducts incident investigations concerning releases of hazardous chemical substances. Throughout FY 2017, investigative field work and analysis continued on several important incident investigations. The CSB deployed to five chemical incidents in FY 2017. The CSB anticipates it will continue to advance these investigations in FY 2018.

## FY 2017 COMPLETED REPORTS

**Refinery Chemical Release and Fire (Baton Rouge, LA):** On November 22, 2016, an isobutane release and fire seriously injured four workers in the sulfuric acid alkylation unit at the ExxonMobil Refinery in Baton Rouge, Louisiana. During the removal of an inoperable gearbox on a plug valve, isobutane was released into the unit, forming a flammable vapor cloud. The isobutane reached an ignition source within 30 seconds of the release, causing a fire and severely burning four workers who were unable to exit the vaporcloud before it ignited. *The CSB's final investigation report was released on September 18, 2017.*

**Refinery Fire (Delaware City, DE):** On November 29, 2015, an operator at the Delaware City Refining Company's (DCRC) Kellogg Alkylation Unit suffered second degree burns to his face and neck while performing de-inventorying activities on a vessel in preparation for the removal of a pipe spool from a connected process. This incident followed two previous incidents at the same facility in August 2015. The CSB's investigation report focused on the adequacy of written procedures and safety processes. *The final report was released at a news conference on May 18, 2017, in Wilmington, Delaware.*

**Chemical Release and Disruption of Drinking Water Supply (Charleston, WV):** On January 9, 2014, an estimated 10,000 gallons of crude methylcyclohexanemethanol (MCHM) mixed with propylene glycol phenyl ethers (PPH Stripped) were released into the Elk River when a 46,000-gallon storage tank located at the Freedom Industries site in Charleston, West Virginia, failed, disrupting the drinking water supply for approximately 300,000 residents in nine counties. The CSB's report called on aboveground storage tank facilities, government officials, drinking water utilities and public health agencies across the country to follow recommended best practices to prevent similar incidents. *The final investigation report was released on May 11, 2017.*

**Refinery Explosion and Catalyst Release (Torrance, CA):** On February 18, 2015, the ExxonMobil refinery in Torrance, California, released spent catalyst material into the surrounding community, and an explosion resulted in four minor injuries and extensive property damage. The CSB's investigation focused on the technical cause of the equipment failure; organizational factors; process hazard analyses and mechanical integrity at the refinery; and the State of California's Process Safety Management regulations for refineries. *The final report was released at a news conference on May 3, 2017, in Torrance, California.*

**Nitrous Oxide Explosion (Cantonment, FL):** On August 28, 2016, a nitrous oxide trailer truck exploded at the Airgas manufacturing facility near Pensacola, Florida. The explosion killed the only Airgas employee present and heavily damaged the facility, halting nitrous oxide manufacturing at the Cantonment plant and leading to shortages for the medical, university, and food manufacturing industries. The plant has been inoperable since the incident. *The final report was released at a news conference on April 20, 2017, in Pensacola, Florida.*



## FY 2017 OPEN INVESTIGATIONS

Investigation	Location	Incident Date
Arkema Inc. Chemical Plant Fire	Crosby, TX	Aug. 29, 2017
Didion Milling Company Explosion and Fire	Cambria, WI	May 31, 2017
Midland Resource Recovery Explosion	Barbour County, WV	May 24, 2017
Loy-Lange Box Company Pressure Vessel Explosion	St. Louis, MO	Apr. 3, 2017
Packaging Corporation of America Hot Work Explosion	DeRidder, LA	Feb. 8, 2017
Sunoco Logistics Partners Fire	Nederland, TX	Aug. 12, 2016
Enterprise Gas Plant Explosion	Moss Point, MS	Jun. 27, 2016
DuPont LaPorte Toxic Chemical	La Porte, TX	Nov. 15, 2014

## RECOMMENDATIONS

CSB investigations result in high-impact recommendations to regulatory agencies, state and local governments, corporations, industry organizations and others, aiming to drive chemical safety change. In FY 2017, one recipient exceeded the actions recommended by the CSB. Following an incident at the former Valero facility in Delaware City, Delaware, in which two contractors died from nitrogen asphyxiation in a confined space, the CSB issued a recommendation to revise the American Society of Safety Engineers (ASSE) standard, *Safety Requirements for Entering Confined Spaces*. The revised standard, issued in August 2016, addressed critical safety gaps identified in the 2005 Valero asphyxiation incident, the 2007 Xcel Energy hydroelectric tunnel fire and the 2008 Packaging Corporation of America storage tank explosion. The revised standard notated that oxygen deficiency was the leading atmospheric hazard resulting in fatalities inside confined spaces.

**804**  
TOTAL

**168**  
OPEN-TOTAL

**636**  
CLOSED-TOTAL

**19**  
ISSUED

**43**  
CLOSED

## ADVOCACY & OUTREACH

During FY 2017, the CSB continued to advocate for the implementation of its safety recommendations by engaging with recommendations recipients and presenting its findings and other safety topics at conferences, professional society and stakeholder meetings.

## CRITICAL DRIVERS LIST

In December 2016, the CSB added Safe Hot Work Practices to its Critical Drivers List (CDL). Hot work incidents occur throughout many industries in the United States, including food processing, pulp and paper manufacturing, oil production, fuel storage, and waste treatment. Most hot work incidents result in the ignition of combustible materials or the ignition of structures or debris near the hot work.

The CSB found that hot work is one of the most common causes of worker deaths among incidents it investigates. These incidents often result in injuries and fatalities and have the potential to be catastrophic. Through increased outreach and education efforts guided by this program, the CSB continues to disseminate key lessons and best practices to prevent worker deaths during hot work in and around storage tanks containing flammable materials.

In FY 2017, CSB Board members presented at 83 conferences, professional societies and stakeholder meetings, expanding its reach to new audiences. More than 65% of the outreach events focused on issues on the CDL to increase awareness of the most critical chemical safety issues identified by the CSB.

## COLLABORATION

The CSB collaborated with other Federal agencies and safety organizations to advance shared safety goals. In June 2017, the CSB participated in the nationwide Safe + Sound Week, partnering with Occupational Safety and Health Administration, the National Institute for Occupational Safety and Health, the National Safety Council, the American Society of Safety Engineers and the American Industrial Hygiene Association to raise awareness and understanding of the value of safety and health programs.

**78**

RECOMMENDATION STATUS CHANGES



## FY 2017 NUMBERS

**1**

new safety video

**2**

new safety video animations

**1**

video safety message

**7**

business meetings

**83**

presentations by the Board to stakeholders

**19**

new recommendations

**43**

closed recommendations

**78**

recommendation status changes

**5**

deployments initiated

**5**

final reports issued

**1**

safety alert issued



## SAFETY ALERT

On August 27, 2017, the CSB released the Safety Alert entitled *After Harvey: Precautions Needed during Oil and Chemical Facility Startup*, urging oil and chemical facilities to take special precautions when restarting in the wake of plant shutdowns caused by Hurricane Harvey.

The startup of major processes at chemical facilities is a hazardous phase, and facilities need to pay particular attention to process safety requirements during this critical period to assure a safe and expeditious return to normal operations.

Restarting a complex chemical process requires a higher level of attention and care than normal processing, because numerous activities are occurring simultaneously and many automatic systems are run under manual control. Because a significant number of facilities were shut down during Hurricane Harvey, there were a significant number of facilities restarting, which presented an increased risk to safety.

## SAFETY VIDEOS

The CSB publishes computer-animated safety videos on its website and on YouTube that are available free of charge to the public in order to disseminate investigative findings and lessons learned. In FY 2017, the CSB released one new safety video, two new video animations, and one safety message.

- “Blocked In” describes safety lessons from the explosion and fire at the Williams Olefins plant in Geismar, Louisiana.
- “Animation of the Fire at ExxonMobil’s Baton Rouge Refinery” portrays a fire that erupted during maintenance activities, severely burning four workers.
- “Animation of the 2015 Explosion at ExxonMobil Torrance, CA” depicts an explosion in a gasoline processing unit resulting in two worker injuries and a release of debris into the community.
- “Back to School Safety Message” reminds teachers, staff and school administrators about the hazards of using flammable materials, such as methanol, during classroom science demonstrations.



## ORGANIZATIONAL EXCELLENCE

Over the past two years, the CSB has placed a special emphasis on organizational efficiency and health, increasing collaboration internally and externally, and improving productivity within the organization. Results from the 2017 Office of Personnel Management's (OPM) Federal Employee Viewpoint Survey (FEVS) show a significant improvement in employee engagement. Overall employee engagement increased from 58% in 2016 to 79% in 2017. This 21% increase in employee engagement reflects CSB leadership's dedication to the creation and retention of an engaged, high-performing workforce and to the pursuit of operational excellence.

## CSB STAFF PUBLICATIONS

The CSB continues to be a recognized expert in driving chemical safety change. In FY 2017, CSB staff authored eight publications to broadly disseminate its safety messages.



- Tinney, V.; Denton, J.; Sciallo-Tyler, L.; Paulson, J. **School Siting Near Industrial Chemical Facilities: Findings from the U.S. Chemical Safety Board's Investigation of the West Fertilizer Explosion.** *Environmental Health Perspectives*. 2016. 124 (10). 1493-1496.
- Sutherland, V. **The U.S. Chemical Safety Board: Moving Forward to Continually Drive Chemical Safety Change.** *Process Safety Progress*. 2016. 35(4). 306-311.
- Banks, J. **Dangerously Close: The CSB's Investigation into the Fatal Fire and Explosion in West, Texas.** *Process Safety Progress*. 2016. 35(4). 312-316.
- Sutherland, V. **CSB Chair Says Agency's Watchdog Role Is Invaluable.** *Houston Chronicle*. 22 March 2017.
- Sutherland, V. **A Somber Anniversary: BP Texas City Refinery Blast Was 12 Years Ago Today.** *Industrial Safety and Hygiene News*. 24 March 2017.
- Sutherland, V. **The Unique Role of the U.S. Chemical Safety and Hazard Investigation Board.** *Process Safety Progress*. 2017. 36(2). 120.
- Banks, J.; Oyewole, S.; Parasram, V.; Shroff, R. **Hot Work, Safe Work: Key Lessons from the U.S. Chemical Safety and Hazard Investigation Board Investigations of Hot Work Incidents.** *NFPA Journal*. May June 2017.
- Mulcahy, M.E.; Boylan, C.; Sigmann, S.; Stuart, R. **Using Bowtie Methodology to Support Laboratory Hazard Identification, Risk Management and Incident Analysis.** *Journal of Chemical Health and Safety*. 2017. 24(3). 14-20.



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## ONLINE OUTREACH



### YouTube

@USCSB: The CSB's safety videos have totaled over 8.2 million views with more than 27,000 subscribers



### Twitter

@chemsafetyboard: more than 4,900 followers



### Facebook

@US Chemical Safety Board:  
more than 11,800 likes and 12,500 followers



### Website - [www.csb.gov](http://www.csb.gov)

Our website provides information on investigations, status of recommendations and information on Board activities.