



# RISK BULLETIN

## Process Safety Management

### LESSONS LEARNED FROM THE U.S. CHEMICAL SAFETY BOARD

#### INTRODUCTION

The purpose of this bulletin is to summarize and present key lessons learned from recent industrial accidents investigated by the United States Chemical Safety Board (CSB). The findings of these investigations illustrate exposures that many industrial facilities need to identify and control to reduce or prevent bodily injury, property damage, and third party legal liability. The intent of this article is to spur the reader to take a more critical eye to the risks of industrial operations and take steps to better mitigate the risks.

The CSB is an independent federal agency whose board of directors is appointed by the President. The CSB is headquartered in Washington, DC, and functions similarly to the National Transportation Safety Board (NTSB). The CSB not only investigates accidents, but also reviews the effectiveness of regulations and regulatory enforcement. The CSB is staffed by chemical and mechanical engineers, safety professionals, and other technical experts from the private and public sectors. The CSB does not issue fines or citations, but rather issues recommendations for improvements/changes to the industrial facilities, regulators, and industry groups.

The primary mission of the CSB is to conduct root cause analysis of chemical accidents at fixed industrial facilities. Root causes and lessons learned are presented for each accident profiled below. The root causes are usually deficiencies in safety management systems, but can be any factor that would have prevented the accident if that factor had not occurred. Accident causes often involve equipment failures, human errors, unforeseen chemical reactions or other hazards. Additional detail on the accidents can be found via the links to the CSB website accident summaries, videos, and final reports.



## CONCLUSION

Industrial chemical accidents often result in death and injuries to facility personnel and the surrounding community, on- and off-site property damage, and legal liability from nearby businesses and other third parties. In addition, industrial facilities dealing with such accidents also have to deal with business interruption and loss of productivity.

In retrospect, many industrial accidents could be prevented if companies had information readily available and appropriate engineering and procedural controls were effectively implemented. Often solutions and guidance are available via industry groups, regulators, and safety organizations. The CSB is a great source of information on the hazards of industrial and chemical operations. The lessons learned in the accident investigations completed by the CSB are an excellent resource for industry as they identify key steps for preventing similar accidents at other facilities.

Common accident root causes include a lack of knowledge of the material and process hazards. Facilities need to understand chemical reaction processes, equipment limitations, the risks involved, and how these risks can be minimized. Facilities need to communicate these risks to on- and off-site personnel. Industrial accidents can be exacerbated by poor response planning and training, and a lack of communication between the facility, first responders, and the community. Industrial facilities should work with local emergency planning committees and the community to provide education on site hazards and coordinate emergency response procedures.

While accidents do occur and are sometimes beyond our control, many times there are ways to prevent them or reduce catastrophic impacts. Industry must continually study and evaluate site risks and implement engineering controls, safety procedures, and effective management of change programs. Facilities with an engineering and safety program that continually evaluates risks and properly communicates those risks will be more likely to prevent accidents and continue to be safe and profitable places to work at and to live near.

## REFERENCES

- American Petroleum Institute (API) Website [www.api.org](http://www.api.org)  
 Brubaker Calkins, Laurel and Cronin Fisk, Margaret, "BP Settles Claims, Ends Texas Refinery Blast Trial" July 22, 2008  
 National Fire Protection Association (NFPA) Website [www.nfpa.org](http://www.nfpa.org)  
 Occupational Safety and Health Administration (OSHA) Website [www.osha.gov](http://www.osha.gov)  
 U.S. Chemical Safety Board (CSB) Website <http://www.chem-safety.gov>

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