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CCPS

What is Safety Worth?

The U.S. Chemical Safety and Hazard Investigation Board (CSB) has issued more than 130 investigative reports during its almost two decades of operation. These valuable documents detail investigations of incidents at industrial facilities involving fatalities, injuries, and environmental impacts. The insights and recommendations they provide have helped prevent reoccurrences. I have heard first-hand testimonials at chemical facilities in the U.S. and around the world of the usefulness of CSB investigations and reports in evaluating hazards and risks.

The president's recent budget request, however, seeks to eliminate the CSB entirely. While the tiny agency requires a budget of only about \$12 million, the "America First: Budget Blueprint to Make America Great Again" overlooks the value of that small financial investment. The CSB helps to maintain the safety and security of U.S. businesses and citizens, helping to save both money and lives.

The CSB began operation in 1998 as an independent, nonregulatory, federal agency with a mission to conduct investigations of chemical accidents, identify root causes and potential contributing factors, and communicate findings to the American people. Reports of these investigations are distributed for free and are used by industry, emergency responders, and communities to prevent future catastrophic incidents. Many of the CSB's recommendations have been directed at the U.S. Occupational Safety and Health Administration (OSHA), the U.S. Environmental Protection Agency (EPA), and industry trade organizations to improve existing regulations, standards, guidelines, and outreach programs.

What is the value of the CSB?

To people. According to a 2017 Strata report, the EPA set the value of a statistical human life at \$6.3 million; the U.S. Food and Drug Administration (FDA) at \$6.5 million; and the U.S. Dept. of Transportation (DOT) at around \$9.1 million. If recommendations from the CSB save just two lives a year, the CSB would pay for itself.

Asphyxiation in industrial settings is one hazard to human life that the CSB has highlighted. Nitrogen is safe to breathe when mixed with an appropriate level of oxygen, but disrupting the balance in air (78% nitrogen, 21% oxygen, 1% other) can cause nitrogen asphyxiation. Decreases in oxygen concentration can cause impaired judgment, and concentrations below 10% can be fatal. From 1992 to 2002, the CSB investigated 85 incidents of nitrogen asphyxiation that caused 80 deaths and 50 injuries. To share this informa-

tion with industry and the public, the CSB created a training presentation on the hazards of nitrogen (www.csb.gov/assets/1/19/Nitrogen_Asphyxiation_Bulletin_Training_Presentation.pdf).

To property and the environment. Many of the incidents that the CSB investigates have profound consequences that extend beyond the borders of the facility and affect the surrounding community. Such was the case in West, TX, at the West Fertilizer Co. storage and distribution facility (www.csb.gov/west-fertilizer-explosion-and-fire-). An ammonium nitrate explosion at the facility killed 15, injured 260, and caused widespread damage to the surrounding community. Lack of zoning regulations to restrict buildings near hazardous industrial facilities allowed the town of West to encroach on and overtake a safety buffer zone around the plant.

CSB recommendations based on its investigations of the incident include training and certification programs, hazardous response operating procedures for emergency responders, and updates to regulations and codes that aim to make facilities, personnel, communities, emergency responders, and citizens safer.

In addition to impacting facilities and communities, incidents can have an environmental footprint as well. A toxic release of allyl alcohol vapor at the MFG Chemical, Inc., facility in Dalton, GA, sent 154 people to the hospital and forced the evacuation of nearby residents (www.csb.gov/mfg-chemical-inc-toxic-gas-release). The release also contaminated water at the facility that made its way into two nearby creeks, killing fish and other aquatic life.

Priceless

Bruce K. Vaughen, a well-regarded process safety professional and coauthor of *Process Safety: Key Concepts and Practical Approaches*, says, "Incidents with fatalities, injuries, environmental harm, and property damage, described in detail in the publicly available CSB reports and videos, provide yet another set of eyes to help us better understand what happened, and additional guidance on how we can prevent the incident from recurring."

Preventing an industrial incident means preventing fatalities, injuries, damage, and environmental impacts. Prevention can be difficult to quantify, especially when there are injuries and fatalities involved. Although I attempted to detail the financial cost, the moral and ethical value is more nebulous. For this reason, when considering the value of the CSB, I would conclude that it is priceless.

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