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A Brief Overview of the Chemical Safety Board

Learning from Experience

P2SAC Spring 2023 Conference

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Purdue University, West Lafayette, IN

Melinda M. Hartz, P.E.

Chemical Incident Investigator

U.S. Chemical Safety and Hazard Investigation Board

CSB History

U.S. Chemical Safety and Hazard Investigation Board

- **Independent Federal Agency**
- **Established in 1990 Clean Air Act Amendments**
- **First funded in November 1997**
- **Did not begin operations until January 1998**
- **5-member Board (including Chairperson)**

Legislative Authority

42 USC§7412(r)(6)

U.S. Chemical Safety and Hazard Investigation Board

1. **Investigate**
2. **Determine and report to the public in writing the facts, circumstances, and conditions**
3. **Determine (probable) cause**

Of any accidental release resulting in a fatality, serious injury or substantial property damage.

- **Scope is for “stationary sources”**
- **Not an enforcement agency**

About the CSB

U.S. Chemical Safety and Hazard Investigation Board

- **Mission** – Drive chemical safety excellence through independent investigations to protect communities, workers, and the environment.
- **25th anniversary this year**
- **CSB has deployed to over 130 incidents and issued over 900 recommendations**
- **CSB Reporting Rule – 253 incidents which resulted in fatalities at 37 facilities, serious injuries at 140 facilities, and substantial damage to 118 facilities nationwide since March 2020.**

2023 Investigations Closure Plan

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	INCIDENT NAME	INCIDENT LOCATION	INCIDENT DATE
First Half of 2023	Intercontinental Terminals Company (ITC)	Deer Park, TX	3/17/2019
	Watson Manufacturing and Grinding	Houston, TX	1/24/2020
	Bio-Lab	Lake Charles, LA	8/27/2020
	Optima-Belle LLC	Belle, WV	12/9/2020
	Wacker Polysilicon North America	Charleston, TN	11/13/2020
	LyondellBasell	LaPorte, TX	7/27/2021
Second Half of 2023	KMCO	Crosby, TX	4/2/2019
	Yenkin-Majestic	Columbus, OH	4/8/2021
	Wendland 1H Well	Burleson County, TX	1/29/2020
	Didion Milling	Cambria, WI	5/31/2017
	Foundation Food Group	Gainesville, GA	1/28/2021

Published

2023 Drivers of Critical Chemical Safety Change

- *Process Safety Management – online tool*
- *Risk Management Program*
- *Inherently Safer Design*
- *Emergency Preparedness*
- *Reactive Hazards*

Learning from Experience

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The Four Pillars of Risk Based Process Safety

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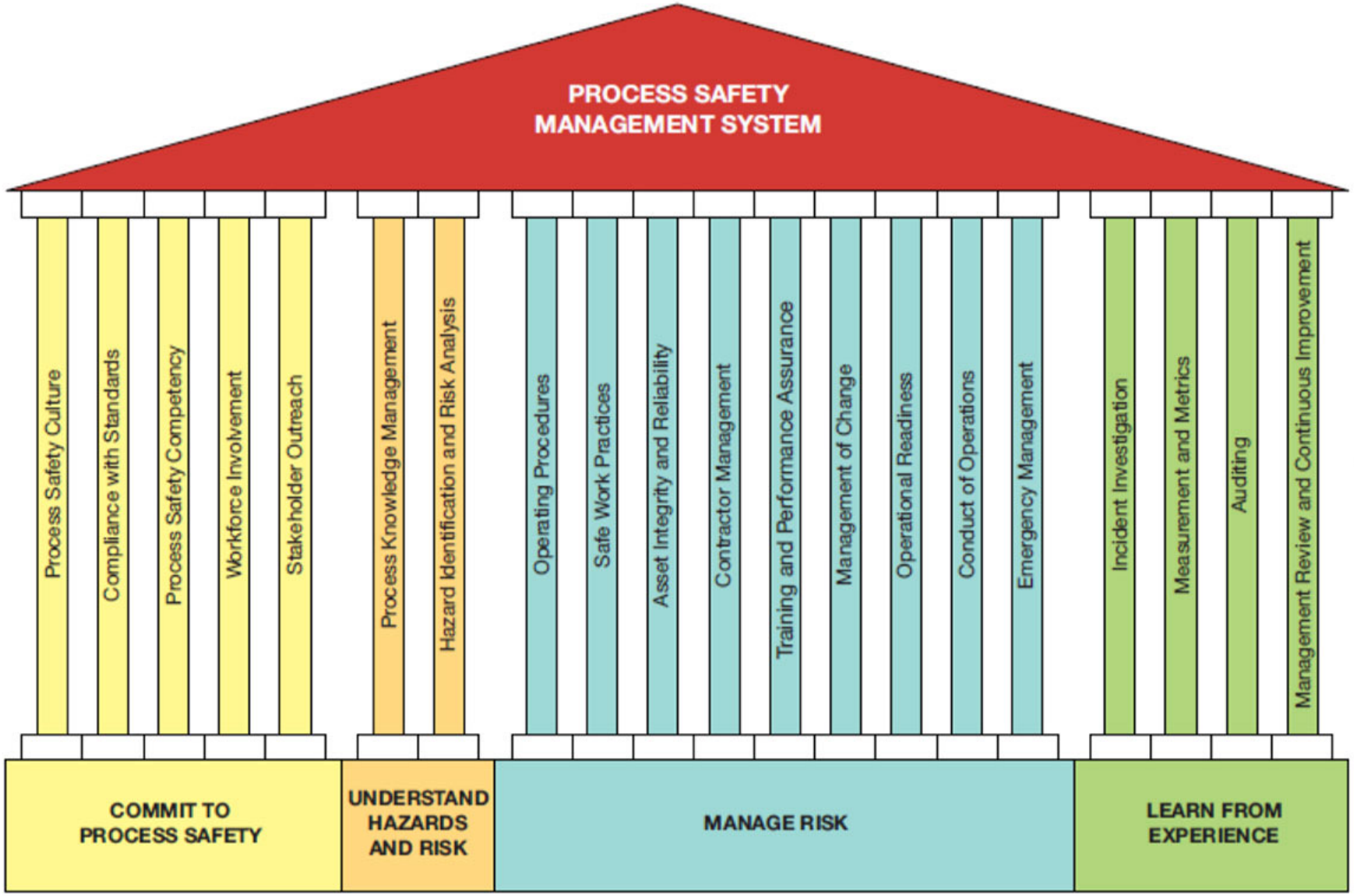

Source: Center for Chemical Process Safety (CCPS)

Trevor Kletz

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Important Themes

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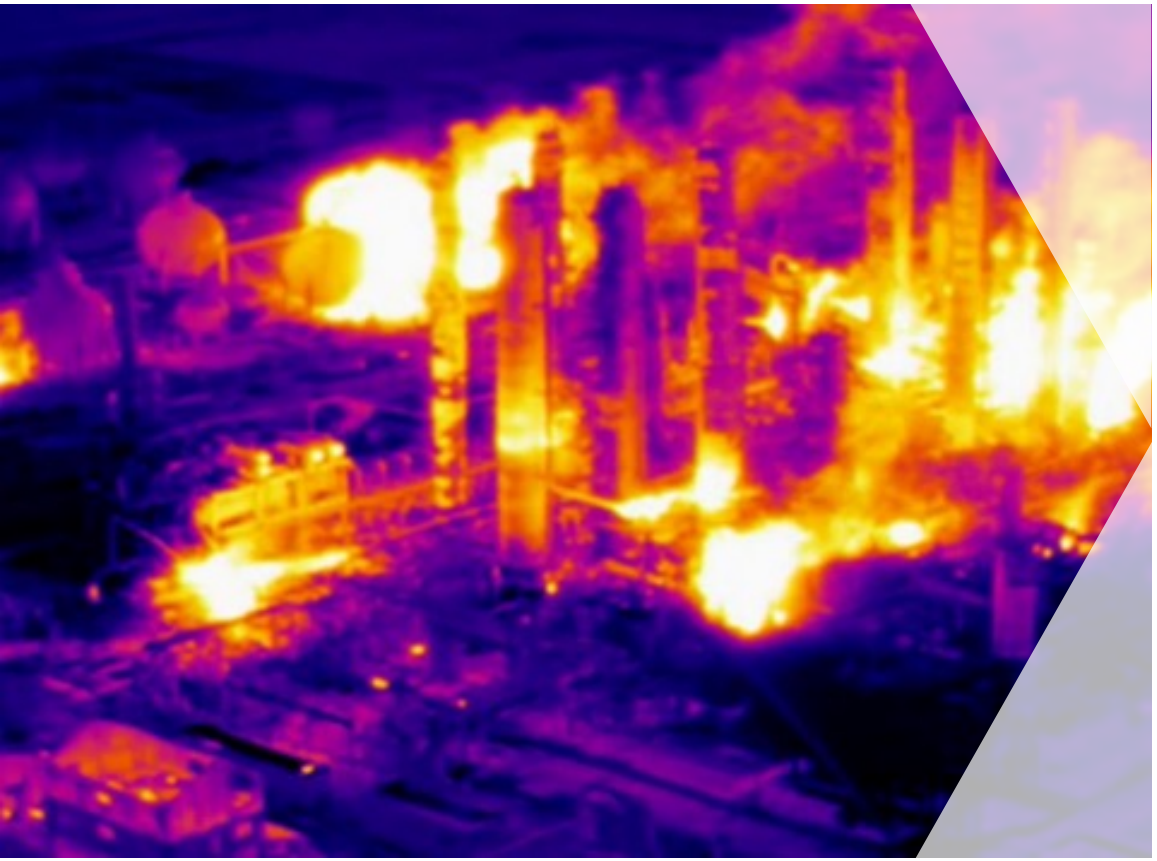

- **Near misses are a gift**
- **Expect Human Error to occur and design accordingly**
- **Incident investigation management system should account for the above**
- **How to deal with “organizational memory”**

What are some strategies you have seen?

Near Misses and Warning Signs – Some Previous Examples

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• Imperial Sugar – 2008	Previous smaller combustible dust fires
• Loy-Lange Box Company – 2017	Previous leaks, history of corrosion before BLEVE
• Kuraray America – 2018	Previous relief device releases, VCEs predicted
• AB Specialty Silicones – 2019	Previous drum explosion due to mixing incompatibles
• TPC Group – 2019	Excessive popcorn polymer for months

Case Study: Kuraray America

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Background

- Pasadena, TX
- May 19, 2018
- 23 Injured
- Ethylene release, fire, explosion
- Starting up morning of incident
- Reactor 2 had lower design pressure than the others, with no visual reminder of this to Operators (740 psig vs 1150 psig)
- Concern over flare permit limits caused limited venting to flare
- Liquid in reactor
- Operator turnover during startup

Kuraray America - 2018

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Case Study: Kuraray America

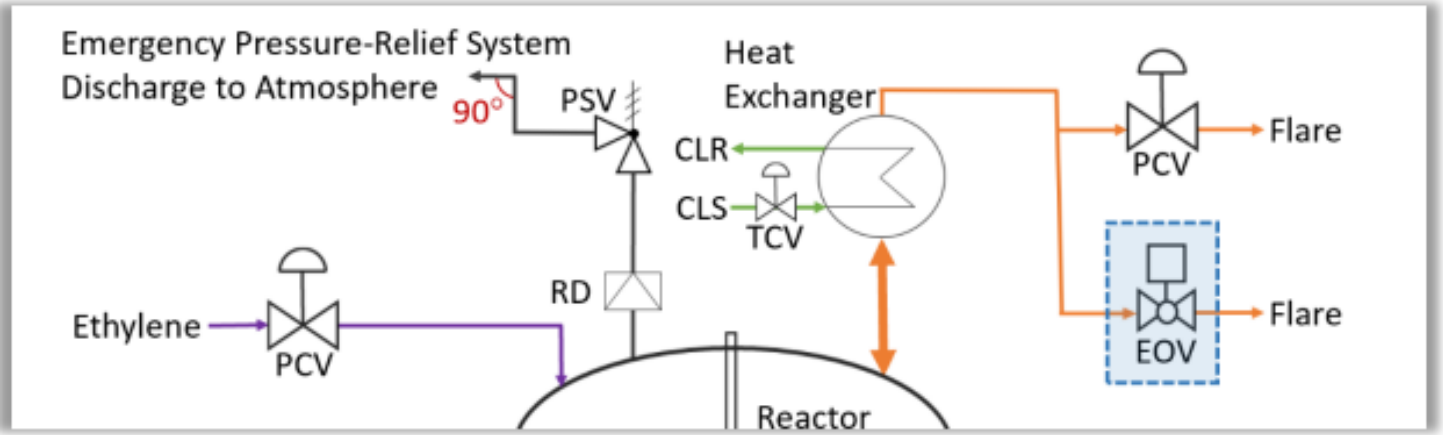

Figure 13. Emergency Open Valve to Flare. (Credit: CSB)

- **Previous near miss in 1980s, but cloud did not ignite. Organizational memory?**
- **2015 PHA team did not recognize liquid in reactors as a hazard, but did recognize reliefs to unsafe locations**
- **How do you know relief is venting to a safe location?**

Published industry studies have shown that flammable gases can be discharged into the air safely by following the design guidelines in API 521. Among other considerations, emergency pressure-relief system outlet piping should direct a release of flammable vapor **vertically** upward to satisfy these design guidelines [79, p. 12].

You can learn from others' experiences too...

CSB

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www.csb.gov

youtube.com/USCSB