THE US CHEMICAL SAFETY BOARD AND INHERENTLY SAFE TECHNOLOGY (IST)

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Disclaimer

This presentation by Manuel R. Gomez of the US Chemical Safety and Hazard Investigation Board (CSB) on 5/5/2011 to the TURI Spring Continuing Education Conference in Lowell, MA has not been approved by the Board and is given for general informational purposes only. Conclusions or other statements do not represent the official views of the CSB. Any material in the presentation that did not originate in Board-approved reports is solely the responsibility of the author and does not represent an official finding, conclusion, or position of the Board.

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Outline

- Primer on US Chemical Safety Board
- Video of recent case illustrating:
  - CSB work
  - Application of IST and other prevention principles by CSB
- Other examples of CSB work involving IST principles
- Where might the CSB go with IST? How?

CSB OVERVIEW

- **1990 Clean Air Act Amendments (only funded 1998)**
- **Trigger: Bhopal**
- **Modeled after NTSB: Not regulatory**
- **Law also created OSHA PSM Standard (1992) and EPA RMP(1996) regulations:**
  - **So work straddles occupational & environmental arenas**

CSB OVERVIEW

Mission

- To ***promote prevention of industrial chemical accidents*** **that harm employees, damage the environment and endanger the public.**

Activities

- **Incident Investigations & Safety Studies**
- **Determine Root/Contributing Cause(s)**
- ***Issue preventive recommendations***
- **Incipient data collection role (not yet in place)**

CSB IN CONTEXT

Staffing:

- EPA, 17,000
- OSHA 1,700

- CSB 45-50

INVESTIGATIONS & STUDIES

- **Independent: No oversight or review of reports or conclusions by *anyone.***
- **Multidisciplinary teams, multiple visits, interviews, extensive data collection, subpoena powers.**
- **Investigate regulatory and voluntary standards, industry common and best practices, similar incidents.**
- **Public meetings & reports (1-2 yrs)**
- **Output:**
  - **5-8 “major”investigations + 5-10 “assessments”/yr**
  - **Study every 3 years**

CURRENT INVESTIGATIONS & STUDIES

- **Approximately:**
  - **17 ongoing investigations; one is BP Gulf explosion**
  - **One modest study: Petroleum storage tanks incidents impacting young people.**
  - **One CSB-sponsored study of IST-related issues by National Academy of Sciences**

RECOMMENDATIONS

- **Agency's Primary Preventive Tool**
- **To agencies, industry, trade groups, standards organizations, unions, others.**
- **Not obligatory, only "moral" authority**
- **If We Do Them Right: Prevention**

Deadly Practices

[video]

Other Examples of IST in CSB Work

Valero Refinery, McKee, TX

- **2/18/2007: Propane fire burned three workers and caused a refinery shut down.**

- **Heat released >5000 lbs of chlorine from three 1-ton cylinders stored nearby (for use in cooling water treatment).**

- **FINDING:**

Safer biocides exist for cooling tower use (sodium hypochlorite).

- **CSB RECOMMENDATION:**

Expedite ongoing move to substitute biocide at all its refineries

Other Examples of IST in CSB Work

Bayer CropScience Pesticide Waste Tank Explosion, Institute, WV

- Waste recovery tank explosion in pesticide process kills 2 workers.
- Methyl isocyanate (MIC) used in the process.
  - Aboveground "day tank" stored MIC for each process, only about 100 ft from unit that exploded.
- Fragments from explosion struck protective steel blanket around MIC tank; no MIC released.
- Piping above MIC tank ***could*** have been struck by fragments and released tank's contents.
    - CONCLUSION: VERY SERIOUS NEAR MISS

Other Examples--Bayer CropScience

- **FINDINGS:**

– High concentration of hazardous chemical processes in Kanawha Valley area.
– OSHA and EPA haven't enough inspection resources to oversee them.

- **CSB RECOMMENDATION:**

– Area's public health authorities to establish a statewide program based on principles of Contra Costa County program (CA).
– Contra Costa program requires consideration of IST for highly hazardous processes.

Other Examples--Bayer CropScience

- **2009: U.S. Congress appropriated $600,000 to the CSB to directly fund NAS study to:**
  - **"examine use and storage of MIC…and….the feasibility of implementing alternative chemicals or processes at the facility."**
- **Although focused on MIC, study will also advise CSB regarding means of incorporating IST in its future work.**

Other Examples—BP Refinery Explosion in Texas

- During start-up, overflow of liquid flammables from a "blowdown drum" discharging to atmosphere
  - Flammable ignited and exploded
  - 15 workers killed, >170 injured

- **FINDING:**

- "Blowdown" design is inherently unsafe in most instances

- **CSB RECOMMENDATION:**

  - Revise API standard to urge use of inherently safer alternatives (e.g., flares)

Where and How Can the CSB Go with IST in the Future?

- Few applications so far.

- CSB and IST expertise are limited.
  - No available repository of process-specific IST information
  - No "pool" of expert advisors or consultants.
  - Decisions very case-specific, research intensive & confounded by difficult factors (e.g., costs, risk transfer)

- Can CSB and TURI network collaborate?
  - Find missed opportunities in earlier CSB cases?
  - Identify opportunities in future?

QUESTIONS?