REFLECTING ON THE PAST, ENVISIONING THE FUTURE: A VISION 20/20 PRIMER

Process Safety Management Mentoring (PSM²) Forum

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### Committed Culture

**EVENT DATE**  January 28, 1984

| **Country** | USA |
| **Location** | Florida |
| **Unit Type** | Space Shuttle |
| **Material** | Rocket Fuel |
| **Event** | Explosion |
| **Cause** | O-ring failure |
| **Fatalities** | 7 |

“The [Rogers] Presidential Commission concluded that the NASA organization contributed to the technical failures attributing the controversial decision to launch to a flawed decision making process.”

“A separate report by the US House of Representatives did lay blame with managers, without naming individuals, suggesting that they were unqualified for the positions they held.”

From “Incidents that Define Process Safety”

In a Committed Culture, executives involve themselves personally, managers and supervisors drive excellent execution every day, and all employees maintain a sense of vigilance and vulnerability.
Committed Culture

The Columbia Accident Investigation Board (CAIB) “also examined similarities between the Columbia accident and the accident that occurred to Challenger some 17 years earlier. In the case of Challenger all of the arguments were made before lift off, in the case of Columbia they were made after the launch. However, in both cases, each decision in the long chain of argument, taken by itself, did not appear to be influencing flight safety at that time. In retrospect, the cumulative effect was fatal.”

From “Incidents that Define Process Safety”

EVENT DATE  February 1, 2003
Country          USA
Location         Texas/Louisiana
Unit Type        Space Shuttle
Material         -
Event            Disintegration
Cause            Wing damage
Fatalities       7

In a Committed Culture, executives involve themselves personally, managers and supervisors drive excellent execution every day, and all employees maintain a sense of vigilance and vulnerability.
Vibrant Management Systems

API RP 75 –

In October 2015, the original SEMS rule, as known as the Workplace Safety Rule, made the previously voluntary practices in the API RP 75 mandatory for all offshore oil and gas operations in federal waters.

In June 2015, the revised SEMS II rule became effective.

From BSSE’s “SEMS Fact Sheet”

EVENT DATE  April 20, 2010
Transocean Deepwater Horizon

Country  USA
Location  Gulf of Mexico
Unit Type  Drilling Rig
Material  Oil
Event  Blowout
Cause  Barrier failure
Fatalities  11
Disciplined Adherence to Standards

The company’s corporate safety procedures and standard industry practice require back up protection in the form of a double valve, which can be locked in the closed position with the intervening space vented, or line blind inserted between flanges whenever a process line connected to operating plant in opened. However, at Phillips Pasadena, a local plant safety procedure for this work was in place that did not require this form of back up to be used.”

From “Incidents that Define Process Safety”

Disciplined Adherence to Standards means using recognized design, operations, and maintenance standards. These standards are followed every time, all the time, and are continually improved.
“As the firefighters were removing the sheathing of the 4-sidecut line, white hydrocarbon vapor visibly began to emerge from under the now-exposed insulation material. The firefighters continued to remove the sheathing despite the formation of hydrocarbon vapor.”

“Directed by the operations personnel, the Chevron Fire Department sprayed the insulation with hard, straight streams using the fire hoses in an attempt to knock the insulation off the pipe.”

From CSB’s Final Investigation Report on Chevron Richmond Refinery Pipe Rupture and Fire

“Sailing with the bow or stern doors open had happened at least five times before, but the ships masters had not been made aware of these incidents by the shore management. These should have been identified as high potential near misses and investigated accordingly. Had this happened, then perhaps remote indicator lights showing door status may have been fitted some time previously.”

From “Incidents that Define Process Safety”
Harmonization of Global Standards

“*A competitor plant* that used MIC as an intermediate integrated the operation of the MIC and downstream plant so there was no inter-plant storage – all MIC produced was immediately used to manufacture the final product.”

“This incident also raised questions on *application of industry standards* in countries where Local Authorities are not applying much scrutiny.”

From “Incidents that Define Process Safety”

**EVENT DATE** December 3, 1984

**Country** India

**Location** Bhopal

**Unit Type** Reactor

**Material** MIC

**Event** Toxic Release

**Cause** Exothermic rxn

**Fatalities** 3,787 to 20,000+

Harmonization of Global Standards for the safe design, operation, and maintenance of equipment streamlines practices, eliminates redundancy, and cooperatively addresses emerging issues.
Enhanced Stakeholder Knowledge

“CSB determined that lack of knowledge and understanding of [Fertilizer Grade Ammonium Nitrate] detonation hazards at the [West Fertilizer Company] facility contributed to the emergency responder fatalities.”

“…CSB found that none of the firefighter HAZMAT field training courses provide sufficient information on firefighter situational awareness and risk assessment that could help them make informed decisions while at the fire scene.”

From CSB’s Final Investigation Report on West Fertilizer Company Fire and Explosion

**Enhanced Stakeholder Knowledge** promotes understanding of risk among all stakeholders, including the public, government, and industry leaders.
“Occidental Petroleum had carried out regular safety audits of its facilities, but they were not performed well. Few if any problems were ever identified, including serious issues with corrosion of deluge pipes and spray heads. When a major problem was found, it was sometimes just ignored.”

From “Incidents that Define Process Safety”

**Occidental Piper Alpha**

- **Country**: United Kingdom
- **Location**: North Sea
- **Unit Type**: Pump
- **Material**: Condensate
- **Event**: Explosion
- **Cause**: Blind flange
- **Fatalities**: 167

**Meticulous Verification** by knowledgeable independent parties helps companies evaluate their process safety programs from an independent perspective.

Photo reference: http://news.bbcimg.co.uk/media/images/68102000/jpg/_68102529_piper_alpha_fire.jpg
“The Federal Government has developed and implemented numerous programs aimed at reducing the safety risks and security risks associated with hazardous chemicals. However, additional measures can be taken by executive departments and agencies (agencies) with regulatory authority to further improve chemical facility safety and security in coordination with owners and operators.”

From Executive Order 13650 – Improving Chemical Facility Safety and Security
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References


