

Process Safety & Risk Management

AIChE - Cleveland

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Presented by

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Year	Location	Description
1984	Bhopal, India	Addition of water to a tank containing methyl isocyanate vapors. 3,000 deaths in local community – eventually 15-22,000
1989	Pasadena, TX	Release of ethylene/propylene lead to explosion. 23 deaths and 130 injuries
1990	Channelview, TX	Explosion of storage tank. 21 deaths
2000	Pasadena, TX	Explosion of a dry butadiene tank. 1 death
2005	Texas City, TX	Explosion during startup of Isomerization Unit. 15 deaths and 170 injuries
2008	Port Wentworth, GA	Dust explosion involving sugar – total destruction of the building complex. 14 deaths and 36 injuries

What is Process Safety Management?

- ***29 CFR 1910.119 – 14 paragraphs (OSHA Standard)***
- ***... involves adopting a comprehensive program to prevent or minimize the consequences of catastrophic releases of toxic, flammable or explosive chemicals.*** These releases may result in toxic, fire or explosion hazards

What is Process Safety Management?

- Process Safety involves all *managers, employees and contract workers*, with the purpose of ***minimizing uncontrolled change from design and/or operating intent at their facility***
- Process Safety is a disciplined framework for managing the integrity of hazardous processes, operating systems, and materials by applying good design principles, engineering, operating practices, and maintenance practices

Process Safety...today

- ...reaction following catastrophic incidents in compliance with government regulations
- Actions are frequently influenced by attorneys rather than engineering, operations and safety
- “Imagine the unimaginable”

***Good people do not need laws to tell
them to act responsibly.***

- Plato

Process Safety...future

- Focus on accident prevention rather than just reactive compliance
- Due diligence – Process safety Culture
 - Texas City Incident (23 Mar 2005) – See Baker Panel Report
 - Flixborough Disaster (1 Jun 1974)

3 Keys to Process Safety – Not 14 paragraphs

- Understand your processes, their hazards and their safe operating limits
- Consistently operate and maintain systems per documented procedures and standards
- Effectively manage all deviations and changes

Understand your processes, their hazards and their safe operating limits...

- A solid understanding of all systems and hazards
 - *Gap Analyses / Program Assessments (Audits)*
 - *Process Safety Information (PSI)*
 - *Process Hazard Analyses (PHAs)*
 - *Incident Analyses*
 - *Emergency Planning & Response*
 - *Trade Secrets*

Consistently operate and maintain systems following documented procedures and standards

- A Zero Defect approach...if it can't be done right...don't do it
- Requires strong leadership
 - *Standard Operating Procedures (SOPs)*
 - *Training*
 - *Mechanical Integrity*
 - *Contractors*
 - *Hot Work*

Effectively manage all deviations and changes

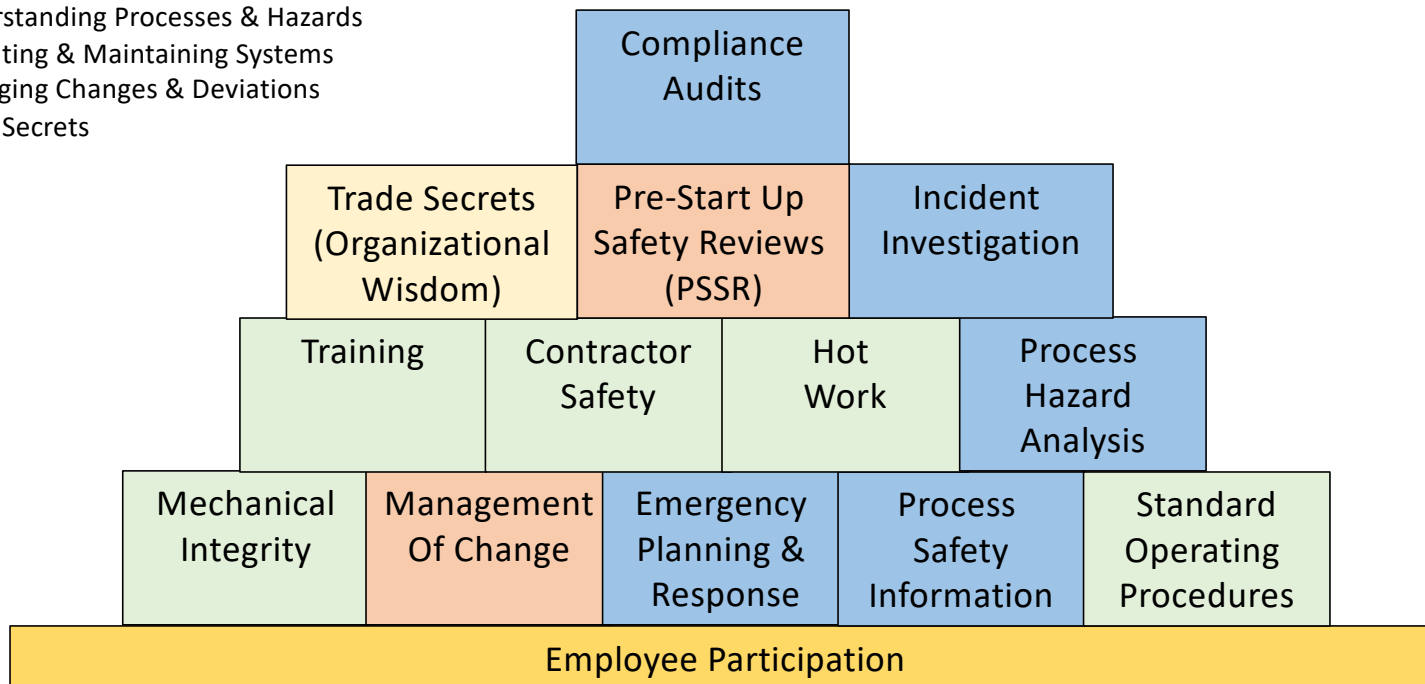
- Meaning...addressing *any* change in:
 - Equipment
 - Maintenance
 - Processes and Procedures
 - Training
 - Raw Materials
 - Products
 - Personnel
- *Management of Change (MOCs)*
- *Pre-startup Safety Reviews (PSSRs)*

PSM Plan – Main Focus Areas

- Employee Involvement
- Understanding Processes & Hazards
- Operating & Maintaining Systems
- Managing Change & Deviations
- Trade Secrets *aka* Organizational Wisdom

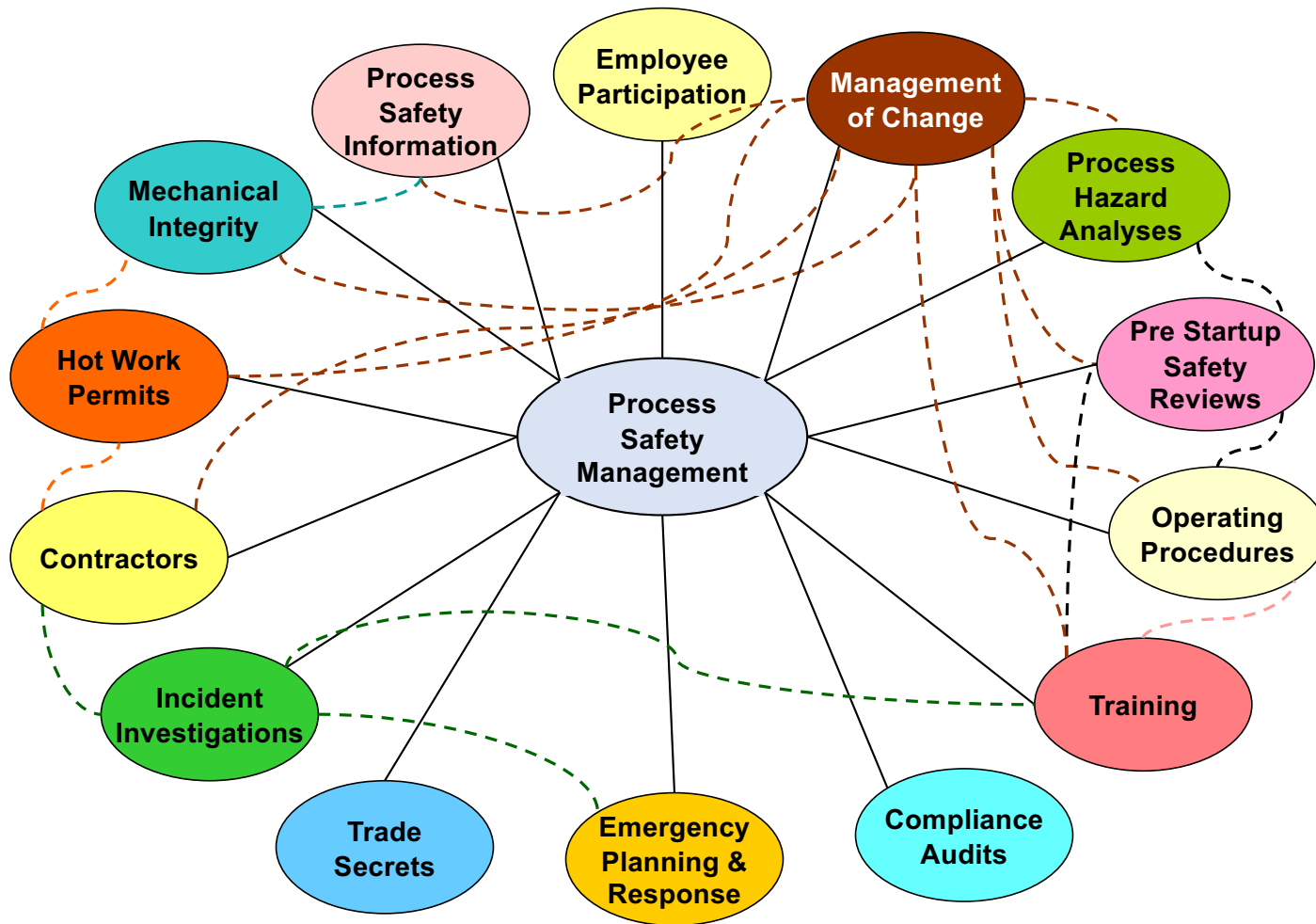
Foundation of PSM - 14 Elements

- Employee Involvement
- Understanding Processes & Hazards
- Operating & Maintaining Systems
- Managing Changes & Deviations
- Trade Secrets



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1984	Bhopal, India	Addition of water to a tank containing methyl isocyanate vapors. 3,000 deaths in local community – eventually 15-22,000 Root Cause – Process Hazard Analysis, Mechanical Integrity
1989	Pasadena, TX	Release of ethylene/propylene lead to explosion. 23 deaths and 130 injuries Root Cause – Mechanical Integrity, Training, Hot Work and Contractors
1990	Channelview, TX	Explosion of storage tank. 21 deaths Root Cause – Mechanical Integrity and Process Hazard Analyses
2000	Pasadena, TX	Explosion of a dry butadiene tank. 1 death Root Cause - ???
2005	Texas City, TX	Explosion during startup of Isomerization Unit. 15 deaths and 170 injuries Root Cause – Management of Change
2008	Port Wentworth, GA	Dust explosion involving sugar – total destruction of the building complex. 14 deaths and 36 injuries Root Cause – Management of Change

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Thank You !

***Questions?
Comments?***

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