Update on Process Safety Regulations

Presented by Geoff Barnard, P.E., CFSE

907-865-5992 x4268 geoff.barnard@aesolns.com

Presenter

Geoff Barnard, P.E., CFSE

- Consultant with aeSolutions Alaska, LLC
- 13 years Automation and Process Safety Engineering
- ISA Safety & Security Division Board of Directors, Software Safety Committee Chair
- Member ISA 18 and ISA 84 committees
- ISA Training Instructor (EC50, EC50CT)
- Authored technical papers and reference text on Safety Instrumented Systems and Process Safety
Integrated Risk Management

- Management System Development, Assessment & Auditing
- PHA/LOPA Studies
- Consequence Modeling & Facility Siting Studies
- IPL Optimization
- Alarm Management
- Industrial Cybersecurity
- Automation Hardware & Software Engineering
- Reliability & Maintenance Support

Presentation Agenda

- Brief History of Process Safety Management regulation and enforcement programs in U.S.
- Presidential Executive Order 13650
- Proposed updates to OSHA PSM and EPA RMP regulations
- Significance of OSHA’s actions regarding “RAGAGEP”
- Update on BSEE reforms for offshore O&G
- Significance to Alaska businesses and open discussion
Process Safety Management Timeline

- **Bhopal Disaster**
  - December 3, 1984
- **Pasadena Chemical Plant Explosion**
  - October 23, 1989
  - 22 killed
  - 300+ injured
- **February 1992**
  - 29 CFR 1910.119 establishes OSHA Process Safety Management (PSM)
- **March 1985**
  - AIChE forms Center for Chemical Process Safety (CCPS)
- **March 1986**
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- **March 1989**
  - AIChE forms Center for Chemical Process Safety (CCPS)
- **October 1989**
  - Pasadena Chemical Plant Explosion
  - 22 killed
  - 300+ injured
- **February 1992**
  - 29 CFR 1910.119 establishes OSHA Process Safety Management (PSM)
- **June 1996**
  - 40 CFR 68 establishes EPA Risk Management Plan (RMP) Rule
- **1998**
  - Chemical Safety Board (CSB) becomes operational
- **2007**
  - OSHA initiates Refinery National Emphasis Program (NEP) Audits
- **2009**
  - OSHA initiates Chemical Facility NEP Audits
- **August 2013**
  - Executive Order 13650 issued: Actions to Improve Chemical Facility Safety and Security
- **June 2013**
  - OSHA issues Executive Order 13650: Actions to Improve Chemical Facility Safety and Security
- **June 2015**
  - OSHA issues Clarification Letter on enforcement surrounding “RAGAGEP”
- **West Fertilizer Company Explosion**
  - April 17, 2013
  - 15 killed
  - 260+ injured
- **Texas City Refinery Explosion**
  - March 23, 2005
  - 15 killed
  - 180+ injured
- **Texas City Refinery Explosion**
  - March 23, 2005
  - 15 killed
  - 180+ injured
- **West Fertilizer Company Explosion**
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  - 15 killed
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- **June 15, 2015**
  - OSHA issues Clarification Letter on enforcement surrounding “RAGAGEP”

OSHA Process Safety Management
29 CFR 1910.119

- **Requirements for preventing catastrophic releases of toxic, reactive, flammable, or explosive chemicals**
- **Performance-based requirements**
- **Concerned with employee safety**
- **Covered processes contain a threshold quantity of one or more Highly Hazardous Chemicals, or 10,000+ pounds of flammable liquids or gases**
**OSHA Process Safety Management**

**29 CFR 1910.119**

- Currently does NOT apply to:
  - Retail facilities
  - Normally unoccupied remote facilities
  - Oil and Gas well drilling and servicing activities
  - Oil and Gas production facilities
  - Hydrocarbon fuel storage
  - Atmospheric tank storage
  - Ammonium Nitrate

**OSHA Process Safety Management**

**29 CFR 1910.119**

- PSM Program contains 14 elements:
  - Employee Participation
  - Process Safety Information
  - Process Hazard Analysis
  - Operating Procedures
  - Training
  - Contractors
  - Pre-Startup Safety Review
  - Mechanical Integrity
  - Hot Work Permits
  - Management of Change
  - Incident Investigation
  - Emergency Planning and Response
  - Compliance Audits
  - Trade Secrets
EPA Risk Management Plan Rule
40 CFR 68

• Concerned with offsite consequences, community impacts, environmental damage, etc.
• Three program levels
• Program 3 closely aligned with OSHA PSM requirements
• Risk Management Plan must be submitted to EPA and state / local planning entities

Process Safety Regulations

• In spite of regulations and investments in safety by the industry, serious incidents continue to occur
• Chemical Safety Board (CSB) tasked with impartial root-cause investigations
• Recommendations issued where gaps are identified:
  – Facility or corporate management systems
  – Industry groups (API, ASME, etc) and Trade Unions
  – Local government policies or enforcement
  – Federal agencies or regulations (OSHA, EPA, etc)
July 17, 2001 – Delaware City Refinery

Fatal explosion after hot work ignites flammable vapors above a spent sulfuric acid tank

CSB issues recommendation to OSHA to ensure coverage of atmospheric storage tanks under PSM

September 8, 2003 – Reactive Chemical Hazards

CSB issues report on 167 serious reactive chemical incidents in U.S. resulting in 108 deaths over 20 years

Included recommendations to OSHA, EPA, & industry groups regarding chemical reactive hazards prevention, including coverage under PSM & RMP regulations
October 23, 2009 – San Juan Gasoline Terminal

Overfill of gasoline storage tank results in 107 acre vapor cloud explosion

300 businesses and homes impacted

CSB issues multiple recommendations to OSHA & EPA including proposed updates to include SIL rated overfill protection, and coverage of above ground storage tanks under PSM / RMP

April 4, 2010 – Anacortes Refinery

Heat exchanger failure during maintenance resulted in explosion and fire, killing 7 workers

CSB issues multiple recommendations to EPA including proposed updates RMP Rule regarding documented use of inherently safe technology
April 17, 2013 – West Fertilizer Company

12 firefighters killed
3 residents killed
260+ injuries

Extensive community damage
150 homes and businesses
2 schools, nursing home, park

CSB issues multiple recommendations to OSHA & EPA
including coverage of ammonium nitrate under PSM/RMP

According to EPA data
the past ten years have resulted in...

• 1,500 reportable accidents
• 500 accidents with off-site impacts
• Nearly 60 fatalities
• 17,000 seeking medical treatment
• $2+ billion in property damage

Increasing public awareness and intolerance
“The incident would likely have been prevented if process safety management principles or good engineering practice had been followed more effectively at the facility.”

CSB Recommendations to Federal Agencies:
- OSHA 44
- EPA 25
- DHS/FEMA 4
- NIOSH 4
- DOT 3
- OPE 3
- DOD 2
- NIST 1

Numerous others to local governments, trade unions, industry groups responsible for engineering standards

August 2013 – Executive Order 13650

Improving Chemical Facility Safety & Security
- Established working group that includes DHS / FEMA, OSHA, EPA, DOJ, ATF, DOT, USDA to address:
  - Community planning and preparedness
  - Federal interagency coordination
  - Improving data management
  - Modernizing policies and regulations
  - Incorporating stakeholder feedback

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**Executive Order 13650**
**Improving Chemical Facility Safety & Security**

**EPA RMP rulemaking and enforcement expansion:**
1. Requirements for third-party program compliance audits
2. Expanded incident investigations with root-cause analysis
3. Inherently safety technology alternatives analysis
4. New disclosure requirements to LEPCs
5. Annual coordination with local LEPCs
6. Tabletop and field emergency response exercises
7. Increased public access to information for accident preparedness planning

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**OSHA considers rulemaking and enforcement expansion:**
1. Ttighter exemptions for Atmospheric Storage Tanks
2. Inclusion of Oil & Gas well drilling and servicing
3. Inclusion of Oil & Gas production facilities
4. Expanded coverage of Reactivity Hazards
5. Updated list of covered Highly Hazardous Chemicals
6. Additional management system elements
7. Requirements for determining and documenting RAGAGEP
8. Requirements to evaluate updates to RAGAGEP
Executive Order 13650
Improving Chemical Facility Safety & Security

9. Expanded scope of Mechanical Integrity requirements
10. Organizational Management of Change
11. Coordination of emergency planning with local responders
12. Mandatory 3rd party program compliance audits
13. Coverage of explosives and pyrotechnics disposal
14. Updates to flammable liquids and spray finish standards
15. Inclusion of Ammonium Nitrate as a covered chemical
16. Tightening exemption for chemical retail facilities
17. Clarifying threshold quantities and concentrations of Highly Hazardous Chemicals

June 5, 2015
OSHA issues Clarification Letters on:
• Threshold quantities and covered concentration of Highly Hazardous Chemicals
• Requirements and enforcement surrounding RAGAGEP

Recognized And Generally Accepted
Good Engineering Practice
OSHA Existing Requirements for RAGAGEP

29 CFR 1910.119

- (d)(3)(ii): Employers must document that all equipment in PSM-covered processes complies with RAGAGEP;
- (j)(4)(ii): Inspections and tests are performed on process equipment subject to the standard’s mechanical integrity requirements in accordance with RAGAGEP;
- (j)(4)(iii): Inspection and test frequency follows manufacturer’s recommendations and good engineering practice, and more frequently if indicated by operating experience.

Equipment must be designed, operated, maintained, and tested to ensure safety

June 5, 2015 – OSHA Clarification on RAGAGEP

RAGAGEP must be both “recognized and generally accepted” and “good engineering” practices

- Owner must determine and document the applicable code, standard, or recommended practice and follow in it’s entirety, including “grandfathered” equipment
- Mandatory compliance with all “shalls” and “shall nots”
- Selective compliance is not acceptable
- Internal company standards are not a substitute for, and cannot deviate from RAGAGEP
- Updates to RAGAGEP must be evaluated for applicability
Recent Examples of RAGAGEP

- ISA/IEC 62443 (ISA 99) Industrial Automation and Control System Security

* NFPA 85, 86, 87 and API RP-538, RP-556, application specific standards for Fired Heaters all contain linking clauses to ANSI/ISA 84

Prescriptive design standards are not being replaced, but industry is shifting toward inclusion of risk-based, performance standards as well.

Safety & Environmental Management Systems 30 CFR 250

- Offshore Oil & Gas covered by BSEE “Workplace Safety Rule” based upon API RP 75
- Requires development of a Management System with 12 elements, similar to PSM / RMP
- Original SEMS rule effective November 15, 2010
- Implementation required within one year
- First program audit required within three years
Safety & Environmental Management Systems
30 CFR 250

• SEMS II expansion effective June 4, 2013
• Added provisions increasing employee participation, job safety analysis, individual authority to stop work, ability to report unsafe conditions, 3rd party audits
• Implementation required within one year
• Program audits required to address within two years

April 14, 2016 – BSEE Well Control Regulation

• Response to Deepwater Horizon Investigation
• Combination of prescriptive and performance-based requirements for:
  – Blowout Preventers (BOPs) – Cementing
  – Well Design – Real-Time Monitoring
  – Well Control – Subsea Containment
  – Casing
• Applies to oil and gas drilling, completions, workovers, and decommissioning
Conclusions

• Regulations are becoming more stringent
• Engineering standards are shifting from prescriptive to performance / risk-based
• All of us play a part in reducing risk
• All of us have responsibility to be aware of applicable regulations and appropriate “Good Engineering Practice”

Impacts to Alaska Businesses

• Upstream O&G drilling and production facilities could become covered by PSM / RMP
• PSM / RMP scope likely to grow for facilities already covered
• Increased regulatory requirements will impact existing facilities and new projects nationwide
• How will Alaska upstream facilities and projects be impact relative to rest of United States?