Creating Customers for Life™

BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Process Safety Management (PSM) Hot Points

1

Training Objectives

Associates who participate in this training session will be able to:

1) Understand the history and purpose of the PSM standard;
2) Describe the general requirements of the standard;
3) Know the "Hot Points" that result in non-compliance and could potentially result in an accidental release; and
4) Utilize the information to validate and/or improve their facility's PSM program.

2

Overview

In this Session:

1) History and Purpose
2) OSHA vs. EPA
3) Applicability
4) PSM Requirements
5) Correlated Statistics

3

The PSM Standard

Purpose

29 CFR 1910.119

This section contains requirements for ***preventing or minimizing the consequences of catastrophic releases*** of toxic, reactive, flammable, or explosive chemicals.

4

PSM History and Introduction

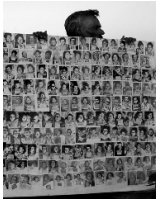
- FLIXBOROUGH, UK - June 1, 1974
  - Massive explosion - Deceased: 28, Injured: 36
- SEVESO, ITALY - July 10, 1976
  - Runaway reaction - Crops lost - 80,000 animals slaughtered
- BHOPAL, INDIA - December 3, 1984
  - Massive release of Methyl Isocyanate
  - Immediately Deceased: 2,259, Total Dead/Injured: Unknown
- NORTH SEA, UK - July 6, 1988
  - Oil platform explosion - Deceased: 167
- HOUSTON, TX - OCTOBER 23, 1989
  - Oil refinery multiple explosions - Deceased: 23, Injured: 314

5

PSM History and Purpose

Chemical Related Accidents

- BHOPAL, INDIA - December 3, 1984



- Union Carbide Corporation and Union Carbide India Limited
- Cause: Malfunctioning valve allowed water to enter a tank containing MIC creating a runaway exothermic reaction
- Methyl Isocyanate
- Deceased: Unknown

6

PSM History and Purpose

Chemical Related Accidents

- HOUSTON, TX - OCTOBER 23, 1989

- Phillips Petroleum - Houston Chemical Complex
- Cause: Accidental release of extremely flammable process gas during regular maintenance on one of the polyethylene reactors.
- Multiple explosions
- Deceased - 23, Injured - 314

7

PSM History and Purpose

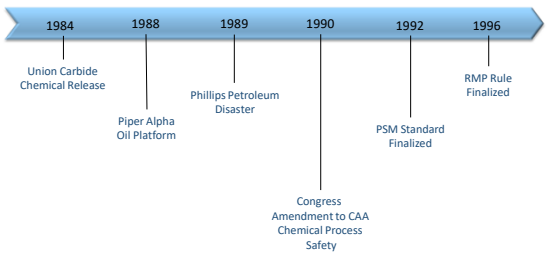
Laws Regulating Hazardous Materials

- 1990 - The Clean Air Act Amendments (CAAA)
  - Process Safety Management of Highly Hazardous Chemicals. (29 CFR 1910.119)
  - Risk Management Programs for Chemical Accidental Release Prevention. (40 CFR Part 68)
  - National Chemical Safety and Hazard Investigation Board. (CSB)

8

PSM History and Purpose

Timeline of Events: *History of PSM/RMP*



9

The PSM Standard

OSHA vs. EPA

Occupational Safety and Health Administration (OSHA)
29 CFR 1910.119 - Process Safety Management of Highly Hazardous Chemicals

Environmental Protection Agency (EPA)
40 CFR PART 68 - Chemical Accident Prevention Provisions
Subpart D—PROGRAM 3 PREVENTION PROGRAM

10

The PSM Standard

OSHA vs. EPA

Important Distinctions: ***Purpose***

OSHA	EPA
To prevent unwanted releases of hazardous chemicals especially into locations that could expose **employees** and others to serious hazards.	To prevent serious chemical accidents that have the potential to affect **public** health and the **environment**.

11

The PSM Standard

OSHA vs. EPA

Important Distinctions: ***Language***

OSHA	EPA
Employer	Owner/Operator
Workplace	Environment & Public
Hazardous Chemical	Regulated Substance

12

The PSM Standard

Applicability - Identify Covered Processes

29 CFR 1910.119(a)(1)(i)

A ***process*** which involves a chemical at or above the specified threshold quantities listed in appendix A to this section;

13

The PSM Standard

Applicability - Identify Covered Processes

OSHA defines a "Process" as:

"Any ***activity*** involving a highly hazardous chemical including any use, storage, manufacturing, handling, or the on-site movement of such chemicals, or combination of these activities."

14

The PSM Standard

Applicability - Identify Covered Processes

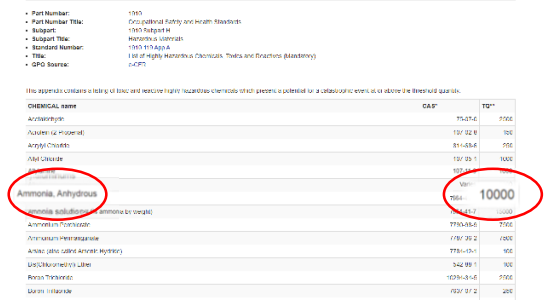
29 CFR 1910.119(a)(1)(i)

"A process which ***involves a chemical at or above the specified threshold quantities*** listed in appendix A to this section;"

15

The PSM Standard

Applicability - Identify Covered Processes



16

The PSM Standard

Applicability - Identify Covered Processes

- 29 CFR 1910.119(a)(1)(ii)
- A process which involves a ***Category 1 flammable*** gas or liquid with a ***flashpoint below 100°F*** in a quantity of 10,000 pounds or more ***except for***:
    1. Hydrocarbon fuels used solely for workplace consumption as a fuel (heating, vehicles, etc.)
    2. Flammable liquids with a flashpoint below 100°F kept below their normal boiling point without benefit of chilling or refrigeration

17

The PSM Standard

Applicability - Identify Covered Processes

Does not apply to:

- Retail facilities;
- Oil or gas well drilling or servicing operations; or,
- Normally unoccupied remote facilities.

18

The PSM Standard

Understanding Performance Based Standards

Written to achieve a specific objective

- State "what" must be performed, but not "how" it is to be performed
- Emphasis is placed on the desired outcome
- Gives the flexibility to tailor programs
- Challenge: Does our program comply?

19

The PSM Standard

Process Safety Management

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

20

Creating Customers for Life™

BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Employee Participation 1910.119(c)

21

Employee Participation

29 CFR 1910.119(c)(1)

Employers must ***develop a written plan of action*** regarding the implementation of the employee participation.

22

Employee Participation

29 CFR 1910.119(c)(2)

Employers must ***consult with employees*** and their representatives on the conduct and development of ***process hazards analyses*** and on the development of the ***other elements of process safety management*** in this standard.

23

Employee Participation

29 CFR 1910.119(c)(3)

Employers must provide to employees and their representatives ***access*** to ***process hazard analyses*** and to all ***other PSM information***.

24

Employee Participation

Common Deficiencies:

- No written employee participation program
- Employees unaware of PSM program
- No participation in the PSM Program Implementation
- Employees don't know how to access PSM program information

Hot Points

25

Creating Customers for Life™

BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Process Safety Information 1910.119(d)

26

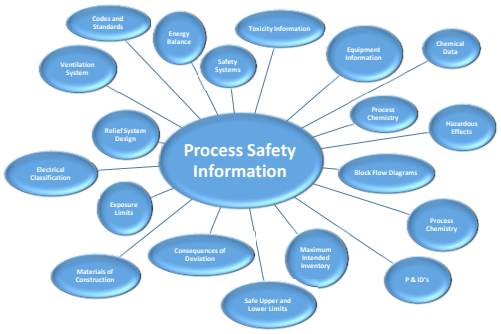
Process Safety Information

29 CFR 1910.119(d)

The employer must complete a compilation of written process safety information ***before conducting any process hazard analysis***.

27

Process Safety Information



28

Process Safety Information

Process Safety Information

The compilation of the Process Safety Information will include **Information Pertaining to the:**

- Hazards of the Highly Hazardous Chemical (d)(1)
- Technology of the Process (d)(2)
- Equipment in the Process (d)(3)

29

Process Safety Information

Hazards of the highly hazardous chemical must include:

- Toxicity information
- Permissible exposure limits
- Physical data
- Reactivity data
- Corrosivity data
- Thermal and chemical stability data
- Hazardous effects of inadvertent mixing of different materials (i.e. oil)

30

Process Safety Information

29 CFR 1910.119(d)(2)

This process safety information must include information pertaining to the… ***technology of the process***...

31

Process Safety Information

Technology of the process must include:

- Block flow or simplified process flow diagram
- Process chemistry
- Maximum intended inventory
- Safe upper and lower limits (temperatures, pressures, etc.)
- Evaluation of consequences of deviations, including those affecting the safety and health of employees.

32

Process Safety Information

29 CFR 1910.119(d)(3)

This process safety information must include information pertaining to the… ***equipment in the process***...

33

Process Safety Information

Equipment in the process must include:

- Materials of construction
- Piping and instrument diagrams (P&ID's)
- Electrical classification
- Relief system design and design basis
- Ventilation system design
- Design codes and standards employed
- Material and energy balances
- Safety systems (e.g. interlocks, detection system, etc.)
- RAGAGEP

34

Process Safety Information

Recognized and Generally Accepted Good Engineering Practice (RAGAGEP)

Applies to process equipment **design** and **maintenance**; including **inspection** and **test frequencies and practices**.

Examples:

- Widely adopted codes and standards
- Consensus documents
- Non-consensus documents
- Internal standards

35

Process Safety Information

29 CFR 1910.119(d)(3)(iii)

For existing equipment designed and constructed in accordance with ***codes, standards, or practices*** that are ***no longer in general use***, the employer must determine and document that the equipment is ***designed, maintained, inspected, tested,*** *and* ***operating in a safe manner***."

36

Process Safety Information

Common Deficiencies:

- Incomplete Information
- Incorrect Information
- Process Safety Information is not maintained while making changes to the system.

Hot Points

37

Creating Customers for Life™

BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Process Hazard Analysis 1910.119(e)

38

Process Hazard Analysis

29 CFR 1910.119(e)(1)

The employer must perform an initial ***process hazard analysis*** (hazard review) on processes covered by this standard. The process hazard analysis must be appropriate to the ***complexity of the process*** and must ***identify***, ***evaluate***, and ***control the hazards*** involved in the process.

39

Process Hazard Analysis

When to conduct a PHA:

- **Must** be completed for:
  - New installation (new equipment/technology)
  - An existing system transitioning to a covered process
- **Possibly** complete for:
  - As part of a Management of Change
  - Following incident or near-miss

40

Process Hazard Analysis

The purpose of this element:

A PHA is an organized, systematic and thorough system analysis to:

(1) Predict what conditions could cause a chemical release.

(2) Identify and Evaluate safeguards and controls already in place.

(3) Recommend further controls, if needed.

41

Process Hazard Analysis

29 CFR 1910.119(e)(2)

The employer must use ***one or more of the following methodologies…***

1) Checklist
2) What-If/Checklist Analysis
3) Hazard and Operability Study (HAZOP)
4) Fault Tree Analysis
5) Failure Mode and Effects Analysis (FMEA)
6) An appropriate equivalent methodology

42

Process Hazard Analysis

29 CFR 1910.119(e)(3)

The process hazard analysis ***must address***:

1) The hazards of the process
2) Previous incidents which had a potential for catastrophic consequences
3) Engineering and administrative controls
4) Consequences of failure of the controls
5) Facility Siting
6) Human Factors

43

Process Hazard Analysis

29 CFR 1910.119(e)(3)(vii)

"A ***qualitative evaluation*** of a range of the possible safety and health ***effects of failure of controls*** on employees in the workplace."

44

Process Hazard Analysis

PHA Risk Matrix Example

Consequence		Frequency: Not expected to occur (Level 1)	Occur only a few times during life of the refrigeration system (Level 2)	Occur several times during life of the refrigeration system (Level 3)	Occur yearly or more often (Level 4)
Potential for first aid only	Level 1	D	D	C	C
Potential for injury requiring physician's care	Level 2	D	C	B	B
Potential for single life-threatening injury	Level 3	C	B	B	A
Potential for multiple life-threatening injuries	Level 4	C	B	A	A

A – Critical - Must Be Improved
B – Undesirable - Must Be Improved
C – Acceptable With Controls
D – Acceptable

45

Process Hazard Analysis

29 CFR 1910.119(e)(4)

Must be performed by a ***team with expertise in engineering and process operations***, and include:

- At least one employee who has **experience** and **knowledge** specific to the **process**
- One member… **knowledgeable** in the specific process hazard analysis **methodology** being used

46

Process Hazard Analysis

PHA Recommendations

Establish a system to **promptly** address the PHA team's findings and recommendations

1) Addressed in a timely manner
2) Documented
3) Resolutions could be resolved by:
   - Accepted and implemented
   - Modified and implemented
   - Rejected

47

Process Hazard Analysis

Revalidation & Retention

Revalidated Every **5 years**

- By a team meeting the same requirements in paragraph (e)(4)
- Assure is consistent with the current process

Retained for the **Life of the Process**

48

Process Hazard Analysis

Common Deficiencies

- PHA not performed
- Not retained for the life of the process
- Resolution of recommendations not documented

Hot Points

49

Creating Customers for Life™

BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Operating Procedures 1910.119(f)

50

Operating Procedures

29 CFR 1910.119(f)(1)

The employer must develop and implement written operating procedures that provide clear instructions for ***safely conducting activities*** involved in each covered process.

51

Operating Procedures

Written Operating Procedures

- Must be written
- Provide clear instructions
- Consistent with process safety information

52

Operating Procedures

Written Operating Procedures

Must include these elements:

1. Steps for each operating phase
2. Operating limits
3. Consequences of Deviation
4. Safety and health considerations
5. Safety systems and their functions

53

Operating Procedures

Written Operating Procedures

29 CFR 1910.119(f)(2) through (f)(4) state written operating procedures must be:

1. "Readily available" to the operators
2. Reviewed as often as necessary to assure that they reflect current operating practice
3. Certified Annually
4. Safe Work Practices implemented

54

Operating Procedures

Common Deficiencies:

- No written procedures
- Procedures not certified annually
- Did not include emergency shutdown procedures
- Procedures not current and/or modified when changes are made to the system

Hot Points

55

Creating Customers for Life™

BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Training
1910.119(g)

56

Training

1910.119(g)(1)(i)

Each employee presently involved in operating a process, and each employee before being involved in operating a newly assigned process, must be trained in an ***overview of the process*** and in the ***operating procedures***.

57

Training

Initial Training

- An “overview of the process”
- The operating procedures they will be required to perform
- Emphasis must be placed on:
  - Safety and health
  - Emergency procedures
  - Applicable safe work practices.

58

Training

Refresher Training 29 CFR 1910.119(g)(2)

- Minimum of every 3 years
- More often if necessary to assure the employee:
  - Understands the requirements
  - Adheres to procedures
- Employees must be consulted on frequency

59

Training

Training Documentation

The employer shall prepare a record which contains:

- Identity of the employee
- Date of training
- Means used to verify the employee understood the training

60

Training

Common Deficiencies:

- Training not documented
- Verification of understanding not documented
- No training on an "Overview of the Process"
- Refresher training not up-to-date

Hot Points

61

Creating Customers for Life™

BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Contractors
1910.119(h)

62

Contractors

1910.119(h)(1) - Application

Applies to contractors ***performing maintenance*** or ***repair, turnaround, major renovation***, or specialty work ***on or adjacent to*** a covered process.

63

Contractors

1910.119(h)(2)(i)

Employer Responsibilities. The employer, when selecting a contractor, must ***obtain*** and ***evaluate*** information regarding the contract employer's safety performance and programs.

64

Contractors

Employer Responsibilities 1910.119(h)(2)

The employer must inform contract employers on:

- Potential **fire, explosion, or toxic release hazards** related to the contractor's work and the **process**.
- Applicable provisions of the **emergency action plan**
- Safe work practices – including control over the **entrance** and **exit**

65

Contractors

Employer Responsibilities 1910.119(h)(2)

The employer must:

- Periodically **evaluate** the **performance** of contract employers in fulfilling their obligations
- Maintain a contract employee **injury and illness log** related to the contractor's work in **process areas**

66

Contractors

1910.119(h)(3)(i)

Contractor Responsibilities. The contract employer must assure that ***each contract employee is trained*** in the work practices necessary to ***safely perform his/her job*.**

67

Contractors

Contractor Responsibilities 1910.119(h)(3)

Must assure:

- Contract employees are trained on:
  - Work practices necessary to perform their jobs safely
  - Potential hazards related to the process (fire, explosion, toxic release, etc.)
  - Applicable provision of the Emergency Action Plan
- All facility safe work practices are followed

68

Contractor Responsibilities

1910.119(h)(3)(v)

Contractor Responsibilities. "…advise the employer of any unique ***hazards*** presented by the contract employer's ***work***, or of ***any hazards found*** by the contract employer..."

69

Contractors

Common Deficiencies:

- Questionnaire completed but not evaluated
- Security - Checking in & Checking out
- Contractors not trained
- No Performance Evaluations
- No Approved Contractor List

Hot Points

70

Creating Customers for Life™

BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Pre-Startup Safety Review 1910.119(i)

71

Pre-Startup Safety Review

1910.119(i)(1)

The employer must ***perform a pre-startup safety review for new facilities*** and for ***modified facilities*** when the modification is significant enough to require a change in the process safety information.

72

Pre-Startup Safety Review

PSSR Procedures 1910.119(i)(1)

The employer shall perform a pre-startup safety review:

- New facilities
- Modified facilities
  - When the modification requires a change in the process safety information

73

Pre-Startup Safety Review

1910.119(i)(2)

The pre-startup safety review must confirm that ***prior to the introduction of highly hazardous chemicals*** to a process the following is addressed:

74

Pre-Startup Safety Review

PSSR Procedures 1910.119(i)(2)

Prior to the introduction of highly hazardous chemicals:

- Construction and equipment is in accordance with design specifications
- Procedures are in place and are adequate
- For **new facilities:** a PHA has been performed and recommendations resolved
- For **modified facilities**, the requirements of the MOC are completed
- Training of each employee involved in operating a process has been completed

75

Pre-Startup Safety Review

Pre-startup Safety

Must verify completion of updates within other elements.

76

Pre-Startup Safety Review

Common Deficiencies:

- PSSR not performed
- PSSR performed not documented
- Project PHA recommendations have not been resolved

Hot Points

77

Creating Customers for Life™

BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Mechanical Integrity 1910.119(j)

78

Mechanical Integrity

Application

This section apply to the following process equipment:

- 1910.119(j)(1)(i) thru (vi)
  - Pressure vessels and storage tanks;
  - Piping systems and valves;
  - Relief and vent systems and devices;
  - Emergency shutdown systems;
  - Controls (including monitoring devices and sensors, alarms, and interlocks) and,
  - Pumps.

79

Mechanical Integrity

29 CFR 1910.119(j)(2)

Written Procedures. The employer must ***establish and implement written procedures*** to maintain the on-going integrity of process equipment.

80

Mechanical Integrity

Written Procedures

- Must create written procedures
- Must be implemented
- Each employee involved in maintaining the on-going integrity must be trained

81

Mechanical Integrity

29 CFR 1910.119(j)(4)(i)

Inspections and tests ***must be performed*** on process equipment.

82

Mechanical Integrity

Inspections and Testing: Procedures and Frequency

- Applicable manufacturers' recommendations
- Good engineering practices (RAGAGEP)
- Be performed more frequently if determined by prior operating experience

RAGAGEP

83

Mechanical Integrity

29 CFR 1910.119(j)(4)(iv)

The employer must **document each inspection and test** performed…

- Date of the inspection or test
- Name of the person
- The serial number or other equipment identifier
- A description of the inspection or test performed
- The results of the inspection or test

84

Mechanical Integrity

Equipment Deficiencies 29 CFR 1910.119(j)(5)

Deficiencies in equipment that are outside acceptable limits must be corrected:

- Before further use; or
- In a safe and timely manner when necessary means are taken to assure safe operation.

85

Mechanical Integrity

Quality Assurance 29 CFR 1910.119(j)(6)(i)

In the construction of new plants and equipment, the employer must assure:

- During construction, the equipment is suitable for the process application
- Equipment is installed properly and consistent with design specifications
- Maintenance materials, spare parts and equipment are suitable for the process

86

Mechanical Integrity

Common Deficiencies:

- No written MI procedures
- Inspections and tests do not follow manufacture's recommendations and/or RAGAGEP (type and frequency)
- Documentation does not include all required elements.
  - Date of the inspection or test
  - Name of person who performed
  - Equipment identifier
  - Description of the inspection or test
  - Results of the inspection or test

Hot Points

87

Creating Customers for Life™

BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Hot Work 1910.119(K)

88

Hot Work

29 CFR 1910.119(k)(1)

The employer must issue a ***hot work permit*** for hot work operations conducted on or near a covered process.

89

Hot Work

29 CFR 1910.119(k)(2)

The permit must document that the fire prevention and protection ***requirements in 29 CFR 1910.252(a) have been implemented prior*** to beginning the hot work operations.

90

Hot Work

29 CFR 1910.119(k)(2)

The permit must be ***kept on file until completion of the hot work operations***.

OR

91

Hot Work

Common Deficiencies:

- Hot work permits not fully completed
- No verification method

Hot Points

92

Creating Customers for Life™

BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Management of Change 1910.119(l)

93

Management of Change

29 CFR 1910.119(l)(1)

The employer must ***establish and implement written procedures to manage changes*** (except for "replacements in kind")…

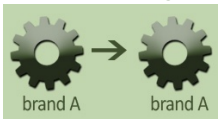


94

Management of Change

Replacement in kind

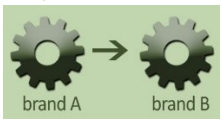
Identical Change



An identical change does not require an MOC to be performed

VS

Replacement in Kind



A full MOC is not needed, but should be verified

95

Management of Change

Management of Change Procedures

Written procedures to manage changes to:

1. Process chemicals
2. Technology
3. Equipment
4. Procedures
5. Changes to facilities that affect a covered process

96

Management of Change

29 CFR 1910.119(l)(2)

The MOC procedures must assure that the ***following considerations are addressed*** **prior** to any change:

97

Management of Change

Management of Change Procedures

The following considerations are addressed:

- **The technical basis for the proposed change**
- Impact of change on safety and health
- Modifications to operating procedures
- Necessary time period for the change
- Authorization requirements for the proposed change

98

Management of Change

Management of Change Procedures

The following considerations are addressed:

- The technical basis for the proposed change
- **Impact of change on safety and health**
- Modifications to operating procedures
- Necessary time period for the change
- Authorization requirements for the proposed change

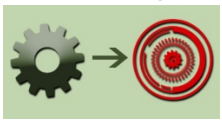
99

Management of Change

Process Change

Impact of change on safety and health

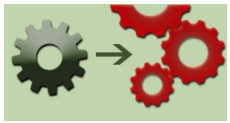
Minor Change



MOC w/ Safety and Health Checklist

VS

Major Change



MOC w/ Process Hazard Analysis

100

Management of Change

Management of Change Procedures

The following considerations are addressed:

- The technical basis for the proposed change
- Impact of change on safety and health
- **Modifications to operating procedures**
- Necessary time period for the change
- Authorization requirements for the proposed change

101

Management of Change

Management of Change Procedures

The following considerations are addressed:

- The technical basis for the proposed change
- Impact of change on safety and health
- Modifications to operating procedures
- **Necessary time period for the change**
- Authorization requirements for the proposed change

102

Management of Change

Management of Change Procedures

The following considerations are addressed:

- The technical basis for the proposed change
- Impact of change on safety and health
- Modifications to operating procedures
- Necessary time period for the change
- **Authorization requirements for the proposed change**

103

Management of Change

29 CFR 1910.119(l)(3)

Employees involved in operating a process and maintenance and contract employees whose job tasks will be affected by a change in the process ***must be informed of, and trained in, the change prior to start-up*** of the process or affected part of the process.

104

Management of Change

Management of Change Procedures

Employees informed of and trained in the change:

- Operators
- Maintenance who may be affected
- Contractors who may be affected
- Prior to start-up
- Documented

105

Management of Change

29 CFR 1910.119(l)(4)

If a change results in a change in the ***process safety information***, such information must be ***updated accordingly***.

106

Management of Change

107

Management of Change

29 CFR 1910.119(l)(5)

If a change results in a change in the ***operating procedures*** or practices, such procedures or practices must be ***updated accordingly***.

108

Management of Change

Common Deficiencies:

- Changes made to the system without MOC
- MOC not fully completed
- PSI not updated accordingly
- Documented training not provided
- No authorization signatures

Hot Points

109

Creating Customers for Life™

BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Incident Investigation 1910.119(m)

110

Incident Investigation

Incident Investigation Requirements

- Incident Investigation (m)(1) thru (m)(3)
- Investigation Report (m)(4)
- Resolving Report Findings (m)(5)
- Review and Retention (m)(6)

111

Incident Investigation

29 CFR 1910.119(m)(1)

The employer must ***investigate each incident which resulted in, or could reasonably have resulted in a catastrophic release*** of highly hazardous chemical in the workplace.

112

Incident Investigation

Catastrophic Release

OSHA

- A "***major uncontrolled emission, fire, or explosion***, involving one or more highly hazardous chemicals, that presents serious danger to employees in the workplace."

EPA

- "…involving one or more regulated substances that presents imminent and substantial endangerment to public health and the environment."

113

Incident Investigation

Requirements for an Incident Investigation

- Initiated as early as possible, but not later than 48 hours
- Establish an incident investigation team
- Must be within "48 Hours"

114

Incident Investigation

29 CFR 1910.119(m)(4)

A ***report must be prepared*** at the conclusion of the investigation…

115

Incident Investigation

Investigation Report

A report must be prepared which includes at a minimum:

- Date of the incident;
- Date the investigation began;
- A description of the incident;
- The factors that contributed to the incident; and,
- Recommendations resulting from the investigation.

Investigation reports must be **retained for five years**.

116

Incident Investigation

Incident Report Review 29 CFR 1910.119(m)(6)

Reviewed with all affected personnel.

- Maintenance and Refrigeration Operators
- Employees who work near the area
- Contractors
- ????

117

Incident Investigation

Common Deficiencies:

- Investigation not initiated within 48 hours
- Recommendations not resolved
- Report not reviewed with all affected personnel

Hot Points

118

Creating Customers for Life™

BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Emergency Planning & Response 1910.119(n)

119

Emergency Planning & Response

29 CFR 1910.119(n)

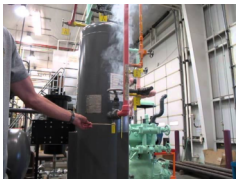
The employer must establish and implement an ***emergency action plan*** for the entire plant in accordance with the provisions of **29 CFR 1910.38.**

120

Emergency Planning & Response

29 CFR 1910.119(n)

In addition, the emergency action plan must include **procedures for handling small releases**.



121

Emergency Action Plan

Emergency Action Plans 1910.38:

- Procedures for reporting a fire or other emergency;
- Emergency evacuation procedures – types; exit routes and assembly areas
- Procedures for employees addressing critical operations
- Methods to account for all employees
- Procedures for employees performing rescue and medical duties
- Person to contact for more info on plan and their duties

122

Emergency Action Plan

Review of Emergency Action Plan:

Must review EAP with each employee when:

- Plan initially developed
- New employee orientation
- Employee's responsibilities change
- Plan is changed/updated.

123

Emergency Response

29 CFR 1910.119(n)

Employers covered by the PSM standard may also be subject to the ***HAZWOPER provisions*** contained in ***29 CFR 1910.120*** (a), (p) and (q).

124

Emergency Response

HAZWOPER 1910.120 (q) Requirements:

1. Emergency Response Plan
2. Procedures for handling emergency response
3. Skilled support personnel
4. Training, trainers and refresher training
5. Medical surveillance and consultation
6. Chemical protective clothing
7. Post-emergency response operations

125

Emergency Planning & Response

Common Deficiencies:

- Poorly planned exit routes and assembly areas
- Shelter in place not planned out
- Alarms not distinctive
- Lack of training
- Lack of PPE & portable detector for responders
- Employees responding to small releases

Hot Points

126

Creating Customers for Life™

BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Compliance Audits 1910.119(o)

127

Compliance Audits

29 CFR 1910.119(o)(1)

Employers must certify that they have evaluated compliance with the PSM standard requirements at least ***every three years*** to verify that the procedures and practices developed are ***adequate and are being followed***.

128

Compliance Audits

Compliance Audits 29 CFR 1910.119(o)

- Conducted Every 3 Years
- At Least One Person Knowledgeable in the Process
- Audit Report Developed
- Action Plan to Resolve All Recommendations
- Must Retain the 2 Most Recent Reports

129

Compliance Audits

Common Deficiencies:

- Audits not conducted or certified
- Poorly performed audits
- Incomplete reports
- Inadequate recommendations
- Recommendations not tracked to closure

Hot Points

130

Creating Customers for Life™

BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Trade Secrets 1910.119(p)

131

Trade Secrets

1910.119(p)(1)

Employers ***must make all information*** necessary to comply with the section ***available*** to those persons responsible for…

132

Trade Secrets

Trade Secrets Procedures

Employers shall make all information necessary to comply with the section available to those persons responsible for:

- Compiling the process safety information
- Assisting in the development of the process hazard analysis
- Developing the operating procedures
- Involved in incident investigations;
- Emergency planning and response; and
- Compliance audits.

133

Trade Secrets

Trade Secrets Procedures

- Nothing shall preclude the employer from requiring the persons to enter into confidentiality agreements
- They shall have access to trade secret information contained within the process hazard analysis and other documents.

134

Creating Customers for Life™

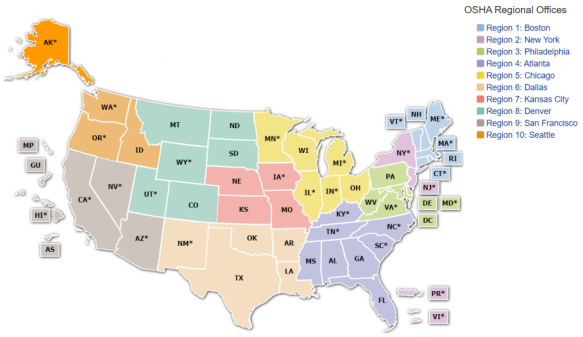
BASSETT MECHANICAL
• CONTRACTING • ENGINEERING
• METAL FABRICATING • SERVICE

Correlated Statistics

135

Correlated Statistics

OSHA Offices by State and Region



136

Correlated Statistics

National Unit Tons Chemical by Region

Chemical Name	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7	Region 8	Region 9	Region 10	Total
Flammable Mixture	151	145,277	612,542	289,974	1,652,949	14,157,150	2,306,726	471,099	398,969	184,294	20,219,132
Propane	158,444	141,393	125,208	374,286	844,793	2,246,679	1,633,974	260,050	299,223	42,652	6,126,702
Ammonia (anhydrous)	3,972	3,514	40,504	366,774	1,248,697	854,618	1,485,347	294,684	68,523	148,332	4,514,964
Butane	2,168	250,500	61,686	98,451	545,370	1,799,330	765,721	260,665	436,202	58,854	4,276,948
Ethane	0	0	469	285	67,658	1,708,485	65	313	0	6	1,777,281
Isobutane (Propane, 2-methyl)	518	869	6,925	6,612	22,936	676,997	278,100	3,417	24,730	7,742	1,028,851
Ethyle (Ethene)	0	25	91	3,176	10,294	851,351	10,032	0	0		874,969
Propylene (1-Propene)	188	0	30,083	2,306	10,048	824,095	3,071	487	0	0	870,277
Chlorine	1,433	33,344	20,448	103,578	31,429	206,793	14,925	3,957	29,633	10,112	455,651
2 - Methypropene (1- Propene, 2-methyl)	0	0	598	2,782	1,729	395,225	0	0	0	0	400,333

137

Correlated Statistics

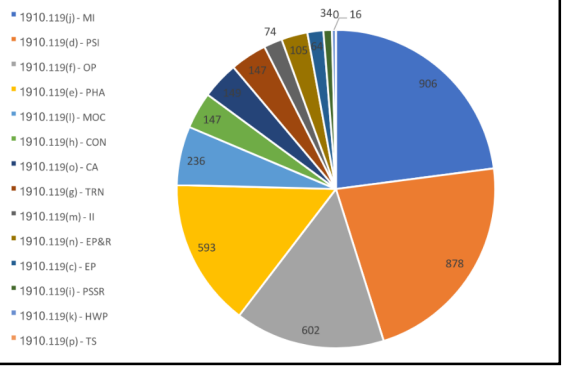
National Unit Tons Toxic Chemicals by Region

Chemical Name	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7	Region 8	Region 9	Region 10	Total
Flammable Mixture	151	145,277	612,542	289,974	1,652,949	14,157,150	2,306,726	471,099	398,969	184,294	20,219,132
Propane	158,444	141,393	125,208	374,286	844,793	2,246,679	1,633,974	260,050	299,223	42,652	6,126,702
Ammonia (anhydrous)	3,972	3,514	40,504	366,774	1,248,697	854,618	1,485,347	294,684	68,523	148,332	4,514,964
Butane	2,168	250,500	61,686	98,451	545,370	1,799,330	765,721	260,665	436,202	58,854	4,276,948
Ethane	0	0	469	285	67,658	1,708,485	65	313	0	6	1,777,281
Isobutane (Propane, 2-methyl)	518	869	6,925	6,612	22,936	676,997	278,100	3,417	24,730	7,742	1,028,851
Ethyle (Ethene)	0	25	91	3,176	10,294	851,351	10,032	0	0		874,969
Propylene (1-Propene)	188	0	30,083	2,306	10,048	824,095	3,071	487	0	0	870,277
Chlorine	1,433	33,344	20,448	103,578	31,429	206,793	14,925	3,957	29,633	10,112	455,651
2 - Methypropene (1- Propene, 2-methyl)	0	0	598	2,782	1,729	395,225	0	0	0	0	400,333

138

Correlated Statistics

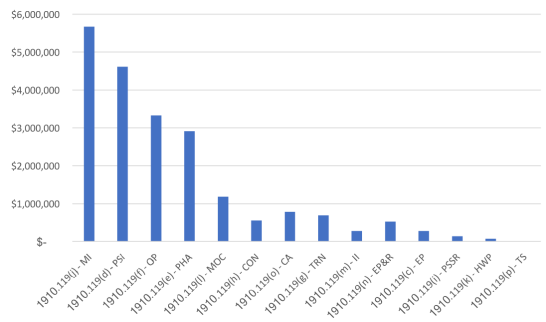
OSHA VIOLATIONS BY PSM ELEMENT



139

Correlated Statistics

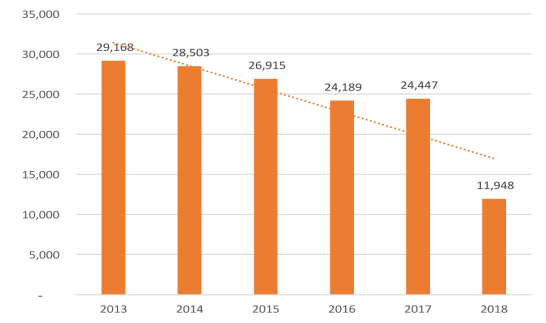
OSHA VIOLATION PENALTIES BY PSM ELEMENT



140

Correlated Statistics

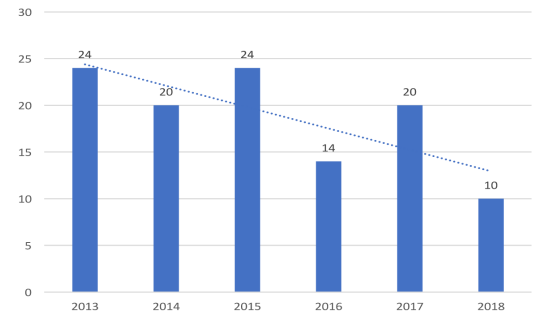
NRC DATA – ALL REPORTABLE INCIDENTS



141

Correlated Statistics

NRC DATA – AMMONIA REPORTABLE INCIDENTS



142

Questions?

143