

2015 Ammonia Safety Day OSHA Update

**Richard Bailey, CIH, CSP
Regional Industrial Hygienist
Kansas City Regional Office**



2015 Ammonia Safety Day OSHA Update

- **Ammonia Health and Safety Hazards**
- **29 CFR 1910.119 - Process Safety Management**
 - **Applicability**
 - **Determination**
- **Other Applicable Standards**
- **Emphasis Programs**
 - **National Emphasis Programs**
 - **Local Emphasis Programs**
- **Region VII Data**

2015 Ammonia Safety Day

OSHA Update

- **Health Hazards to Employees**
 - High Health Hazard
 - Corrosive
 - Irritation - Eye, Skin, and Respiratory Irritation.
 - Eyes - **Temporary Blindness**
 - Skin - **Chemical Burns**
 - Lungs - **Pulmonary Edema (Fluid in Lungs)**
 - **Odor Threshold - 20 ppm**

2015 Ammonia Safety Day

OSHA Update

- **Exposure Limits**
 - Occupational Safety and Health Administration (OSHA)
 - **Permissible Exposure Limit (PEL)**
 - **50 ppm Time Weighted Average (TWA)**
 - **Industries**
 - **General Industry (GI)**
 - **Construction**
 - **Shipyard**

2015 Ammonia Safety Day

OSHA Update

- **Exposure Limits**
 - National Institute for Occupational Safety and Health (NIOSH)
 - **Immediately Dangerous to Life or Health (IDLH)**
 - **300 ppm**
 - **Recommended Exposure Limit (REL)**
 - **25 ppm**
 - **35 ppm**

2015 Ammonia Safety Day

OSHA Update

- **Exposure Limits**
 - **Agency for Toxic Substances and Disease Registry (ATSDR)**
 - **Inhalation Minimal Risk Level (MRL)**
 - **1.7 ppm (acute); 0.1 ppm (chronic)**
 - **American Conference of Governmental Industrial Hygienists (ACGIH)**
 - **Threshold Limit Value (TLV)**
 - **25 ppm**
 - **35 ppm**
 - **0.1 ppm (chronic)**

2015 Ammonia Safety Day

OSHA Update

- **Exposure Limits**
 - **American Conference of Governmental Industrial Hygienists (ACGIH)**
 - **Threshold Limit Value (TLV)**
 - **25 ppm**
 - **35 ppm**
 - **0.1 ppm (chronic)**

2015 Ammonia Safety Day

OSHA Update

- **Health Effects – Various Sources (Not Complete)**
 - **Hoarseness**
 - **Violent Coughing**
 - **Painful Breathing**
 - **Dyspnea (Shortness of Breath)**
 - **Impaired Vision / Blindness**
 - **Cyanosis**
 - **Cutaneous Burns - Varying Severity.**
 - **Severe Burns**
 - **Tissue Liquefaction**
 - **Deep Penetration**

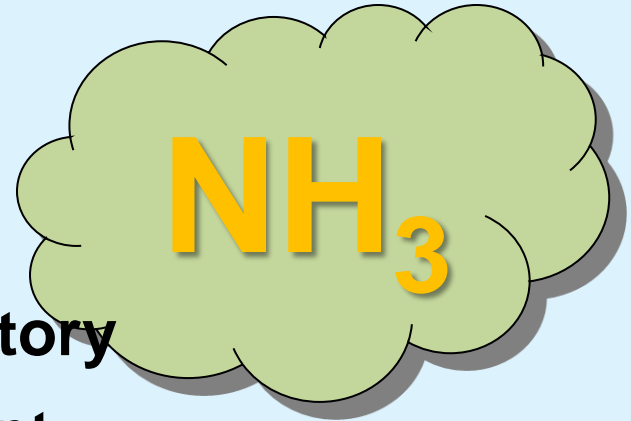
2015 Ammonia Safety Day

OSHA Update

- **Flammable Concentrations**
 - **15% to 28% by Volume in Air**
- **Lubricating Oils**
 - **Contact Increases Flammable Concentration**
- **Explosion**
 - **Enclosed Space**
 - **Internal Source of Ignition**
 - **Ammonia Vessel**
 - **External Source of Ignition**
 - **Vessel Exposed to Fire.**

PSM Applicability

- Process \geq 10,000 lbs NH_3
- Determination
 - Maximum Intended Inventory
 - Maximum Process Amount
 - 9,000 - 9,999 lbs.
- Multiple, Separate Systems <10,000 lbs.
 - Co-Located
 - Not Connected, But Effected
 - Fire / Explosion Potential

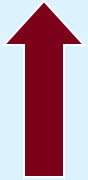


NH3 Refrigeration Processes < 10,000 lbs

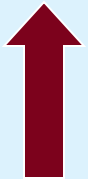
- **Not Covered by 29 CFR 1910.119 - PSM**
- **OSH Act Sec 5(a)(1) - General Duty Clause**
 - **NH3 Release**
 - **Toxic Exposure**
 - **Fire / Explosion**
 - **Serious Hazard**
 - **Industry Recognition - IIAR & ASHRAE**
 - **Feasible and Useful Means of Abatement**



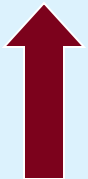
PSM Program Problem Signs



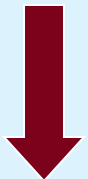
- **System Leaks**



- **NH3 Purchase Quantities**



- **System Downtime**



- **PSM / System Knowledge**

Chemical NEP - Region VII
PSM Violations
FY 2010-2014 - 40 Inspections
FY 2014 - 9 Inspections

<u>1910.119(f) Operations Procedures</u>	<u>16 - 4</u>
<u>1910.119(d) Process Safety Information</u>	<u>15 - 10</u>
<u>1910.119(j) Mechanical Integrity</u>	<u>11 - 8</u>
<u>1910.119(e) Process Hazard Analysis</u>	<u>10 - 4</u>
1910.119(g) Operator Training	5 - 2
1910.119(n) Emergency Response Plans	5 - 1

(Includes Closed and Open Inspections – Subject to Change)

Chemical NEP - Region VII

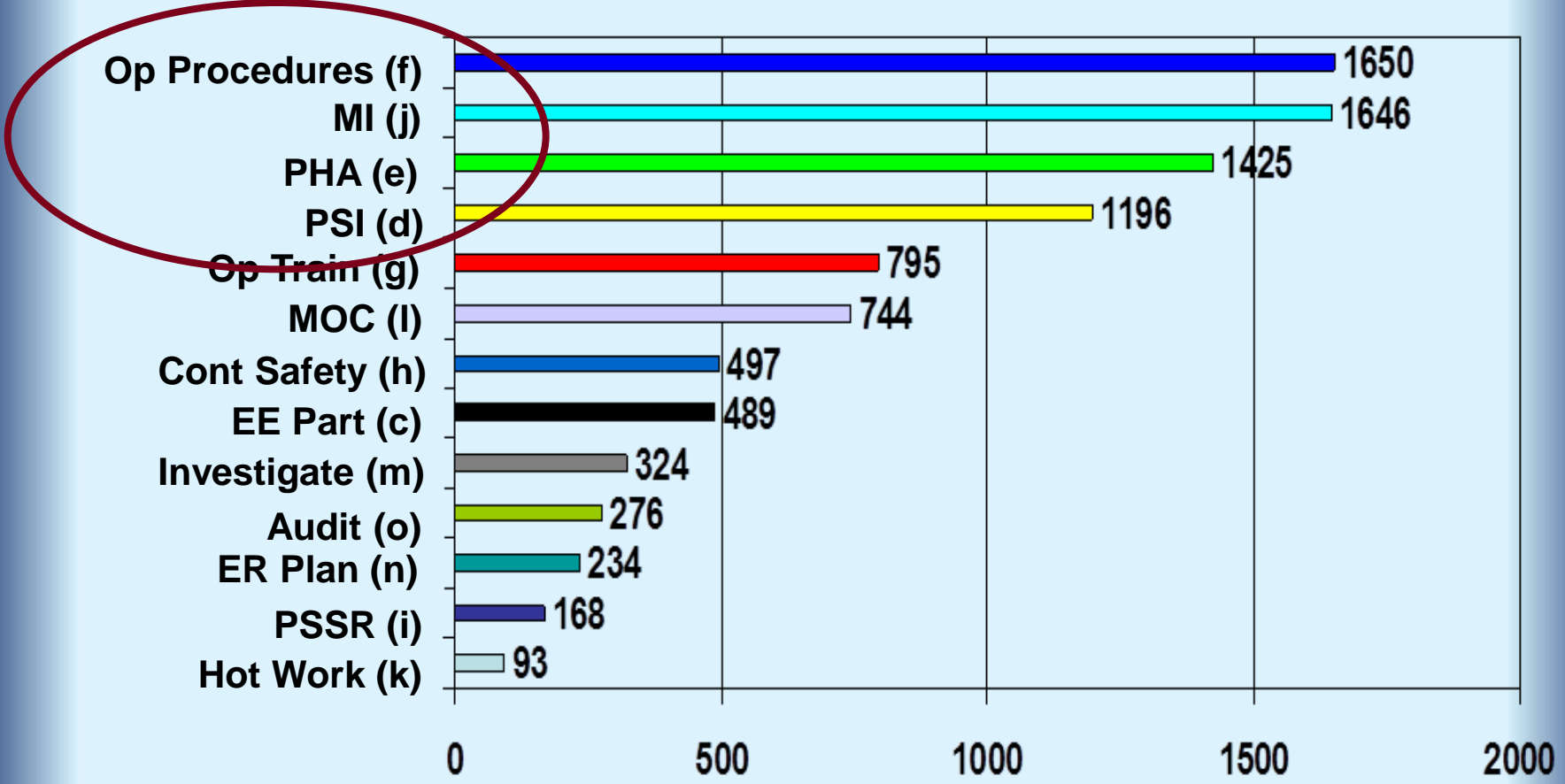
PSM Violations

FY 2010-2014 - 40 Inspections

1910.119(m) Incident Investigations	5 - 4
1910.119(h) Contractor Safety	4 - 2
1910.119(l) Management of Change	4 - 4
1910.119(o) Audit Program	4 - 3
1910.119(i) Pre Startup Safety Review	1 - 0
1910.119(k) Hot Work	1 - 0

(Includes Closed and Open Inspections – Subject to Change)

PSM - 1910.119 Violations SIC 20 and 4222



May 1992 – October 15, 2008

9215 Total PSM Violations

Other Standards

Exposure to Ammonia

- **1910.132 - Personal Protective Equipment**
- **1910.134 - Respiratory Protection**
 - Maintenance
 - Drain Oil Pot
 - Emergency Response
- **1910.1000 - Ammonia Exposure**



Other Standards

Hazard Prevention

- **1910.147 - Lockout / Tagout**
- **Subpart S - Electrical Standards**
 - **1910.307 - Hazardous Locations**
 - **Class 1, Div 1 or 2**



Other Standards

Exposure and Release Mitigation

- **1910.38 - Emergency Action Plans**
 - Facility Employee Evacuation
- **1910.120(q) - HAZWOPER / Emergency Response**
 - Emergency Shutdown
 - Contain Release



Other Standards Construction

- **1926.64 - Process Safety Management**
 - Total Quantity Applicable
- **Other Equivalent Construction Standards**



PLAN . PROVIDE . TRAIN .

Three simple steps to preventing falls.

Chemical NEP

- **PSM Covered Chemical Facilities National Emphasis Program**
- **Implement and Conduct Program**
- **Reduce or Eliminate Workplace Hazards**
 - **Catastrophic Release**
 - **Highly Hazardous Chemicals**
- **Not Applicable**
 - **Petroleum Refineries**
- **Website**
 - **http://www.osha.gov/OshDoc/Directive_pdf/CPL_03-00-014.pdf**

Chemical NEP

Programmed Inspections - Facilities

- **EPA**
 - **Chemical Accident Prevention Provisions, Program 3 Risk Management Plans**
- **OSHA**
 - **Inspection Database (IMIS and OIS)**
 - **OSHA Area Office Knowledge of Local Facilities**
- **Explosives Manufacturing**
 - **North American Industry Classification System (NAICS) Codes**

Chemical NEP

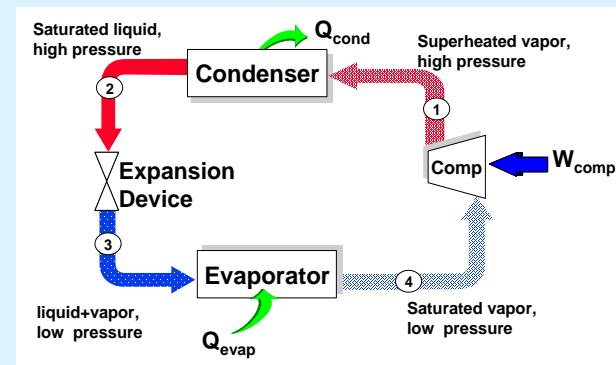
Un-Programmed Inspections

- **PSM-Covered Process**
- **Complaint**
 - **Employee**
- **Referral**
 - **Other Source (EPA, State, Fire)**
- **Fatality**
 - **1 or more Employee Deaths**
- **Catastrophe**
 - **3 or more Employee Hospitalizations**

Chemical NEP

Dynamic List Questions

- Periodically Develop Dynamic Lists
- Categories
 - General PSM Information
 - Ammonia Refrigeration
 - Chemical Processing
 - Process
 - Equipment
 - Operations



Chemical NEP

Dynamic List Questions

- **Specific Investigative Questions**
 - **Gather Facts Related to PSM Requirements**
- **Question Subjects**
 - **Specific Equipment or Task**
 - **General Procedure or Process**
- **CSHO Select One, or More Units**
- **Not Publically Disclosed**
 - **Maintain Inspection Integrity**

Emphasis Programs

- Potentially Applicable
- National
 - Site Specific Targeting Program
- Local (Region / Area)
 - EPA Chemical Release
 - Missouri Workers Compensation
 - Powered Industrial Trucks
 - Respiratory and Noise Hazards



Hazard Communication

Aligns with the UN's Globally Harmonized System of Classification and Labelling of Chemicals

- **Labeling**
- **Safety Data Sheet**
- **Pictograms**
- **Effective dates**
- **<http://www.osha.gov/dsg/hazcom/index.html>**

Hazard Communication Effective Dates




Effective Completion Date	Requirement(s)	Who
June 1, 2015 December 1, 2015	Compliance with all modified provisions of this final rule, except: The Distributor shall not ship containers labeled by the chemical manufacturer or importer unless it is a GHS label	Chemical manufacturers, importers, distributors and employers

Hazard Communication Effective Dates

Effective Completion Date	Requirement(s)	Who
June 1, 2016	Update alternative workplace labeling and hazard communication program as necessary, and provide additional employee training for newly identified physical or health hazards. .	Employers
Transition Period to the effective completion dates noted above	May comply with either 29 CFR 1910.1200 (the final standard), or the current standard, or both	Chemical manufacturers, importers, distributors and employers

Hazard Communication

HCS Pictograms and Hazards

<u>Health Hazard</u>	<u>Flame</u>	<u>Exclamation Mark</u>
		
<ul style="list-style-type: none">• Carcinogen• Mutagenicity• Reproductive Toxicity• Respiratory Sensitizer• <u>Target Organ Toxicity</u>• Aspiration Toxicity	<ul style="list-style-type: none">• <u>Flammables</u>• Pyrophorics• Self-Heating• Emits Flammable Gas• Self-Reactives• Organic Peroxides	<ul style="list-style-type: none">• <u>Irritant (skin and eye)</u>• Skin Sensitizer• Acute Toxicity• Narcotic Effects• <u>Respiratory Tract Irritant</u>• Hazardous to Ozone Layer (Non-Mandatory)

Hazard Communication

HCS Pictograms and Hazards

Gas Cylinder



- Gases Under Pressure

Corrosion



- Skin Corrosion / Burns
- Eye Damage
- Corrosive to Metals




Exploding Bomb



- Explosives
- Self-reactive
- Organic Peroxides

Hazard Communication

HCS Pictograms and Hazards

Flame Over Circle	<u>Environment</u> <u>(Non-Mandatory)</u>	<u>Skull and</u> <u>Crossbones</u>
 <ul style="list-style-type: none"><li>• Oxidizers	 <ul style="list-style-type: none"><li>• <u>Aquatic Toxicity</u>	 <ul style="list-style-type: none"><li>• <u>Acute Toxicity</u> <u>(Fatal or Toxic)</u>

Hazard Communication Label Information

Product Identifier

Supplier Identification

Precautionary Statements

Hazard Pictograms

Signal Word

Hazard Statement

Supplemental Information

WATER. REST. SHADE.

The work can't get done without them.

OSHA Heat Stress Campaign

Website

<http://www.osha.gov/SLTC/heatillness/index.html>

Smart Phone App





Preventing Falls in Construction

OSHA Falls in Construction Campaign

Website

<http://www.osha.gov/SLTC/stopfalls/index.html>

OSHA Website



- OSHA Website
www.osha.gov
- OSHA's Ammonia Refrigeration eTool
http://www.osha.gov/SLTC/etools/ammonia_refrigeration/index.html
- OSHA's Ammonia Refrigeration eTool - References
http://www.osha.gov/SLTC/etools/ammonia_refrigeration/references/index.html

Questions and Answers