

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

OSHA's Process Safety Management Standard covers many different chemical processes and industries. Since this training is focused on ammonia refrigeration systems, all of our explanations and examples will be from those systems.

OSHA's Process Safety Management Standard has 16 sections. We will look in depth at the 13 sections that describe the elements of a program that the employer has to comply with.

Each worksheet gives a brief explanation of one of the PSM sections, followed by questions. Please work on the questions in your small group. You will then compare your answers with the other groups.

Your discussions may lead to more questions. All questions that can't be answered immediately, or that lead to longer discussions should be noted on the "Parking Lot" Flip Chart.

Each table will have copies of all of the OSHA standards you will need to answer the questions.

We will not spend time on the first two sections of the PSM standard.

The first two sections are:

a) ***Application***

This section describes who is covered by this standard. Any non-retail facility with an ammonia refrigeration system with a capacity of 10,000 pounds or more is covered by this standard.

b) ***Definitions***

This section defines ten words or phrases that are used in very specific ways in the standard. You may want to refer to the definitions to help answer the questions in the exercises.

Module 2, Task 2
OSHA's PSM Standard
A Plan for Keeping the Ammonia in the Pipes

(c) Employee Participation

Workers play an important role in every Process Safety Management program.

Employers must develop a written plan for including workers in the Process Safety Management program.

Employers shall consult with workers and their union on the Process Safety Management program and how it is carried out.

Employers must provide workers with all of the information that is required under this standard.

Read 1910.119(c) and answer the following questions as a group:

- 1. The Porky Pig Plant has an "Open Door Policy" for employees. According to management, this means that any employee with a question or concern is welcome to bring that concern up with the Plant Manager.*

Does the Porky Pig Open Door Policy meet the requirements of the PSM Employee Participation section?

- 2. The steward at the Chicken Little Poultry Plant wants to be sure his company has an adequate PSM program. He asked the company to tell him the capacity of their ammonia refrigeration system.*

Why is that an important question?

Management told the steward that they did not have to answer his question because it was secret company information. Do they have a right to deny this information?

- 3. The Safety Committee members of the Brown Cow Company want to see the company's written plan for employee participation.*

The company agreed to allow them to see the written plan, but will not provide copies.

Should these employees file an OSHA complaint because they cannot get copies?

Module 2, Task 2
OSHA's PSM Standard
A Plan for Keeping the Ammonia in the Pipes

(d) Process Safety Information

The employer must pull together all of the technical information about the chemical, the process, the equipment, the design and the safe operating limits of the system that is covered.

The employer must include information about what would happen if the system is operated outside of the specifications.

*The employer must document that the equipment complies with **good engineering practices**.*

(You will learn more about good engineering practices in the next exercise).

Work as a group to answer the following question.

Use the requirements in 1910.119(d) to find your answers.

- 1. The Safety Committee at the Brown Cow Dairy requested the information required in 1910.119(d)(1) from the company. They were given the attached MSDS for ammonia.*

Go through the requirements of 1910.119(d)(1) and determine if the company complied with the PSM standard.

- 2. Joe Cool, a Refrigeration Tech at the Brown Cow Dairy is not sure if the piping in the engine room is adequate. He asks the company to give him any information about the installation of the piping that will tell him if it is safe. The company gives him a Piping and Instrumentation Diagram (P&ID) and the name of the contractor that installed the piping. According to 1910.119(d)(3)(i) and 1910.119(d)(3)(ii), is there any other information that the company should provide Joe Cool about the safety of the piping?*

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

Sample Chemical Hazard Information

Tanner Industries, Inc. divisions: National Ammonia, Northeastern Ammonia, Hamler Industries, Bower Ammonia & Chemical

735 Davisville Road, Third Floor, Southampton, PA 18966; 215-322-1238

Corporate emergency telephone number: 800-643-6226

Chemtrec: 800-424-9300

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Description

Chemical Name: Ammonia, Anhydrous

CAS Registry No: 7664-41-7

Synonyms: Ammonia

Chemical Family: Inorganic Nitrogen Compound

Formula: NH₃

Molecular Weight: 17.03 (NH₃)

Composition: 99+% Ammonia

Statement of Health Hazard

Hazard Description

Ammonia is an irritant and corrosive to the skin, eyes, respiratory tract and mucous membranes. Exposure to liquid or rapidly expanding gases may cause severe chemical burns and frostbite to the eyes, lungs and skin. Skin and respiratory related diseases could be aggravated by exposure.

- Not recognized by OSHA as a carcinogen
- Not listed in the National Toxicology Program
- Not listed as a carcinogen by the International Agency for Research on Cancer

Exposure Limits for Ammonia: Vapor

Exposure Limits for Ammonia: Vapor

OSHA	50 ppm PEL 8 hour TWA
NIOSH	35 ppm STEL 15 minutes
	25 ppm 18 mg / m ³ REL 10 hour TWA
	300 ppm IDLH
ACGIH	25 ppm TLV 8 hour TWA
	35 ppm STEL 15 minutes

Toxicity: LD 50, (Oral / Rat), 350 mg / kg

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

Physical Data

Boiling Point: -28°F at 1 atm

Sample Chemical Hazard Information

pH: N/A

Specific Gravity of Gas (air = 1): 0.596 at 32°F

Specific Gravity of Liquid (water = 1): 0.682 at -28°F (compared to water at 39°F)

Percent Volatile: 100% at 212°F

Appearance and Odor: Colorless liquid or gas with pungent odor

Critical Temperature: 271.4°F

Gas Specific Volume: 20.78 Ft³/lb at 32°F and 1 atm

Vapor Density (air = 1): 0.0481 Lb/Ft³ at 32°F

Liquid Density: 38.00 Lb/Ft³ at 70° F

Approximate Freezing Point: -108°F

Weight (per gallon): 5.15 pounds at 60°F

Vapor Pressure: 114 psig 70°F

Solubility in Water (per 100 pounds of water): 86.9 pounds at 32°F,
51 pounds at 68°F

Surface Tension: 23.4 Dynes / cm at 52°F

Critical Pressure: 111.5 atm

Emergency Treatment

Effects of Overexposure

Eye: Tearing, edema or blindness may occur.

Skin: Irritation, corrosive burns, blister formation may result. Contact with liquid may produce a caustic burn and frostbite.

Inhalation: Acute exposure may result in severe irritation of the respiratory tract, bronchospasm, pulmonary edema or respiratory arrest.

Ingestion: Lung irritation and pulmonary edema may occur. *Extreme exposure may result in death from spasm, inflammation or edema. Brief inhalation exposure to 5,000 ppm may be fatal.*

Emergency Aid: Remove patient to uncontaminated area

Eye: Flush with copious amounts of tepid water for a minimum of 20 minutes. Eyelids should be held apart and away from eyeball for thorough rinsing.

Skin: Flush with copious amounts of tepid water for a minimum of 20 minutes while removing contaminated clothing, jewelry and shoes. Do not rub or apply ointment on affected area. Clothing may initially freeze to skin. Thaw frozen clothing from skin before removing.

Inhalation: Remove to fresh air. If not breathing, administer artificial respiration. If trained to do so, administer supplemental oxygen, if required.

Ingestion: If conscious, give large amounts of water to drink. May drink orange juice, citrus juice or

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

diluted vinegar (1:4) to counteract ammonia. If unconscious, do not give anything by mouth. **DO NOT INDUCE VOMITING!**

SEEK IMMEDIATE MEDICAL HELP FOR ALL EXPOSURES!

Sample Chemical Hazard Information

Note to Physician

Respiratory injury may appear as a delayed phenomenon. Pulmonary edema may follow chemical bronchitis. Supportive treatment with necessary ventilation actions, including oxygen, may warrant consideration.

Fire and Explosion Hazard Data

Flashpoint: None

Flammable Limits in Air: LEL/UEL 16% to 25% (listed in the NIOSH Pocket Guide to Chemical Hazards 15% to 28%)

Extinguishing Media: Dry Chemical, CO₂, water spray or alcohol-resistant foam if gas flow cannot be stopped

Auto Ignition Temperature: 1,204°F (If catalyzed), 1,570°F (If un-catalyzed)

Special Fire-Fighting Procedure

Must wear protective clothing and a positive pressure SCBA. Stop source if possible. If a portable container (such as a cylinder or trailer) can be moved from the fire area without risk to the individual, do so to prevent the pressure relief valve of the trailer from discharging or the cylinder from rupturing. Fight fires using dry chemical, carbon dioxide, water spray or alcohol-resistant foam. Cool fire exposed containers with water spray. Stay upwind when containers are threatened. Use water spray to knock down vapor and dilute.

Unusual Fire and Explosion Hazards

- Outdoors, ammonia is not generally a fire hazard. Indoors, in confined areas, ammonia may be a fire hazard, especially if oil and other combustible materials are present. Combustion may form toxic nitrogen oxides.
- If relief valves are inoperative, heat exposed storage containers may become explosion hazards due to over pressurization.

Chemical Reactivity

Stability

Stable at room temperature. Heating a closed container above room temperature causes vapor pressure to increase rapidly. Anhydrous ammonia will react exothermically with acids and water. Will not polymerize.

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

Conditions to Avoid

Anhydrous ammonia has potentially explosive reactions with strong oxidizers. Anhydrous ammonia forms explosive mixtures in air with hydrocarbons, chlorine, ethanol, fluorine and silver nitrate. Anhydrous ammonia reacts to form explosive products, mixtures or compounds with mercury, gold, silver, iodine, bromine and silver oxide. Avoid anhydrous ammonia contact with chlorine, which forms a chloramine gas, which is a primary skin irritant and sensitizer. Avoid anhydrous ammonia contact with galvanized surfaces, copper, brass, bronze, aluminum alloys, mercury, gold and silver. A corrosive reaction will occur.

Sample Chemical Hazard Information

Hazardous Decomposition Products

Anhydrous ammonia decomposes to hydrogen and nitrogen gases above 450°C (842°F). Decomposition temperatures may be lowered by contact with certain metals, such as iron, nickel and zinc and by catalytic surfaces such as porcelain and pumice.

Spill or Leak Procedures

Steps to be Taken

Stop source of leak if possible, provided it can be done in a safe manner. Leave the area of a spill by moving laterally and upwind. Isolate the affected area. Non-responders should evacuate the area, or shelter in place. Only properly trained and equipped persons should respond to an ammonia release. Wear eye, hand and respiratory protection and protective clothing; see PROTECTIVE EQUIPMENT. Stay upwind and use water spray downwind of container to absorb the evolved gas. Contain spill and runoff from entering drains, sewers, and water systems by utilizing methods such as diking, containment, and absorption. CAUTION: ADDING WATER DIRECTLY TO LIQUID SPILLS WILL INCREASE VOLATILIZATION OF AMMONIA, THUS INCREASING THE POSSIBILITY OF EXPOSURE.

Special Protection and Procedures

Respiratory Protection

Respiratory protection approved by NIOSH/MSHA for ammonia must be used when applicable safety and health exposure limits are exceeded. For escape in emergencies, MSHA/NIOSH approved respiratory protection that consists of a full-face gas mask and canisters approved for ammonia is required. Refer to 29 CFR 1910.134 and ANSI: Z88.2 for requirements and selection. A positive pressure SCBA is required for entry into ammonia atmospheres at or above 300 ppm (IDLH).

Eye Protection

Chemical splash goggles should be worn when handling anhydrous ammonia. A face shield can be worn over chemical splash goggles as additional protection. Do not wear contact lenses when handling anhydrous ammonia.

Ventilation

Local exhaust should be sufficient to keep ammonia vapor to 25 ppm or less.

7 of 31

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Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

Protective Equipment

- At a minimum, splash proof, chemical safety goggles, ammonia resistant, gloves (such as rubber), and ammonia-impervious clothing should be worn to prevent contact during normal loading, unloading and transfer operations and handling small spills. Face shield and boots can be worn as additional protection.
- Respiratory protection approved by NIOSH/MSHA for ammonia must be used when applicable safety and health exposure limits are exceeded. For a hazardous material release response, Level A and/or Level B ensemble including positive-pressure SCBA should be used. A positive pressure SCBA

Sample Chemical Hazard Information

is required for entry into ammonia atmospheres at or above 300 ppm (IDLH). Refer to 29 CFR 1910.132 through 1910.138 for personal protective equipment requirements.

Special Precautions

Storage and Handling

Only trained persons should handle anhydrous ammonia. Store in cool (26.7°C / 80°F) and well-ventilated areas, with containers tightly closed. OSHA 29 CFR 1910.111 prescribes handling and storage requirements for anhydrous ammonia as a hazardous material. Use only stainless steel, carbon steel or black iron for anhydrous ammonia containers or piping. Do not use plastic. Do not use any non-ferrous metals such as copper, brass, bronze, aluminum, tin, zinc or galvanized metals. Protect containers from physical damage. Keep away from ignition sources, especially in indoor spaces.

Work-Place Protective Equipment

Protective equipment should be stored near, but outside of anhydrous ammonia area. Water for first aid, such as an eyewash station and safety shower, should be kept available in the immediate vicinity.

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

What are “good engineering practices”?

The Process Safety Management standard covers many different industries with many different processes employing many different chemicals. These industries, processes and chemicals change constantly.

Instead of trying to list all of the rules for every industry, chemical, and process, OSHA relies on RAGAGEP.

What is RAGAGEP???

If you work with or around ammonia refrigeration systems RAGAGEP should be part of your vocabulary.

RAGAGEP stands for Recognized And Generally Accepted Good Engineering Practices.

RAGAGEP are engineering, operation, or maintenance activities based on established codes, standards, published technical reports or recommended practices.

One of the major standards used to guide activities related to ammonia refrigeration systems is the IIAR2 – 2008. Many other standards regarding pressure vessels, piping, and other components can also be used as references for RAGAGEP.

The company's Process Safety Information has to include information about what standards they are using for RAGAGEP.

Work as a group to answer the following questions.

- 1. A new refrigeration tech was told how drain the oil from the oil pots in the ammonia engine room. The process did not sound safe to him, so he asked what standard the procedure was based on.
“That’s how we’ve always done it, and nobody has ever gotten hurt.” was his supervisor’s answer.
Is this RAGAGEP?*
- 2. A new High Pressure Receiver was installed in the ammonia system at the Turkey Lurky Deli Company. The Company has a design specification to ensure piping is completed according to applicable codes. The requirements for this tank were to test at a pressure of 250 psi for 24 hours.*

*The tank was actually tested at 100 psi for 30 minutes. The plant engineer wrote in the maintenance log that this was “long enough to test the welds.”
Is this RAGAGEP?*

9 of 31

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Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

e) Process Hazard Analysis

The employer has to go through a formal procedure called a Process Hazard Analysis (PHA). In the PHA the employer thinks through all the things that could go wrong with their ammonia refrigeration system and what the consequences could be. They have to come up with ways to prevent these things from happening, or to reduce the bad consequences as much as possible.

They have to include previous incidents or near misses.

The PHA process must include at least one employee who actually works on the ammonia refrigeration system.

The recommendations of the PHA team must be documented. There must be a written schedule of when the corrective actions will be completed.

The PHA must be updated every 5 years.

Work as a group to answer the following question.

- 1. The Safety Committee at the Turkey Lurkey plant asked to see the recommendations from the company's most recent Process Hazard Analysis. The PHA document they received was from 2003. The 2003 PHA identified a problem with ignition sources in Engine Room #1, including a gas-fired boiler.*

The PHA Team noted in the documentation that the International Institute of Ammonia Refrigeration standard ANSI/IIAR 2 -1992 says that no open flames or apparatus to produce an open flame shall be installed in a machinery room where ammonia is used as a refrigerant.

There is a note in the PHA that says that a request for money to address the problem was turned down in 2005.

Can you combine the requirement in 1910.119(d)(3)(ii) with the requirements in 1910.119(e)(5) to make an argument that the company did not resolve the team's recommendation properly?

Module 2, Task 2
OSHA's PSM Standard
A Plan for Keeping the Ammonia in the Pipes

(f) Operating Procedures

The employer shall provide written operating procedures that provide clear instructions for activities involved in the ammonia refrigeration system.

The employer has to provide written procedures for activities under all circumstances – not just normal day-to-day operations.

Work as a group to answer the following question.

1. Each table has a poster entitled IIAR Recommended Oil Draining Guidelines. If this is posted in a facility's engine room would that meet the requirements for an oil draining operating procedure?

If there are participants in your group who have been responsible for oil draining operations, ask them how this procedure compares with the procedure they follow.

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

(g) Training

The employer shall train each employee involved in operating the ammonia refrigeration system in an overview of the process and in the operating procedures. The training shall include safety & health hazards, emergency operations, and safe work practices.

The employer shall consult with workers involved in operating the system to determine how often refresher training should be provided. Refresher training shall be provided at least every three years.

The employer shall document that each employee has received and understood the training.

Work together as a large group to discuss the following questions.

1. *Look at the document titled SOP – “A” Frame 5 Operation of Air Units and Control Bank.
Read the section in bold that lists the programs that should be followed “if applicable”.
Do you think this is an adequate description of the necessary safety procedures? Why or why not?*
2. *Look at the document titled Annual Training Frequency Sign-Off.
Does this document put the company in compliance with OSHA's PSM training requirements?
Do you think this is an effective way to ensure that workers are consulted about the frequency of their training?*
3. *Does the PSM training you are participating in today meet the requirements for the training specified in 1910.119(g)?*

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

ANNUAL TRAINING FREQUENCY SIGN-OFF

Based on your experience, is the three year refresher training frequency adequate?

Please respond to each training task listed below, in the appropriate areas. If you are not yet qualified on a task, leave response areas empty.

Procedure	Description	Write "yes" or "no" in this column	Recommend frequency if answer was "no"
SOP-CM-1	FES MODEL 28M AMM. COMPRESSOR #1	Yes	
SOP-CM-2	FES MODEL 28M AMM. COMPRESSOR #2	Yes	
SOP-CM-6	FES MODEL 28M AMM. COMPRESSOR #6	Yes	
SOP-CM-7	FES MODEL 28M AMM. COMPRESSOR #7	Yes	
SOP-CM-8	SULLAIR CM8 AMM. SCREW COMP	Yes	
SOP-CM-9	SULLAIR CM9 AMM. SCREW COMP	Yes	
SOP-CM-10	CM10 AMM. COMPRESSOR	Yes	
SOP-CM-11	AMM SCREW COMPRESSOR 23L	Yes	
SOP-CM-12	CM12 AMM COMPRESSOR	Yes	
SOP-CM-13	CM 13 AMM COMPRESSOR	Yes	
SOP-CM-14	CM 14 AMM COMPRESSOR	Yes	
SOP-CM-15	CM 15 AMM COMPRESSOR	Yes	
SOP-CM-16	CM 16 AMM COMPRESSOR	Yes	
SOP-CM-17	CM 17 AMM COMPRESSOR	Yes	
SOP-PRG-1	#1 AMM AUTO PURGER HANSEN AP24	Yes	
SOP-PRG-2	#2 AMM AUTO PURGER HANSEN AP24	Yes	
SOP-ACCUM-1	CC1 & TRANSFER DRUMS(PV-14&PV-15)	Yes	
SOP-ACCUM-PV-13	AMM LIQUID ACCUMULATOR	Yes	
SOP-ACCUM-2	CC2 & TRANSFER DRUMS(PV-17&PV-18)	Yes	
SOP-ACCUM-PV-16	AMM LIQUID ACCUMULATOR	Yes	
SOP-ACCUM-3	CC3 & TRANSFER DRUMS(PV-20&PV-21)	Yes	
SOP-ACCUM-PV-19	AMM LIQUID ACCUMULATOR	Yes	
SOP-ACCUM-4	CC4 & TRANSFER DRUMS(PV-23&PV-24)	Yes	
SOP-ACCUM-PV-22	AMM LIQUID ACCUMULATOR	Yes	
SOP-ACCUM-5	CC5 & TRANSFER DRUMS(PV-26&PV-27)	Yes	
SOP-ACCUM-PV-25	AMM LIQUID ACCUMULATOR	Yes	
SOP-EC-5	BAC EVAPORATIVE CONDENSER #EC5	Yes	
SOP-EC-7	BAC EVAPORATIVE CONDENSER #EC7	Yes	
SOP-EC-8	BAC EVAPORATIVE CONDENSER #EC8	Yes	
SOP-EC-9	BAC EVAPORATIVE CONDENSER #EC9	Yes	
SOP-EC-10	BAC EVAPORATIVE CONDENSER #EC10	Yes	
SOP-EC-11	BAC EVAPORATIVE CONDENSER #EC11	Yes	

Name: [Redacted]
 Employee's S.S.#: 4
 Date: 9-16-6

310

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

(h) Contractors

Employers who are covered by the PSM standard have special responsibilities when hiring contractors who work on or around ammonia refrigeration systems.

The employer must evaluate the contractor's safety performance and programs.

The employer must provide the contractor with information about the hazards at the workplace and how to work safely around those hazards. The contractor must be sure all the contract employees receive this information and work safely.

Using 1910.119(h) work together to answer the following questions.

1. The ammonia refrigeration system at Henny Penny Deli Co. has a number of condensers and piping on the roof. The Fly-by-Night Roofing Company was hired to patch the roof at the Henny Penny Deli Co. The roofers attached a small come-along (winch) to one of the ammonia pipe supports on the roof to help move some of their equipment. Could this be a problem?

2. Whose problem is this – Henny Penny Deli's or the Fly-by-Night Company's? Why would either of these companies be responsible for poor judgment on the part of some workers?

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

(i) Pre-Startup Safety Review

The employer shall perform a pre-startup safety review (PSSR) for new facilities or in facilities where modifications are significant enough to require a change in process safety information.

The pre-startup safety review shall make sure that construction and equipment is in accordance with design specifications, all safety procedures are in place, and that a PHA has been performed and all issues have been resolved, or that Management of Change requirements have been met.

Using 1910.119(i) work together to answer the following questions.

- 1.** *If Joe Cool replaces a Pressure Relief Valve with an identical Pressure Relief Valve, does he need to go through a Pre-Startup Safety Review?*
- 2.** *If a compressor is shut down for repairs and then put back on-line, is a Pre-Startup Safety Review necessary?*
- 3.** *Do the activities in question #1 and question #2 have to be done according to RAGAGEP?*
- 4.** *Does the company have to have written operating procedures for the activities in question #1 and question #2?*
- 5.** *If a reciprocating compressor is replaced by a screw compressor, is a Pre-Startup Safety Review necessary?*

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

(j) Mechanical Integrity

This section ensures that key components of the ammonia refrigeration system are installed, operated, inspected, maintained, repaired and replaced in a manner that keeps the system operating safely.

Mechanical Integrity does not allow a system that “runs to failure”. Key components of ammonia systems must be inspected and maintained so that they can be replaced BEFORE they fail.

The components that are covered by the Mechanical Integrity section of the PSM standard are:

- *Pressure vessels and storage tanks*
- *Piping systems (including piping components such as valves)*
- *Relief and vent systems and devices*
- *Emergency shutdown systems*
- *Controls (including monitoring devices and sensors, alarms, and interlocks)*
- *Pumps*

Work together to answer the following questions.

1. The motor on the rendering auger at the Beef Buster factory has been burning out once a week for the past month. This creates a lot of extra work for everyone, especially the workers who have to shovel guts off the floor and back into the auger. The chief steward just completed a PSM class and decides to file a complaint based on the Mechanical Integrity section of the PSM standard. His position is that the company is not in compliance with OSHA because they are allowing the auger to “run to failure”.

*Does this complaint have merit?
Why or why not?*

2. The IIAR Bulletin 110 recommends that all ammonia refrigeration system piping be inspected at least annually. When the union safety committee members brought this up the company responded by saying, “This plant has miles and miles of piping. It is not feasible to inspect all of our piping every year. If we tried to do that we would spend all of our time doing inspections and nothing else. Our refrigeration technicians inspect the piping when they are working on related valves and vessels.”

How should the union respond?

The company also pointed out to the union that the IIAR Bulletins are not laws or OSHA standards.

Is the company correct?

How should the union respond?

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

6/1/10 CONCORD, N.H. -- The U.S. Department of Labor's Occupational Safety and Health Administration has proposed a total of \$214,500 in fines against High Liner Foods Inc. for 17 alleged violations of workplace health and safety standards at the company's Portsmouth, N.H., seafood processing plant. The company is mainly cited for a failure to address deficiencies in its anhydrous ammonia piping system used for freezing.

OSHA's inspection found that the company did not properly inspect and test the piping system, which was corroded and encased in ice in many locations. Also, it did not correct previously identified deficiencies in the system. For these conditions, OSHA has issued the company two willful citations, carrying \$140,000 in proposed fines. OSHA defines a willful violation as one committed with plain indifference to or intentional disregard for worker safety and health.

"Failing to inspect and test the ammonia piping system and take corrective action exposes workers to the possibility of an ammonia leak or similar severe or catastrophic incident," said Rosemarie Ohar, OSHA's area director for New Hampshire. "For the health and safety of their workers, employers must proactively assess and address hazards associated with processes and equipment that use large amounts of ammonia or other hazardous chemicals."

OSHA also determined that the plant failed to label and identify piping systems, remove frost and ice accumulations from piping, properly locate relief valves, ensure that the main ammonia shutoff valve was accessible, ensure that an exit door opened to the outside, conduct compliance audits, inspect and test the mechanical integrity of process equipment, provide workers with hand protection and make process safety information available. These conditions resulted in nine serious citations, with \$44,500 in fines. OSHA issues serious citations when death or serious physical harm is likely to result from hazards about which the employer knew or should have known.

High Liner Foods also has been issued one repeat citation and a \$25,000 fine for not properly calibrating equipment used to inspect and test compressors and cryolators. This citation follows an identical hazard cited by OSHA at the company's Danvers, Mass., plant in 2009. Finally, five other-than-serious citations with \$5,000 in fines have been issued for incomplete or inadequate recording of occupational illnesses and injuries.

The company has 15 business days from receipt of its citations and proposed penalties to comply, meet with OSHA's area director or contest the findings before the independent Occupational Safety and Health Review Commission. The inspection was conducted by OSHA's Concord Area Office; telephone 603-225-1629.

Under the Occupational Safety and Health Act of 1970, employers are responsible for providing safe and healthful workplaces for their employees. OSHA's role is to assure these conditions for America's working men and women by setting and enforcing standards, and providing training, education and assistance. For more information, visit <http://www.osha.gov>.

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

(k) Hot Work Permit

The employer shall issue a hot work permit that documents that the fire prevention and protection requirements of 1910.252(a) have been met.

1910.252(a) is the section of OSHA's Welding, Cutting and Brazing standard that addresses fire prevention.

- 1. Although the Department of Transportation (DOT) lists anhydrous ammonia as a non-flammable gas, there have been several fires and explosions of ammonia inside buildings or confined spaces.*

The proper use of Hot Work Permits is very important for the prevention of catastrophic releases of ammonia.

Work together in your group and examine the sample Hot Work Permits. Have these permits been filled out properly?.

- 2. What, if any, problems do you see?*

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

1.

Hot Work Permit		
Date Issued	11/10	
Issued By	[Signature]	
Location of Hot Work	Shop	
Type of Hot Work	Welding - Cutting - Grinding - Other	
EXPIRES	Time _____	Date _____
Job Description		
Safety Requirements - required to be established & maintained		
the person issuing this permit has required the following safety precautions and indicated by his initials that the following circled items have been established prior to issuing this permit		Initials of Issuing Authority
No flammables/combustibles within 35 feet		P
Charged ABC Extinguisher at work area		P
Fire Watch(es) briefed & stationed		P
Adequate ventilation established		P
Welding curtains or shields		P
Respirators used (if required)		—
Hot Work Personal Protective Equipment		P
Welding / cutting equipment inspected		P
No flammable / combustible gasses in area		P
Confined Space Entry Permit Issued		—
Access to work area controlled		P
Task Started	Time _____	Date _____
Task Completed	Time _____	Date _____
Fire Watch Secured	Time _____	Date _____
Permit Ended	Time _____	Date _____
Return Completed Permit to:	[Signature]	

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

2.

ROOF		Hot Work Permit	
Date Issued	10/6		
Issued By	<i>[Signature]</i>		
Location of Hot Work	Roof / Shop / EA		
Type of Hot Work	<input checked="" type="checkbox"/> Welding <input checked="" type="checkbox"/> Cutting <input checked="" type="checkbox"/> Grinding <input checked="" type="checkbox"/> Other		
EXPIRES	Time	1630	Date 11/6
Job Description	SRV work		
Safety Requirements - required to be established & maintained			
the person issuing this permit has required the following safety precautions and indicated by his initials that the following circled items have been established prior to issuing this permit.		Initials of Issuing Authority	
No flammables/combustibles within 35 feet		P	
Charged ABC Extinguisher at work area		P	
Fire Watch(es) briefed & stationed		P	
Adequate ventilation established		P	
Welding curtains or shields		P	
Respirators used (if required)		—	
Hot Work Personal Protective Equipment		P	
Welding / cutting equipment inspected		P	
No flammable / combustible gasses in area		P	
Confined Space Entry Permit Issued		—	
Access to work area controlled		P	
Task Started	Time	Date	
Task Completed	Time	Date	
Fire Watch Secured	Time	Date	
Permit Ended	Time	1630	Date 11/6
Return Completed Permit to:			
<i>[Signature]</i>			

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

3.

Hot Work Permit		
Date Issued	5/7/19	
Issued By	M. Wier	
Location of Hot Work	DD #3	
Type of Hot Work	<input checked="" type="checkbox"/> Welding - <input checked="" type="checkbox"/> Cutting - <input type="checkbox"/> Grinding - <input type="checkbox"/> Other	
EXPIRES	Time <u>1500</u>	Date <u>5/7/19</u>
Job Description		
Safety Requirements - required to be established & maintained		
<small>the person issuing this permit has required the following safety precautions and indicated by his initials that the following circled items have been established prior to issuing this permit</small>		Initials of Issuing Authority
No flammables/combustibles within 35 feet	<input checked="" type="checkbox"/>	✓
Charged ABC Extinguisher at work area	<input checked="" type="checkbox"/>	✓
Fire Watch(es) briefed & stationed	<input checked="" type="checkbox"/>	✓
Adequate ventilation established	<input checked="" type="checkbox"/>	✓
Welding curtains or shields	<input checked="" type="checkbox"/>	✓
Respirators used (if required)	N/A	N/A
Hot Work Personal Protective Equipment	<input checked="" type="checkbox"/>	✓
Welding / cutting equipment inspected	<input checked="" type="checkbox"/>	✓
No flammable / combustible gasses in area	<input checked="" type="checkbox"/>	✓
Confined Space Entry Permit Issued	N/A	N/A
Access to work area controlled	<input checked="" type="checkbox"/>	✓
Task Started	Time <u>0900</u>	Date _____
Task Completed	Time _____	Date _____
Fire Watch Secured	Time _____	Date _____
Permit Ended	Time <u>1700</u>	Date <u>5/7</u>
Return Completed Permit to: <u>J. Wier</u>		

Module 2, Task 2
OSHA's PSM Standard
A Plan for Keeping the Ammonia in the Pipes

4

Hot Work Permit ROOF/WALL		
Date Issued	10/29/19	
Issued By	[Signature]	
ROOF/WALL Hot Work		
Type of Hot Work	Welding - Cutting - Grinding - Other	
EXPIRES	Time 2:55	Date 7/3/19
Job Description		
Safety Requirements - required to be established & maintained		
safety precautions and indicated by his initials that the following circled items have been established prior to		Initials of Issuing Authority
No flammables/combustibles within 35 feet		[Initials]
Charged ABC Extinguisher at work area		[Initials]
Fire Watch(es) briefed & stationed		[Initials]
Adequate ventilation established		[Initials]
Welding curtains or shields		[Initials]
Respirators used (if required)		[Initials]
Hot Work Personal Protective Equipment		[Initials]
Welding / cutting equipment inspected		[Initials]
No flammable / combustible gasses in area		[Initials]
Confined Space Entry Permit Issued		N/A
Access to work area controlled		[Initials]
Water hose when possible		[Initials]
Task Started	Time _____	Date _____
Task Completed	Time _____	Date _____
Fire Watch Secured	Time _____	Date _____
Permit Ended	Time 1:30	Date 7/5/19
Return Completed Permit to:	[Signature]	

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

(I) Management of Change

The company must have a written procedure for managing changes to the ammonia refrigeration process. These changes could be changes in technology, equipment or procedures.

The Management of Change procedure provides a structure for thinking through the reasons for a change and its impact on safety and health, workers, and operating procedures.

Management must update Process Safety Information and Operating Procedures as part of the Management of Change procedure.

Discuss the following questions in your group.

1. It is RAGAGEP for Pressure Relief Valves on ammonia refrigeration systems to be replaced or rebuilt every 5 years. Is it necessary to go through the Management of Change (MOC) procedure if a pressure relief valve is replaced by an identical valve (same manufacturer, same model)? Look at 1910.119(l)(1) and the definition of "Replacement in Kind" in 1910.119(b) to help you answer this question.

2. Is it necessary to go through the Management of Change procedure if a pressure relief valve is replaced by a similar valve from a different manufacturer if the valve is rated the same?

Is there any documentation that needs to be updated in this case?

3. Is it necessary to go through the Management of Change procedure if a pressure relief valve is replaced by a valve from the same manufacturer if the valve is rated for a different relief pressure?

4. Is it necessary to go through the Management of Change Process if there is a reduction in the number of Refrigeration Techs or their hours worked?

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

(m) Incident Investigation

The employer shall investigate each incident which resulted in or COULD have resulted in a catastrophic release of ammonia in the workplace.

The incident investigation shall be started within 48 hours of the incident.

The incident investigation team has to include at least one person who knows about the ammonia refrigeration system. At least one contract worker has to be included if contractors were involved in the incident.

The company has to write a report that includes specific information as well as recommendations resulting from the investigation.

The company has to act upon the findings and recommendations.

The company has to review the report with all affected employees.

Work as a group to answer the following questions:

- 1. Compare the requirements of 1910.119(m)(4) with the information on the attached Incident Report. Does the Incident Report comply with OSHA's PSM requirements?*

- 2. The UFCW OSH Office requested Incident Reports for the past three years from employers that are covered under OSHA's PSM standard. Almost all of these employers responded with a statement that they had not had any Incidents that required investigation over the past three years. Based on the experience of the participants in your group, what is your opinion of this statement?*

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

PSM/RMP Incident Investigation Report

Part A

To be completed for any incident which resulted in, or could reasonably have resulted in a catastrophic release of ammonia involving the refrigeration system, or any time the measured concentration of ammonia exceeds 25 PPM, or in the event that any worker are evacuated from their normal work areas. This form will also need to be completed for any near miss incidents which did not result in a release but had potential consequences.

Complete this report within 48 hours of the release or any near miss incident.

- ✓ RMP requires a 5-year accident investigation review and is covered in this report.
- ✓ A completed **Incident Command Response Checklist** must be included with this report. The checklist contains information on measured concentrations, PPE used, who involved in response and other information which must be retained
- ✓ Complete **PART B** also when the release traveled or is believed to have traveled anywhere outside the plant property boundary

Immediate notice of **ANY** ammonia release **MUST** be made to [REDACTED] -
Corporate Loss Prevention and Corporate Environmental Affairs in [REDACTED]

Date and time incident RELEASE began and ended:	2/06/2008 11:22 ammonia smell was detected near the freezer. 11:24 call to utilities to shut valve.
Date and time INVESTIGATION began and ended:	2/06/2008 Investigation began immediately upon discovery. All documentation and paper work finished 2/07/2008

Description of the incident and factors contributing to the incident:
(Be specific about event and source - use a separate sheet to describe the incident in detail):
We had a weld to fracture in line 51 Frego Freezer causing a minor leak inside. All was contained inside. Everyone was evacuated to the break areas as a precaution. Looking into the leak it was discussed that the expansion of the liquid pipe during freeze and defrost cycles is the contributing factor for the leak.

Names of Investigation team members
(Investigation team must include Incident Commander and Refrigeration Operators, and if applicable, a contractor employee)

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

Estimation of Ammonia Release, approximately >20 lb.

- (include any supporting calculations performed to identify how estimated quantity released was determined – otherwise, indicate how quantity was estimated)

Temporal release estimated less than 20 lbs.

(Gas) or liquid release **(circle one)**

Air Samples:

Level	Time	Area/Location
100 ppm	11:43 pm	Entrance conveyor
80 ppm	11:45 pm	Freezer Door
30 ppm	11:47 pm	Inside the Freezer
100 ppm	12:15 am	Inside Freezer with Suction on.
0 ppm	1:00 am	Inside, After suction complete.

(log additional samples on the back of this form)

***NOTE: The release was not over the 100 lbs. Policy is that we report all incidents and follow up as needed. We made the return call to inform all agencies of the small amount. (JJ Traynom)**

If release was over 100 lbs., identify regulatory agencies contacted.

	Yes	No	Time Contacted	Contacted By (Complete Name)	Incident Report Number
NRC	X		11:40 am		861617
SEPC	X		11:42 am		
LEPC	X		11:45 am		
Other (specify):					1038

(attach copies of reports required by these agencies.)

Did the release result in any **on-site** Fatalities, serious Injury (hospitalization), or significant Property Damage - (circle one) YES (NO)

If YES, describe and also indicate to whom: (employees, contractors, public responders, public, etc.)

Revised 9-3-04
2

Module 2, Task 2
OSHA's PSM Standard
A Plan for Keeping the Ammonia in the Pipes

Recommendations:

1) This is the second time the weld broke at that location. We're investigating the option of reworking the ammonia line. This will help relieve the stress and pressure at the weld location.

Follow-up Date: 2/17/08

Corrective action taken and date

(be specific to identify any operational or process changes which resulted):

1) ~~Raymond~~ engineering will head a project to change the layout of the piping. By doing this it will relieve the stress point in the weld and will eliminate this issue. The modifications will be made at the first available date.

Have all affected employees been notified of corrective actions, changes in procedures, or equipment. - (circle one) **(YES)** NO

- You must share the report – its findings and recommendations with affected workers whose job tasks are relevant to the incident.
- Retain documentation (including names, dates, and topic covered) on file with this report to identify employee notification was completed.

Report by:

[Redacted]



Date:

2/6/07

RETAIN THIS REPORT FOR 5 (FIVE) YEARS

Copies of all incident investigations must be forwarded to [Redacted]
Corporate Loss Prevention in [Redacted]

Complete a detailed written critique of the response and attach to this form. Indicate ammonia concentrations measured, PPE used, who was involved in the response, and any locations evacuated as a result of the release. Also indicate any deviations from the written response plan and include a completed copy of the Incident Command Response Checklist.

Module 2, Task 2
OSHA's PSM Standard
A Plan for Keeping the Ammonia in the Pipes

(n) Emergency Planning and Response

The employer has to have an emergency action plan that complies with 1910.38.

Their plan has to include procedures for small releases.

If the Employer has an Emergency Response Team, they are also covered by 1910.120(q).

Working as a group, use the OSHA standards at your table to determine if the following emergency response systems comply with the PSM standard.

- 1) The Donald Duck Poultry Plant relies on supervisors to notify workers when there is a need for an emergency evacuation. There are only 50 workers in this facility and there are 5 supervisors on the floor at all times. Does this system comply with 1910.119(n)?*

- 2) The Falling Sky Poultry Plant is a huge operation. The 500 workers on each shift are notified by a distinctive alarm when they need to evacuate. The alarm is so loud that the only place you cannot hear it is way in the back of the shipping department where the battery chargers are for the fork trucks. Does this system comply with 1910.119(n)?*

- 3) Whenever there is an evacuation drill at the Porky Pig Plant, the workers usually go sit in their cars and have a cigarette or listen to the radio until it's time to go back in. Does this system comply with 1910.119(n)?*

Module 2, Task 2

OSHA's PSM Standard

A Plan for Keeping the Ammonia in the Pipes

(o) Compliance Audits

Every three years the employer has to evaluate their own compliance with the PSM standard and write a report about what they found.

At least one person who knows about the ammonia refrigeration system has to participate in the audit.

Any problems that are found by the audit have to be corrected, and the corrections have to be documented.

Work as a group to answer the following questions:

- 1) The Brown Cow Safety Committee requested a copy of the most recent PSM Compliance Audit report. The company said the report was shredded as soon as all of the problems were corrected. Look at 1910.119(o)(5) to see if the company is in compliance.*

- 2) Management at the Turkey Lurky Deli has assured the Safety Committee that the company has copies of the last two PSM Compliance Audit reports, but unfortunately they cannot share the reports because of Homeland Security rules. Does the company have to allow the Safety Committee to see the reports? Why or why not?*

- 3) The most recent PSM Compliance Audit at the Falling Sky Poultry Plant was conducted by an outside consulting firm along with the Ammonia Refrigeration Supervisor from the plant. The union filed a complaint with the company saying that a union member must be included on the Audit Team. Does the union's complaint have merit? Why or why not?*

Module 2, Task 2
OSHA's PSM Standard
A Plan for Keeping the Ammonia in the Pipes

(p) Trade Secrets

Employers whose processes involve trade secrets must make PSM information available to their employees, employee representatives, and others who need the information for PSM activities. Since the process of ammonia refrigeration is a well-established, well-known process that does not involve trade secrets, the trade secrets element of the PSM standard should not be needed.

**Congratulations! You have completed the
basic PSM Training Modules!**