

Trainers' Notes
Module 1

Module 1 Goals

Participants will be able to

1. Evaluate the use of ammonia in refrigeration systems with an understanding of the advantages and risks.
2. Recognize the need for a strong safety program around ammonia refrigeration systems
3. Recognize the lack of certainty in exposure limits, and be able to make judgments guided by the values of worker advocacy.
4. Recognize the inconsistencies in Odor Threshold values and other guidelines, and use this understanding to strengthen their advocacy for themselves and other workers.
5. Be aware of the major preventive components of OSHA's Process Safety Management standard

Divide participants into small groups.

Be sure each small group has a set of fact sheets and the Small Group Instructions.

Read through the instructions out loud and make sure everyone understands the process.

Monitor the progress of the groups. When most of the groups appear to be done bring everyone back together to discuss their responses to the questions.

Review the responses to the fact sheet questions from the different groups.

Be sure the major points (in red) are mentioned.

Fact Sheets 1 & 2 do not have discussion questions

Fact Sheet 3

Discussion Question:

What are some things that could make data from accident investigations or human studies difficult to interpret?

❖ **Accident Investigations**

- The amount of ammonia present during accidental releases can be constantly changing due to weather conditions (for outdoor releases); or ventilation and building configuration (for indoor releases).

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- There may be mixtures of chemicals, especially in the case of fires or explosions.
- Fatalities and serious injuries may be due to a combination of inhalation exposure, chemical burns and traumatic injury.
- Monitoring may be done for rescue crews and may not reflect initial conditions
- ❖ Human Studies
 - Human studies on volunteers are limited to reversible effects.
 - Human studies on volunteers are usually done on healthy, young students.
 - There have been very few studies of the short term effects of ammonia exposure on workers.
 - There have been no studies on the long term effects of ammonia exposure on workers.

You have seen two examples of different views on the safety of ammonia. Which approach should the union take?

- ❖ *As the workers' advocate, the union should take the most protective approach possible. Our approach should be based on science and should not exaggerate the dangers.*

Fact Sheet 4

Questions for discussion:

1. A Refrigeration Tech is exposed to 100 ppm of ammonia for an hour while he repairs a leaky valve. For the rest of the shift he is working on the roof and is not exposed to any ammonia.

Has he exceeded the OSHA PEL?

No. His Time Weighted Average for an 8-hour day is 12.5 ppm. This is less than the OSHA PEL of 50 ppm.

Has he exceeded the NIOSH REL?

No. His Time Weighted Average of 12.5 ppm is less than the NIOSH REL of 25 ppm

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Has he exceeded the NIOSH STEL?

Yes. He was exposed to more than 35 ppm in a 15 minute period.

2. Plants with ammonia refrigeration systems often set their production area sensors to alarm when they detect ammonia at 25 ppm. Why?

(Hint: Ammonia refrigeration systems are supposed to be closed systems)

Unless ammonia is being used in a production process or for cleaning, the only reason ammonia would be detectable in a production area with an ammonia refrigeration system is if something is leaking. Leaks must be checked out and repaired as soon as possible.

Fact Sheet 5

Question for discussion:

At the Happy Family meatpacking plant, workers are encouraged to report ammonia smells to management. A supervisor has gotten upset with a production worker who is constantly reporting ammonia smells. He has threatened to write her up for making up problems. He says she wastes his time by making him "chase farts". What could be the problem here? What is a possible solution?

This may be an example of different people having different levels of sensitivity to ammonia. The production worker might be able to detect much lower levels than the supervisor. It is important for the supervisor not to trivialize or make fun of this worker's concerns.

Fact Sheet 6

Question for discussion

When Marcus asked his supervisor about the safety of the ammonia refrigeration system, his supervisor responded. "This company really cares about safety. Don't worry. We have a great alarm system and emergency evacuation plan."

What do you think of this response?

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Even though emergency response is an important part of the safety program for ammonia refrigeration systems, it is more important to prevent emergencies in the first place. The PSM standard is about keeping the ammonia in the pipes where it can't hurt anybody. When the PSM program is effective there will almost never be a need for an emergency evacuation.

Discussion Questions

Pass out the Module 1 Discussion Questions. Read through the scenarios together and work as a large group on the questions.

In both of these incidents, ammonia levels were well under the Permissible Exposure Limit set by OSHA. Yet in both of these incidents workers went to the hospital. What could account for this apparent inconsistency?

Why would workers have severe enough symptoms to go to the hospital if the ammonia levels were relatively low?

The sampling results might not be accurate.

Is there information missing about how the sampling was done?

How accurate is the sampling method that was used?

Was the person doing the sampling trained properly?

How many samples were taken?

Where were the samples taken? Were they taken in the employees' breathing zones at their work stations?

When and how was the monitor calibrated?

Were other chemicals present?

Is there information missing about other conditions in the workplace?

Were the employees working in an area where the ammonia could have collected and not been ventilated out?

Were other chemicals present that were not monitored?

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In the second incident, workers continued to work, and took breaks on the dock to get fresh air. Would you have handled this situation differently? How?

It is important to recognize the limitations of monitoring equipment. It might have been better to have trusted the employees' reports of their symptoms and evacuated the work place until it could be ventilated thoroughly.