Ammonia Refrigeration System
Emergency Action Plans vs. Emergency Response Plans
(Requirements and Ramifications)

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Addressing a release of ammonia at a refrigeration facility can involve detection, reporting, identification, evacuation, leak isolation, vapor suppression, etc. Should the fire authority initiate and manage these actions or should plant personnel? The correct answer will vary from facility to facility, is a function of both the facility characteristics and the resources of the fire authority, and may change over time. The answer will also dictate whether the plant should create an "Emergency Action Plan" or an "Emergency Response Plan" – two conceptually similar approaches that can have quite different technical and legal ramifications. The purpose of this paper is to overview the regulatory requirements and help ammonia refrigeration plant personnel make thoughtful decisions regarding the extent of their emergency preparedness program.

THE CHALLENGE

Emergencies that can occur in an ammonia refrigeration facility range from minor emissions to ammonia releases of the type identified, evaluated, and managed as part of a Risk Management Program (40 CFR Part 68). Emergency preparedness also includes a need to address fires and other non-ammonia-release events. Emergencies can also include deliberately-induced events, theft-triggered releases, and other security issues. The appropriate activities taken to address the emergency will range the full spectrum from evacuation (e.g., employees, adjacent industrial facilities, community), to leak isolation, to vapor suppression. Responses can also include security and law enforcement. Emergency operations are always "event-driven", and effective handling is a function of appropriate training and the availability of adequate emergency response resources such as personnel and equipment.

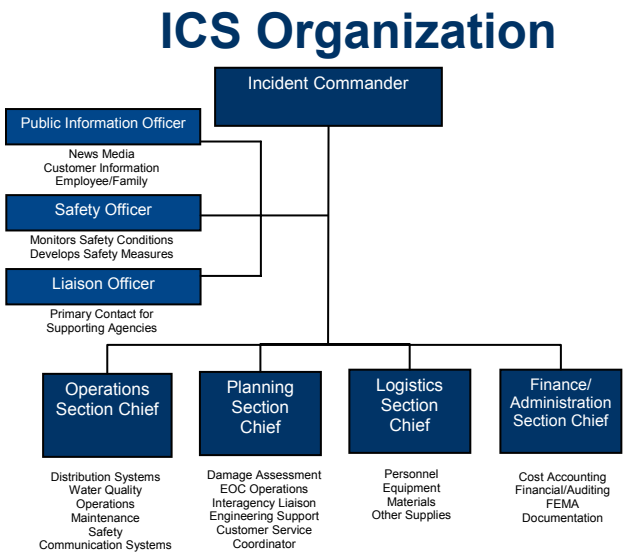
Effectively addressing an emergency requires:

- Pre-Planning
- Resources (Personnel and Equipment)
- Training

The primary objective when addressing an emergency is to provide optimal protection for plant personnel, the community, and the environment. Determining whether plant personnel or municipal emergency responders are better suited to address the emergency is highly dependent on both the facility characteristics and the resources of the fire authority, and ideally in most cases, optimal response will involve both entities.

Whatever the correct answer, these are issues that must be worked out before the emergency occurs, stressing the importance of the pre-emergency planning activity as a fundamental building block for effectively addressing the emergency. While local circumstances will dictate which entity is better able to handle the various aspects of emergency management, it is safe to say that in all cases a more effective result will occur when both plant and local fire authority resources are used in predetermined roles that have been agreed upon in advance, and where the scenarios are consistent with those used in recurrent combined training sessions.

The following section outlines the key planning requirements for ammonia refrigeration plant emergencies. The creation of an appropriate plan will provide the basis for equipment and training issues which must be addressed.



PLANNING REQUIREMENTS

The objectives of the Emergency Action Plan (29 CFR 1910.38) are to identify "designated actions employers and employees must take to ensure employee safety from fire and other emergencies." Specific requirements include:

- "Emergency escape procedures and emergency escape route assignments" (e.g., upwind and uphill)
- "Procedures to be followed by employees who remain to operate critical plant operations before they evacuate"
- "Procedures to account for all employees after emergency evacuation has been completed"
- "Rescue and medical duties for those employees who are to perform them" – Must have proper training and PPE – Must not become part of the problem
- "The preferred means of reporting fires and other emergencies" – In plant and to local authority having jurisdiction
- Legal requirements for reporting to the authority having jurisdiction
- "Names or regular job titles of persons or departments who can be contacted for further information or explanation of duties under the plan"
- Establishment of an "employee alarm system"
- Evacuation - "The employer shall establish in the emergency action plan the types of evacuation to be used in emergency circumstances." – Employees should be trained to evacuate upwind and uphill.
- Training – "The employer shall review with each employee upon initial assignment those parts of the plan which the employee must know to protect the employee in the event of an emergency."
  - "Initially when the plan is developed"

- "Whenever the employee's responsibilities or designated actions under the plan change"
- "Whenever the plan is changed"

It is critical that employees understand what is specifically required of them during an emergency.

Federal requirements for an Emergency Response Plan (29 CFR 1910.120(q)) are:

- Pre-emergency planning and coordination with outside parties
- Personnel roles, lines of authority, training, and communication
- Emergency recognition and prevention
- Safe distances and places of refuge
- Site security and control
- Evacuation routes and procedures
- Decontamination
- Emergency medical treatment and first aid
- Emergency alerting and response procedures
- Critique of response and follow-up
- PPE and emergency equipment

Along with the above requirements for the Emergency Response Plan, the following programmatic elements must be maintained:

- Procedures for handling emergency response
- Training (Initial and Refresher)
- Medical surveillance and consultation

EXAMPLES OF HOW SOME AMMONIA REFRIGERATION FACILITIES ADDRESS EMERGENCY ACTION/RESPONSE

Facility emergency response is part of being a responsible corporate citizen and a good neighbor; however, recognize that:

- Training must be complete and recurrent (knowledge and physical).
- Risk to plant personnel may increase.
- Physicals must be performed annually.
- Emergency response equipment must be maintained and certified.

The advantage of being able to effectively respond to emergencies is the ability to better protect plant personnel, the community, and the environment. However, not adhering to the full extent of the regulatory requirements of a response organization can place personnel at risk and may represent significant legal liability for the ammonia refrigeration facility. For example, if an employee is a designated responder at the facility and a health problem or deficiency in emergency response equipment (e.g., a malfunctioning SCBA that may not have been properly certified) results in an injury during the emergency response, the

TYPICAL CONTENTS OF AN AMMONIA REFRIGERATION FACILITY EMERGENCY RESPONSE PLAN

QUICK REFERENCE

1) FACILITY EVACUATION PLAN

2) EMERGENCY EVENTS NOT INVOLVING A HAZARDOUS MATERIAL
- 2.1) Fire in a Process or Non-Process Area
- 2.2) Injury Requiring Medical Attention
- 2.3) Threats/Civil Disorder
- 2.4) Wildland or Adjacent Property Fire
- 2.5) External Event - Facility Impact Unlikely
- 2.6) External Event - Possible Facility Damage (e.g., earthquake, flood)
- 2.7) Potential Imminent Danger to Personnel (e.g., hostages, armed individual)
- 2.8) Potential Terrorist Incident (e.g., explosives)

3) EMERGENCY EVENTS INVOLVING A HAZARDOUS MATERIAL
- 3.1) Chemical Spill (e.g., caustic)
- 3.2) Anhydrous Ammonia Release
- 3.3) Off-Site Event Involving a Hazardous Material
- 3.4) Potential Terrorist Incident (e.g., explosives)

4) INCIDENTS
- 4.1) Small Fire (Facility)
- 4.2) Minor Injury (First Aid)

APPENDICES
- A) EMERGENCY CONTACT REFERENCE INFORMATION
- B) INCIDENT COMMAND SYSTEM (ICS) POSITION RESPONSIBILITIES & ACTIVITIES
- C) EMERGENCY PERSONNEL ALARM SYSTEM
- D EMERGENCY SHUTDOWN SYSTEM
- E) LOCATIONS OF CHEMICALS AND HAZARDOUS MATERIALS
- F) ENGINEERING DATA
- G) HAZWOPER-TRAINED EMPLOYEES
- H) PROCEDURES FOR HANDLING DEMONSTRATIONS, THREATS OF VIOLENCE, OR CIVIL DISORDER
- I) PUBLIC RELATIONS
- J) FORMS
- K) RECORD OF REVISIONS AND UPDATE

company is likely to incur liability.

If the facility is in a remote location or the municipal emergency response organization does not have the ability to provide a timely or effective response:

- The company will likely maintain at least some basic ability to provide respiratory protection for key personnel who are trained to access key leak isolation points.
- Maintaining these emergency response resources in a "ready" state is critical.
- **For this facility, keeping the facility Emergency Response Plan appropriately updated is critical.**

If you are in a heavily populated area with the ability to provide rapid access and effective response by emergency response resources (e.g., trained HazMat personnel):

- Many companies will donate Self-Contained Breathing Apparatus (SCBA), HazMat Suits, etc. to the municipal emergency response organization.
- Inviting the responders to your facility for familiarization walkdowns, introduction to personnel, and allowing the municipal emergency response organization to use your facility for training and emergency response drills is very effective.
- Discuss the hazards of ammonia with municipal emergency responders. If they are not familiar with key health hazards (e.g., inhalation and contact) and don't understand the thermodynamic concerns (e.g. flashing hazards associated with adding water to a pool of liquid ammonia [tempting if you have the mindset that "dilution" might be helpful for minimizing vapor release]), some companies resolve this by providing appropriate training resources.
- Training and signage that provide the emergency responder, or someone with only routine familiarity with ammonia refrigeration systems, to take basic actions to shut down compressors, isolate the system, and blowdown the ammonia inventory to a safe location (e.g., diffuser system) could be very effective. Obviously, if knowledgeable employees are on-site at the time of the ammonia release, they would be able to provide effective guidance to the municipal incident commander on the best steps to take to control the release.
- **For this situation, an Emergency Action Plan would be adequate.**

Whatever path is chosen, it is critical that employees understand their specific responsibilities during an emergency. Experience has shown that, in the absence of specific guidance and training, it is common for employees to exceed the limits of their training and expose themselves to personal risk levels beyond what the company deems appropriate. This issue, and its dangers, equally applies to fire authority responders who have not been adequately trained in the specifics of emergency response for ammonia refrigeration facilities.

CONCLUSION

Past decisions (perhaps made in a less litigious environment, with fewer neighbors) may have precipitated your current balance between on-site plant emergency resources vs. municipal emergency responders. However, it is important that facility management review their situation periodically and make the best decision for providing optimal emergency preparedness. This often involves balancing:

- Availability of Municipal Emergency Response HazMat Teams
- Plant's Responsibility to Protect Personnel, the Community, and the Environment
- Cost of Maintaining the Program:
  - Keeping Plans Up-to-date
  - Resource Maintenance (Personnel (e.g., physicals and certifications) and Equipment)
  - Training and Emergency Drills