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Enforcement Alert

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Anhydrous Ammonia at Refrigeration Facilities Under Scrutiny by U.S. EPA

EPA Enforcement Efforts Focus on Prevention of Chemical Accidents

Purpose

Evidence gathered by the U.S. Environmental Protection Agency (EPA) indicates that some refrigeration facilities may be failing to properly manage hazardous chemicals, including anhydrous ammonia, as required by the Clean Air Act (CAA) Section 112(r). This Alert is intended to inform the industry that companies must take responsibility to prevent accidental releases of dangerous chemicals like anhydrous ammonia through compliance with CAA's Chemical Accident Prevention Program.

Introduction

The Clean Air Act designates anhydrous ammonia as a regulated substance for accident prevention. Anhydrous ammonia presents a significant health hazard because it is corrosive to the skin, eyes and lungs. Exposure to 300 parts per million is immediately dangerous to life and health. Anhydrous ammonia is also flammable at concentrations of about 15 to 28 percent by volume in air. It can explode if it is released in an enclosed space with a source of ignition present, or if a vessel containing anhydrous ammonia is exposed to fire.

Deficient chemical accident prevention practices at some refrigeration facilities have resulted in releases of anhydrous ammonia into surrounding communities. Recently, chemical releases stemming from CAA 112(r) violations at 9 different refrigeration facilities have resulted in property damage, numerous injuries and hospitalizations and several deaths. Since 2012, EPA responded to these incidents with enforcement actions, imposing over $8.4 million in civil penalties. In addition, companies will spend approximately $10 million on supplemental environmental projects, including purchasing equipment and providing training for emergency responders as well as converting refrigeration equipment to safer technologies.

Case Study: Columbus Manufacturing Inc., San Francisco, CA

- In 2009, facility had two releases, each over 200 pounds of anhydrous ammonia, putting the surrounding community at risk. As a result of the second release:
  - All facility employees and several neighboring businesses were evacuated.
  - Nearly 30 people from the downwind facility sought medical attention.
  - 17 individuals were transported to the hospital. One person was hospitalized for four days.
  - Off-ramps from Highway 101 and several local streets were shut down.
- **Settlement required Columbus to spend $6 million** to improve facility safety by upgrading its refrigeration technology and emergency notification system and to pay a $685,446 penalty.

To help refrigeration facilities comply with CAA requirements and thereby prevent these types of dangerous accidents from occurring, EPA is highlighting the following aspects of the CAA's Chemical Accident Prevention Program:

- The Risk Management Program (RMP) Regulations
- The General Duty Clause
- Industry Standards
- Enforcement Focus on Accident Prevention

Risk Management Program Regulations

The Clean Air Act required EPA to publish regulations and guidance for chemical accident prevention at facilities using substances that posed the greatest risk of harm from accidental releases. These regulations, which are in 40 CFR Part 68, require facilities that have more than a threshold quantity of certain regulated chemicals in a "process" (such as use or storage) to develop a Risk Management Program. For example, the threshold for anhydrous ammonia is 10,000 pounds. Among other requirements, facilities must:

- Analyze the worst-case release scenario to determine the potential effects of a release of an extremely hazardous substance;
- Complete a five-year accident history;
- Coordinate response actions with the local emergency response agencies; and
- Submit to EPA a written Risk Management Plan, which is a summary of the Program, updating the plan every five years or as changes occur.

Facilities that have processes from which worst-case releases could reach the public or where accidental releases within the past 5 years have resulted in certain offsite impacts have additional requirements. For example, owners and operators of Program 3 processes must:

- Conduct an analysis to identify and resolve hazards associated with the process, which must be updated every five years;
- Have a release prevention program, with requirements to:
  - compile process safety information about the chemicals, equipment, and applicable industry standards, and ensure compliance with such industry standards
  - use safe operating procedures,
  - train employees,
  - maintain equipment,
  - conduct compliance audits every three years,
  - investigate accidents,
  - manage changes that could affect a process,
  - perform pre-startup review
  - have an employee participation plan,
  - prevent accidents from hot work, and
  - have a program to manage contractors who are working on or around a process.

- Comply with more comprehensive emergency response planning requirements if employees of the facility will respond to accidental releases of regulated substances.

Use of Emergency Orders to Prevent Ammonia Releases: RBF Frozen Desserts, LLC, West Hartford, CT

- RBF manufactures and stores frozen desserts at its facility, which shares a building as a restaurant and theater and is located in close proximity to homes, schools and other businesses.
- After a 2010 ammonia release and a 2013 fire at the facility, EPA was contacted by Connecticut's Department of Environmental Protection.
- During two inspections, one with an ammonia refrigeration expert, EPA discovered extremely dangerous conditions at the facility. Removal of the ammonia from the system was necessary.
- In August 2014, EPA issued a **Clean Air Act Section 303** emergency order which requires the facility to remove the ammonia and prohibits it from adding ammonia back into the system until unsafe conditions are addressed.
- When RBF tried but was unable to remove the ammonia expeditiously, EPA triggered removal under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in order to minimize the chance of an ammonia release and protect the surrounding community.

Recent cases indicate that refrigeration facilities may not be fully implementing RMPs, despite the requirements of the Chemical Accident Prevention Program. Note that if your ammonia refrigeration facility is subject to these regulations, it is also likely to be subject to the Occupational Health and Safety Administration's Process Safety Management standard.

The General Duty Clause

When Congress amended the Clean Air Act in 1990, it added the General Duty Clause (GDC) at CAA Section 112(r)(1). Under the GDC, owners and operators of facilities that have regulated substances and other extremely hazardous substances are responsible for ensuring that these chemicals are managed safely. Safe management includes taking steps to both prevent accidental releases of the extremely hazardous substances and to minimize the consequences of any accidental releases that may occur. Facilities have been required to comply with the GDC since November 1990. Facilities subject to the General Duty Clause are, among other things, responsible for:

- Identifying the hazards posed by the chemicals and assessing the impacts of possible releases,
- Designing and maintaining a safe facility to prevent accidental releases, and
- Minimizing the consequences of accidental releases that do occur.

Some points to remember about the GDC:

- The GDC applies to many chemicals; it is not limited to the chemicals subject to the RMP regulations.
- The GDC applies facility-wide, regardless of the amount of chemical stored.
- In analyzing the standard of care, EPA consults industry standards, codes and practices, including those mentioned below.

Recent GDC cases indicate that some facilities may not be taking required steps to design and maintain safe facilities or take precautions that would minimize the consequences of an accidental release of ammonia.

Industry Standards

In light of the potential hazards posed by the mishandling of anhydrous ammonia, industry trade associations have issued standards outlining good engineering and operating practices in the ammonia refrigeration industry. In collaboration with the American National Standards Institute, the International Institute of Ammonia Refrigeration ("IIAR") has issued (and updated) "Standard 2: Equipment, Design, and Installation of Closed-Circuit Ammonia Mechanical Refrigeration Systems," along with other applicable standards and guidance. Also in collaboration with the American National Standards Institute, the American Society of Heating, Refrigerating and Air-Conditioning Engineers ("ASHRAE") has issued (and updated) "Standard 15: Safety Standard for Refrigeration Systems." These standards and guidance are consistently relied upon by refrigeration experts and are sometimes incorporated into state building, fire, and mechanical codes. In addition, IIAR has published a guidance document for owners of smaller refrigeration systems that are subject to the GDC but not the RMP regulations.

Ice Buildup Blocking Stairway

Enforcement Focus on Accident Prevention

The following cases illustrate EPA's enforcement focus on preventing chemical accidents before accidental releases threaten human health and the environment.

- In November 2012, EPA and Olympic Fruit Company reached an agreement to settle alleged violations of RMP requirements. The company, based in Union Gap, WA, was required to develop an RMP because it uses more than 10,000 pounds of anhydrous ammonia. Olympic Fruit Company agreed to spend $40,659 to install new ammonia detection sensors, safety shut-off valves, and an emergency pressure control system as well as pay a civil penalty of $33,964. The company also agreed to purchase a hand-held ammonia detector for a local fire department.

- In December 2012, EPA issued an Administrative Order in response to RMP violations identified through an inspection at Millbrook Cold Storage, Inc., located in Somerville, MA. The inspection revealed many dangerous conditions at the facility, including dangerous amounts of ice that made valves inaccessible, absence of a qualified operator to run or maintain the system, and lack of documentation explaining how the system worked. The Administrative Order required the company to hire a refrigeration expert to systematically review the hazards associated with the refrigeration system and recommend steps to address those hazards.

- In May 2013, EPA and Reddy Ice Corporation, an ice manufacturer, agreed to a settlement resolving alleged violations of the RMP requirements, specifically for failing to ensure that storage vessels containing hazardous chemicals were constructed according to safe engineering standards and for inadequately implementing the required accident prevention program at its facility located in Denver, CO. Reddy Ice Corporation, which is based in Dallas, TX, has taken steps to ensure that process vessels containing ammonia are properly constructed and will update the Denver facility's risk management plan. The company also paid a $61,500 civil penalty.

- In May 2014, EPA reached a settlement with Cold Storage Solutions, Inc. and its three sister companies, each of which operates a cold storage warehouse in Lakeville, MA. The facilities are located near stores, schools, and other businesses. The complaints alleged violations of the GDC for failing to, among other things: identify hazards; maintain sufficient documentation to safely operate systems; employ adequate basic safety practices; and have adequate emergency mechanisms and response plans in place. Further a small release of ammonia occurred at one of the Facilities while EPA inspectors were on site, requiring an evacuation. The companies corrected the identified deficiencies and agreed to spend $346,800 to enhance the safety of the neighboring communities. They will install various protective features at the facilities that will help prevent accidental or intentional ammonia releases and they will enhance emergency response capabilities in the surrounding area by providing equipment to local and regional first responders. The companies also paid a civil penalty of $108,000.

Lessons Learned from recent inspections of ammonia refrigeration systems:

• Identifying the hazards that a facility's refrigeration systems present is crucial. Guidance on how to conduct a proper hazard analysis is available from the International Institute of Ammonia Refrigeration or in EPA's General Duty Clause Guidance, found at http://www.epa.gov/osweroe1/docs/chem/gdcregionalguidance.pdf. Part of this analysis should include understanding the gap between the safety requirements of new industry codes and standards and the standards to which the facility was built and developing a plan to address safety deficiencies. In some cases, that plan must include making facility upgrades.

• Preventive maintenance is the standard for the industry. The maintenance program, including inspections, should be documented.

• Gathering sufficient information about the piping and equipment is crucial so that facilities understand the hazards associated with their refrigeration system and can develop a proper maintenance program.

• Refrigeration systems that are missing key controls, such as emergency shutoff valves, because they were not built to industry codes and standards in effect at the time of construction need to be upgraded.

• Halting corrosion of pipes and equipment should be a priority.

• Hammering and shaking of equipment and pipes risks breakage and ammonia releases.

• Defrosting is important. Ice buildup can impede access to important equipment and dangerously weigh down piping.

• Adequate ventilation in a safe location is required for machinery rooms.

• Ability to shut down the system without entering the machinery room is necessary.

• Ammonia pressure relief devices should not be located where they could spray ammonia onto people.

• A trained operator is critical to running an ammonia refrigeration system.

• A well-maintained closed loop system should limit accidents occurring during startup.