



# Chemical Emergency Preparedness and Prevention Advisory

## Ammonia

This advisory recommends ways Local Emergency Planning Committees (LEPCs) and chemical facilities can minimize risks posed by the presence of ammonia in their communities. Ammonia is toxic if swallowed or inhaled and can irritate or burn the skin, eyes, nose, or throat through inhalation or direct contact. Careless storage or mixing of ammonia with other chemicals can cause the release of toxic ammonia vapors, as well as fires and high-pressure releases, and result in injuries or death to unprotected community members. Its toxicity and high production volume prompted EPA to list ammonia as an extremely hazardous substance (EHS) under Section 302 of the Emergency Planning and Community-Right-to-Know Act (commonly known as SARA Title III). In addition, OSHA regulations require that facility employees who could potentially be exposed to ammonia in any form be trained in the safe use and potential hazards posed by this chemical.

EPA stresses that although mishandling of ammonia can cause harm, there is no cause for undue alarm about its presence in the community. Ammonia is typically handled safely and without incident. More than 70% of all ammonia produced today in the U.S. is used either in direct application as a fertilizer or to manufacture other fertilizers. Anhydrous ammonia is commonly applied directly to soils to bolster the strength of plant roots, improve nutrient uptake, and stimulate growth. Ammonia is also used to purify municipal and industrial water supplies, as an oxygen scavenger in treating boiler feed water, and as a refrigerant gas in commercial installations. Reducing the use of chlorofluorocarbons as refrigerants, in efforts to protect the ozone layer, will likely increase reliance on ammonia for refrigeration, which may result in even greater production and storage volumes of ammonia at a greater number of facilities.

### RECOMMENDED STEPS FOR LEPCS

Section 302 of SARA Title III requires LEPCs to develop comprehensive emergency plans to address facilities where ammonia as well as other EHSs and hazardous materials are present in excess of their threshold planning quantities (500 pounds for ammonia). Because ammonia is widely used in large quantities and poses a significant health and safety hazard, EPA suggests that LEPCs take the following steps:

#### Hazards Identification:

- Know where ammonia could be found. Facilities that routinely use ammonia include:
  - Cold storage facilities;
  - Fertilizer manufacturers and farms;
  - Synthetic fibers and plastics plants;
  - Rubber manufacturers;
  - Tanneries;
  - Pharmaceutical companies;
  - Alkali plants;
  - Chemical manufacturers (e.g., nitric acid,

explosives);

- Metal processing plants;
  - Manufacturers of cleaning products;
  - Skating rinks;
  - Pulp and paper processors; and
  - Petroleum refineries and natural gas plants.
- Send a copy of this advisory to all such facilities in your LEPC jurisdiction, calling their attention to the recommended steps for facilities in the section below.
  - Be familiar with other names for "ammonia." Trade names for ammonia include AM-FOL, ammonia gas, anhydrous ammonia, Nitro-Sil, R 717, Spirit of Hartshorn, and liquid ammonia.
  - Be aware that products similar to ammonia (e.g., ammonium hydroxide), while not on the list of EHSs, may still give off ammonia vapors upon release.
  - Ensure that the facilities covered by Sections 302, 311, and 312 of SARA Title III have provided to the LEPC and local fire departments adequate informa-



tion about ammonia stored at their location. Gather information about smaller quantities of ammonia as well. (Not all facilities using or storing ammonia will meet the reporting thresholds.) The LEPC can request material safety data sheets (MSDSs) for hazardous chemicals present at a facility in amounts below the threshold.

### **Emergency Planning:**

- Engage in a dialogue with facilities about possibilities for reducing ammonia inventories or providing special protection to containment vessels. Be aware that reducing inventories could lead to an increase in transportation-related releases.
- Regularly exercise and review Title III plans to ensure that facilities handling large quantities of ammonia are covered, and that emergency response issues concerning possible releases of ammonia have been addressed.
- Ensure that local hospitals and physicians are properly trained and prepared to treat victims of ammonia exposure.
- Ask facility officials for copies of their emergency response plans so the LEPC and fire departments can use them to prepare pre-incident plans and also ensure that facility and community plans are coordinated.

### **Risk Communication:**

- Inform the community of the potential hazard, as well as methods for treating victims of ammonia exposure.
- Inform farmers or other handlers of ammonia of the hazards related to ammonia and the need for safe handling and storage. For example, large quantities of fertilizer should not be stored near explosive or flammable materials.

## **RECOMMENDED STEPS FOR FACILITIES**

In cooperation with LEPCs and local response officials, facilities should take the following steps:

### **Handling and Storage:**

- Ensure that all containers, piping, valves, and fittings contacting ammonia are constructed of iron, steel, or other ammonia-compatible materials, as ammonia is corrosive to even trace amounts of copper, zinc, silver, and many of their alloys. Check that the ammonia contains at least 0.2% water to prevent

stress corrosion of the recommended compatible materials.

- Install tank pressure gauges and safety valves on ammonia gas storage tanks for pressure relief.
- Install leak detectors if facilities are unstaffed for periods of time.
- Refer to Department of Transportation (DOT) regulations for shipping, packaging, marking, and labeling requirements. Also refer to the Compressed Gas Association publications G-2.1/ANSI K61.1-1989 and ANSI/ASHRAE 15 for guidelines on safe handling and storage of anhydrous ammonia. See page 3 of this advisory for the address and telephone number of the Compressed Gas Association.

### **Employee Safety:**

- Ensure that adequate training is provided to all facility employees concerning the safe handling, storage, and use of ammonia.
- Ensure that the proper protective equipment is easily accessible in case ammonia is released. Train employees in the proper use of the equipment.

### **Hazard Awareness:**

- Do not mix ammonia (or products similar to ammonia) with chlorine compounds. While each can be a good cleaning agent alone, a mixture of the two can be dangerous.
- Keep ammonia away from other chemicals. Ammonia may react with other substances (e.g., strong oxidizers, calcium, hypochlorite bleaches, halogens, gold, mercury, and silver) causing fires, explosions, and releases of highly toxic gases.
- Be aware of other hazards associated with ammonia. For example, heat from a fire may cause compressed ammonia gas to expand rapidly. Properly sized pressure relief valves are used to protect storage tanks and prevent rupturing during a fire. Water can be used to control the temperature of the tank and prevent softening of the containment material, thereby minimizing any rupture.
- Further information about hazards posed by ammonia may be obtained from the following organizations: The Fertilizer Institute, 501 Second Street, N.E., Washington, DC 20002, (202) 675-8250; and the International Institute of Ammonia Refrigeration,

1101 Connecticut Avenue, N.W., Washington, DC  
20036, (202) 857-1100.

#### Risk Minimization:

- Place tanks containing ammonia outdoors or in well-ventilated, detached, or segregated areas to minimize damage from possible tank ruptures, explosions, or fires.
- Ensure that no containers are leaking or broken, and conduct regular maintenance checks of all equipment and containers coming in contact with ammonia.

#### Emergency Notification:

- In the event of a release, contact the National Response Center [(800) 424-8802], your SERC and LEPC, and the local fire department.
- When contacting these organizations, provide the following information: chemical name, estimate of quantity released, time and duration of the release, affected media, a list of potential health risks, and the name and telephone number of a contact person at the facility.

### A NEW FEDERAL LAW

Ammonia is specifically mentioned in the accidental release provisions of the Clean Air Act Amendments of 1990. This law requires EPA to promulgate an initial list of at least 100 substances that cause death, injury, or serious adverse health effects to human health or the environment, and determine a threshold quantity for each. Congress has identified the first 15 substances to be included on this list; ammonia is among them. Where regulated substances above the threshold quantity are present at a facility, the owner/operator will be required to prepare a risk management plan that includes a hazard assessment, an accidental release prevention program, and a response program. The law requires that EPA publish regulations under the amended Clean Air Act within three years, and allows facilities an additional three years to comply. Facilities will be required to provide copies of the risk management plan to the LEPC, as well as to the state. In addition, OSHA will promulgate, no later than November 15, 1991, a final rule that will require facilities with certain highly hazardous chemicals present in excess of OSHA thresholds to implement chemical process safety management, an integrated approach to identifying the hazards and managing the risks posed by on-site chemicals. Ammonia is included on the OSHA list as well.

### OTHER INFORMATION

The following is a listing of some sources of information about ammonia and the Emergency Planning and Community Right-to-Know Act.

- *Handbook of Compressed Gases and Anhydrous Ammonia* (CGA G-2). Copies of both documents are available from:  
Compressed Gas Association  
Crystal Gateway #1, Suite 501  
1235 Jefferson Davis Highway  
Arlington, VA 22202  
(703) 979-0900
- *DOT's 1990 Emergency Response Guidebook*. Copies are available from:  
American Trucking Associations  
2200 Mill Road  
Alexandria, VA 22314-4677  
Attn: Customer Services Department  
(800) ATA-LINE
- CHEMTREC, a 24-hour emergency hotline that provides information and assistance to responders during an emergency. Contact (800) 424-9300 or (202) 483-7616. (Note: CHEMTREC is for emergency use only.)
- Response Information Data Sheets (RIDS) found in CAMEO II, a computer-based planning and response management program that is available from:  
The National Safety Council  
444 N. Michigan Avenue  
Chicago, IL 60611  
(312) 527-4800 (x6900)
- Your County or State Health Agency
- Your State Emergency Response Commission
- Your EPA Regional CEPP Coordinator. EPA Regional offices are located in Boston, New York, Philadelphia, Atlanta, Chicago, Dallas, Kansas City, Denver, San Francisco, and Seattle.
- EPA's Emergency Planning and Community Right-to-Know Information Hotline at (800) 535-0202, or (703) 920-9877 from Monday to Friday, 8:30 a.m. to 7:30 p.m., Eastern time.

This advisory is the second of a new series which EPA is publishing to alert LEPCs to hazards posed by hazardous substances that have resulted in accidents where death, injury, or evacuations have occurred. LEPCs are responsible for emergency planning for hazardous materials and for collecting and managing data on hazardous chemicals present in their community.

Please send comments on this Advisory and suggestions for future topics to:

CEPP Advisory  
EPA OS-120  
401 M Street, SW  
Washington, DC 20460

Additional copies of this advisory and the earlier advisory on swimming pool chemicals are available from the above address or by calling (800) 535-0202 or (703) 920-9877.



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