Hazards of Anhydrous Ammonia When Used in the Illegal Production of Methamphetamine

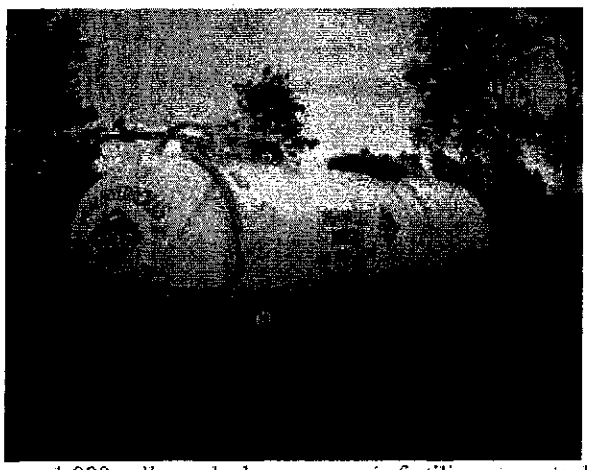
January 2000

Instances of methamphetamine trafficking and abuse in Minnesota are on the increase. Methamphetamine, or meth, is a powerful central nervous stimulant with a high potential for abuse and dependence. Clandestine production of meth in makeshift, illegal labs by untrained individuals is becoming more and more common in the upper Midwest.

One recipe for making meth incorporates the use of anhydrous ammonia (AA) and is called the *"Nazi Method"*. This resource guide is intended to increase first responder awareness of the hazards of AA used by those intent on making meth.

Introduction

Anhydrous ammonia is a low cost, easy to handle fertilizer-supplying crops with the essential nutrient nitrogen. Anhydrous ammonia is stored safely as a liquid in high-pressure tanks at agricultural chemical retailers. Anhydrous ammonia is off-loaded from large bulk tanks into smaller trailered nurse tanks that are then plumbed to a farm implement that injects the AA into the soil. Anhydrous ammonia is also used as a refrigerant and in a wide variety of other chemicals and products.



1,000-gallon anhydrous ammonia fertilizer nurse tank.

Chemical and Physical Properties

Anhydrous ammonia is a colorless, non-flammable liquefied gas. Its vapor is lighter than air and has the same pungent odor as household ammonia. "Anhydrous" means without water.

Anhydrous ammonia liquid will boil at any temperature greater than -28^0 F. Table 1 shows the relationship between temperature and vapor pressure in a closed tank. Pressure rapidly increases as temperature rises.

TABLE 1. Temperature versus vapor pressure of anhydrous ammonia in a closed tank.

Temperature (^{0}F)	Vapor Pressure (psi)
-28	0
0	16 (football)
10	24
30	45 (car tire)
50	78
70	114 (touring bike)
90	166

Reactivity

Anhydrous ammonia is corrosive to copper and galvanized fittings. Tank fittings in contact with AA liquid or vapor will corrode and eventually fail spraying vapor or liquid into the environment. Corroded fittings may appear bluish in color.

Anhydrous Ammonia Theft

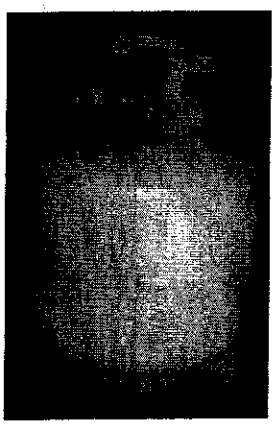
Thieves typically use small, makeshift containers to collect, store and transport AA once stolen from nurse tanks or AA applicator hoses. Buckets and coolers with duct taped lids, gas cans, and common 20-pound barbeque grill propane tanks have been used to contain AA. Garden hoses or inner tubes duct taped to the container and tank valves make this dangerous transfer possible.

Minnesota Department of Agriculture, Agronomy and Plant Protection Division, Incident Response Unit
90 West Plato Blvd., Saint Paul, Minnesota 55107-2094,
Telephone: 651/297-1975 Fax: 651/297-2271 Web Page Address: www.mda.state.mn.us
In Accordance with the Americans With Disabilities Act, an alternative format is available upon request. TTY/TDD: 800/627-3529

SENATE JUDICIARY
Exhibit No. 7
Date 1-13-05
Bill No. SB 166

Routes of Exposure

Ammonia has been found in a variety of containers, few of which have been properly designed for AA's unique chemistry. Since AA vaporizes or boils at -28°F any closed container with AA will be under pressure. Duct taped coolers surrounded by ice will pressurize to that of a car tire (See Table 1.) and could easily rupture spraying liquid and vapor.



Twenty-pound propane tank galvanized valves will corrode and weaken from exposure to AA vapor and/or liquid. Never move a suspected propane tank by grabbing the valve. The valve could break causing an AA release.

NOTE: A person can detect AA at about three parts per million (ppm). The concentration where a responder is in immediate danger to his/her life and health (IDLH) is 300 ppm. Therefore, a responder is likely to be warned of the presence of AA vapor at concentrations before they are harmful.

Health Hazards of Anhydrous Ammonia

There are three types of injuries from AA exposure: dehydration, caustic burning, and freezing.

DEHYDRATION: Anhydrous ammonia will dehydrate body tissue. Contact of the liquid or vapors with the eyes will result in serious injury or blindness. Any tissue contact with the liquid will cause 1st, 2nd, and 3rd degree burns. Acute exposure to vapors will bring about lung damage and possible suffocation.

CAUSTIC BURNING: Anhydrous ammonia in combination with water extracted from body tissue creates a strong base that further damages body tissue by chemical burning.

FREEZING: When liquid AA vaporizes it pulls heat from its surroundings. Body tissue exposed to liquid AA will freeze almost instantly.

Anhydrous ammonia is not a poison. It has no cumulative effects on the human body.

Exposure and Spill Response

Move victim to fresh air if the responder can do so safely. Any detection of AA odor will require backing out, securing the site from others, and dialing 911 to request emergency medical care and the local fire department. Irrigate any affected body tissue with water for at least 20 minutes. Keep patient warm, quiet, and monitor breathing. Always stay up wind. Evacuation of downwind residences may be necessary.

Approach with the wind at your back. Use water applied as a mist to reduce vapors. Never approach a suspected AA container without proper personal protection, which includes wearing positive pressure self-contained breathing apparatus (SCBA). Structural firefighter's protective clothing is not effective in spill situations.

Anhydrous Ammonia is toxic to aquatic organisms. Water applied to AA should not be allowed to escape to sewers or any other direct pathway to surface water. Use water sparingly and contain applied water whenever possible.

Helpful Websites

It is impossible to include all the crucial information to properly address an AA incident in a two-page document. Therefore, the following websites have been included as useful references.

MATERIAL SAFETY DATA SHEETS.
http://MSDS.PDC.CORNELL.EDU/issearch/msdssrch.htm

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK.
http://hazmat.dot.gov/gydebook.htm

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH. POCKET GUIDE TO CHEMICAL HAZARDS.
http://www.cdc.gov/niosh/npg/npgd0000.html

To Contact the State for Assistance:

- Telephone the Minnesota Duty Officer at: **(651) 649-5451 or (800) 422-0798**

DEPARTMENT OF PUBLIC SAFETY
- Bureau of Criminal Apprehension - Call: (651) 642-0610
  http://www.dps.state.mn.us/bca/bca.html
- Emergency Management
  http://www.dps.state.mn.us/emermgt/index.html
- State Fire Marshal
  http://www.dps.state.mn.us/fmarshal/

POLLUTION CONTROL AGENCY: Emergency Response
http://www.pca.state.mn.us/cleanup/er.html

DEPARTMENT OF AGRICULTURE: Incident Response Unit:
http://www.mda.state.mn.us/DOCS/ACRON/Agronomy/Incident/Intro.htm

Federal Drug Enforcement Admin. Contacts

- Minneapolis (612) 348-1700
- Chicago (708) 853-7875