Ammonia

- Non-toxic: inhalation hazard only
- Ammonia is the most common hazardous material shipped per year (tons shipped by rail)
The Hazardous Material Table of the United States Department of Transportation designates the hazard class for ammonia as "non-flammable gas" and lists ammonia as a hazardous substance with a reportable quantity (RQ) of 100 pounds. The 4-digit United Nations identification number for ammonia is 1005.
Non Accidental Releases
Since 1991 Non-Accident Releases (NAR’s) have decreased,

29% in the United States

42% in Canada.
- MI inspection on rail cars and tanks
- Upgraded MI to include current non-destructive testing, above and beyond just hydrotesting
- New rail cars do not have slip tube gauge rods, which reduce packing leaks
- Improvement in valve design to prevent leaks
89% of the Reported NAR’s were releases of vapor or liquid less than 10 gallons.

8% more than 10 gallons.

3% more than 100 gallons.
Shipments of Hazardous Materials by Tankcars
Top 15 Non-Accident Releases 1997

- Ammonia
- LPG
- Fuel Oils
- Sulf Acid
- HCL
- Caustic Soda
- Corr Liq
- Flam Liq
- MTBE
- Phos Acid
- Carbon Dioxide
- Gasoline
- Styrene
- Methanol
- Denat Alc

Bars represent the quantity of releases for each substance.
Top 15 Non-Accident Releases 1998

- Ammonia
- LPG
- Caustic Soda
- HCL
- Fuel Oils
- Flam Liq
- Corr Liq
- MTBE
- Naphita
- Sulf Acid
- Methanol
- Phos Acid
- Gasoline
- Denat Alc
- Styrene
Top 15 Non-Accident Releases 1999

- Ammonia
- LPG
- Fuel Oils
- HCL
- Flam Liq
- Corr Liq
- MTBE
- Caustic Soda
- Sulf Acid
- Comb. Liq
- Denat Alc
- Gasoline
- Phos Acid
- Styrene
- Argon
- Argon
Top 15 Non-Accident Releases 2000

- LPG
- Fuel Oils
- Ammonia
- Hydrochloric Acid
- Petroleum Distillates
- Sulf Acid
- MTBE
- Methanol
- Sodium Hydroxide
- Denat Alc
- Corr Liq nos
- Flam Liq nos
- Combustible Liq nos
- Phos Acid
- Styrene

2000 Estimates for NAR’s Top 15 Non-Accident Releases
## Tank Cars Involved in Non-Accident Releases

<table>
<thead>
<tr>
<th>Year</th>
<th>Ammonia</th>
<th>Phos. Acid</th>
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<tbody>
<tr>
<td>1994</td>
<td>81</td>
<td>90</td>
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<tr>
<td>1995</td>
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<td>1999</td>
<td>82</td>
<td>14</td>
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<tr>
<td>2000</td>
<td>56</td>
<td>13</td>
</tr>
</tbody>
</table>
81% of the known sources of NAR’s were due to **Loose or Defective fittings**.

15% of the known sources of NAR’s were from **Pressure Relief Valves**.
In the Year 2000 there were 22,563 shipments of Phosphoric Acid with 13 reported leaking.

5 Broken Frangible Disk
1 Safety valve
1 Loose Blind Flange
1 Loose Bottom Outlet Cap
2 Loose Bottom Outlet Connectors
2 Loose Bottom Outlet Valve
1 Missing Bottom Outlet Gasket
In the Year 2000 there were 31,189 shipments of Anhydrous Ammonia with 56 reported leaking.

- 18 Loose or missing plugs
- 11 Leaking Pressure Relief Valves
- 13 Loose or leaking Liquid or vapor valves
- 20 Loose Packing Glands
- 2 Loose Gauging Device Assemblies
- 2 Cracked sample lines and leaking valve
- 2 Thermowell leaks
- 9 Loose or broken Manway cover plates
Non-Accident Releases from Tank Cars 2001 Data Summary

NAR Reduction Task Force
Alexandria, VA
April 24, 2002
Tank Cars Leaking Annually
US & Canada, Loaded & Empty

731 is a 41% decrease from the peak of 1,241
Top 15 Commodities by 2001 NAR Frequency
U S& Canada; Loaded & Empty

- Fuel Oils: 111
- Anhydrous Ammonia: 88
- LPG: 82
- Hydrochloric Acid Solution: 60
- Methanol: 33
- Elevated Temp Material: 32
- Flammable Liquid NOS: 32
- MTBE: 30
- Caustic Soda Solution: 25
- Corrosive Liquid NOS: 23
- Waste Flammable Liquid NOS: 22
- Sulfuric Acid: 21
- Denatured Alcohol: 18
- Gasoline: 18
- Sulfuric Acid, Spent: 17
- Hazmat employees have required training every three years for loading and unloading of ammonia.
- Some means of remote cut offs required for truck loading, smart hose, remote electronic shut off etc...
- Hoses are required to be dated and pressure checked
- Rail and truck DOT, water ways include Coast Guard regulations as well as DOT
- Security plans are required
MI on the piping transitions between underground and surface piping, (Williams pipeline was proactively changing out just to be sure.)

Pipeline roughly about every 10 miles pipeline comes out of the ground with remote operated valves. Fenced off area, connected to pipeline control network.