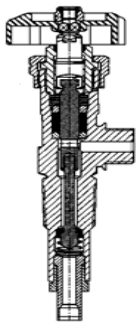
AIGA 2005 Meeting

Compressed Gas Emergency Response Workshop

Eugene Ngai
Director of ER & Disposal Technology
Air Products

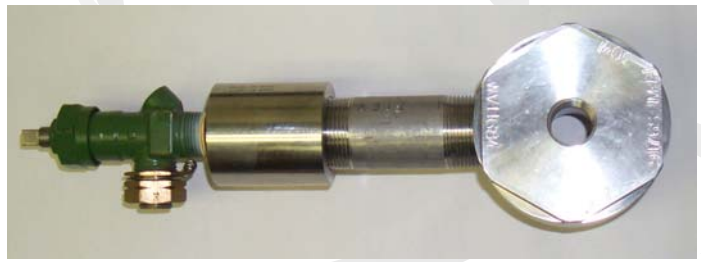
Singapore
August 30, 2005

Design ER/Safety Into the Package

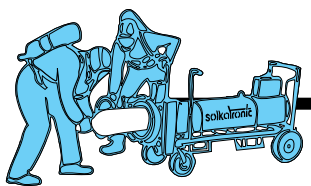


Tube Trailer
Shearoff Valve

PRD Capping



PRD Capping

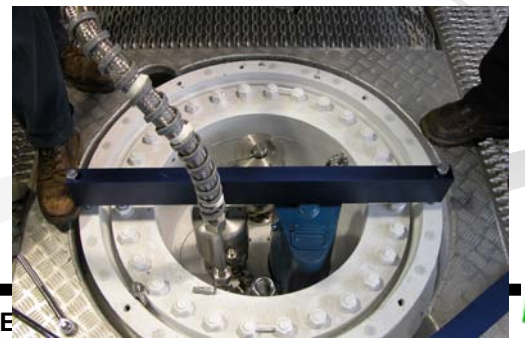


ER Capping for Ammonia ISO Module

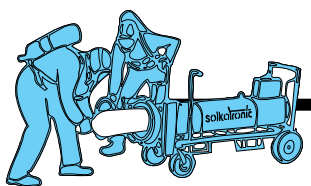
- ER kits mounted on ISO
- Two Relief Device Caps
- Capping Kit for Valves
- Flange capping kit (last resort)

Relief Device Cap

ER Flange Cover



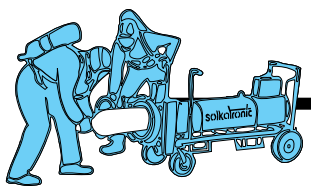
Valve Capping Kit



AIR PRODUCTS

Product and Package Testing Program

- A key part of the ER program is the consideration of the “most likely” event that could cause an incident.
- New products/packages are systematically reviewed and tested to better understand these events and what would be needed to mitigate these safely and quickly. In the past years release testing of Chlorine Trifluoride and Fluorine helped to better define PPE and ER.
- This will help us to better
  - Develop Safety Training Packages
  - Define PPE
  - Understand Gas Behavior
  - Understand Package Behavior
  - Define ER Procedures
  - Design ER Equipment



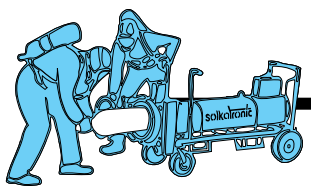
Training Packages

- Besides the 40 hr Compressed Gas ER Training, a number of unique ER training modules have been developed
- All are used as specialized training. Loaded onto CD's with videos for the team to use as refresher training or a quick review during an incident

Ammonia ISO
Ammonia Y Cap
Ammonia Cold Coil
Arsine, Phosphine
Chlorine Trifluoride
Chlorosilane
Emergency Response Containment Vessels (ERCV)
1, 3 Hexafluorobutadiene Y
Nitrogen Trifluoride ISO
Silane ISO
HCl ISO
F2 Mixture ISO
Portable Scrubber

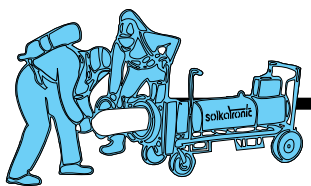
- Each Module contains as a minimum

Chemical and Physical Properties
Package Description
ER Equipment Required
ER Actions
Potential Leak Points
Valve Descriptions
ER Information



Far East Electronic Specialty Gas ER Training 2001-2005

- China 11
- Japan 2
- Korea 7
- Malaysia 5
- Singapore 4
- Taiwan 9
- Thailand 1

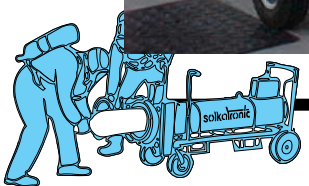


TMAI Safety/ER, San Fu, Chu Pei
Nov 16, 2004

ER Training and Response to Incidents, China

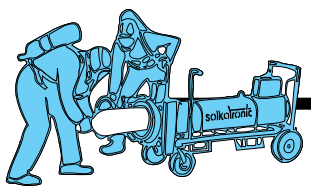
Taiwan ER Drill with Government Agency and Customer, June 2005

Customer Exercises Singapore



Emergency Response Outreach Programs

- Training of local HazMat responders
- Safety and Emergency Response Presentations
- Vaportight Cap Kit Donations
- Mutual Aid Programs
- Donation of Gas and Medical Treatment Books to Hospitals and First Responders
- Translation of Medical Treatment Protocols into local language
- Meetings with local Medical facility to familiarize them with protocols and to insure that appropriate medical supplies are available



Safety/ER Course, Tung Hai University, Tai Chung Taiwan, Nov 17, 2004

Mutual Aid in Taiwan, 2004

H_2S Leaker, Kaoshiung

$TiCl_4$ Disposal, ERIC

Titanium Fire, Kaoshiung

Training of Public Agencies

Korea Gas Safety

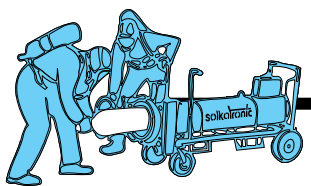
Singapore Civil Defence

New York City Fire Dept

CGA COMPGEAP Program

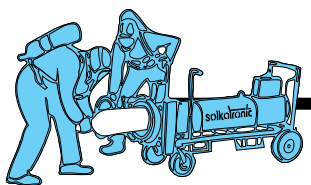
COMPGEAP is an industry wide program in the United States established by the Compressed Gas Association.

- Compressed Gas Emergency Action Program
- Activated by CHEMTREC
- For Transportation Emergencies only
- 10 Member Companies
- Almost 200 Teams able to handle bulk and/or specialty gases
- COMPGEAP ER Frequency (151.505)
- Competency Exam



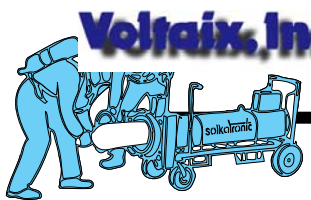
COMPGEAP Committee

- COMPGEAP is a CGA Committee consisting of the members (signatory) who have signed the agreement and have teams and equipment capable of responding to an incident
- It is responsible for organizing and maintaining an industry mutual response/mutual aid network for handling transportation emergencies involving COMPGEAP members and those products covered by COMPGEAP
- Provide emergency services for agencies at the scene with technical advice, expertise, equipment and/or manpower.
- Maintains the COMPGEAP Manual
- Develops resources and training programs



COMPGEAP Member Companies

- AGA/LINDE
- AIRGAS
- AIR LIQUIDE
- AIR PRODUCTS
- BOC
- MATHESON/TRI-GAS
- MESSER
- PRAXAIR
- SCOTT
- VOLTAIX

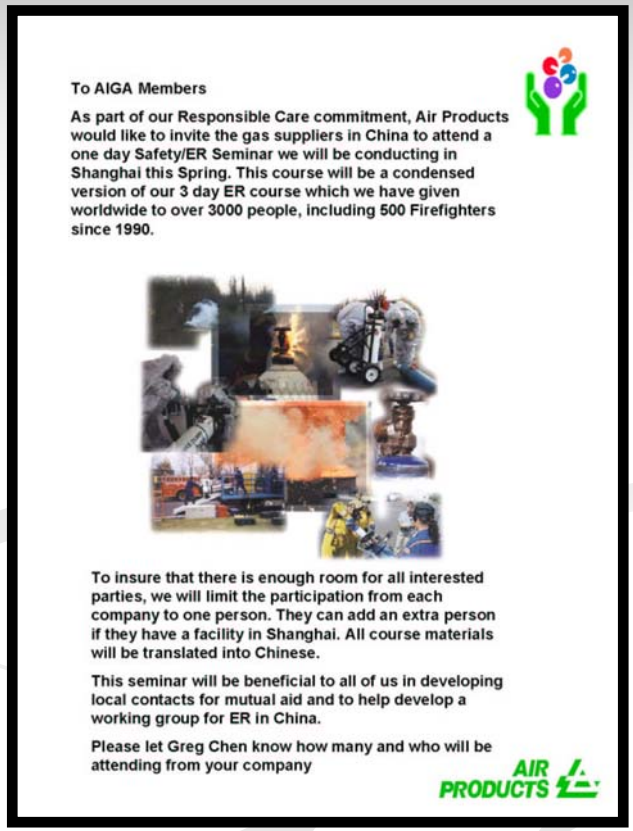


Morrisville, PA Mutual Aid Group
Gas Companies and Fire Department

- Air Products led the effort to develop local Mutual Aid Groups
- Quarterly Meetings
  - **Air Liquide**
  - **Messer**
  - **Falls Township**
  - **BOC**
  - **Scott**
  - **Air Products**
  - **Morrisville**
  - **Voltaix**
  - **Trenton Fire Dept**
  - **Bucks County HazMat**

Mutual Aid In China

- One day ER/Safety Training
  - Suzhou, May 19
  - Pudong, May 20
  - Competitors (Messer, BOC, Air Liquide, Linde, etc)
  - Fire Dept (Shanghai Chemical Rescue, Suzhou Fire Bureau, WGQ Fire Bureau)
  - Customers (National Semiconductor, Hejian)



To AIGA Members

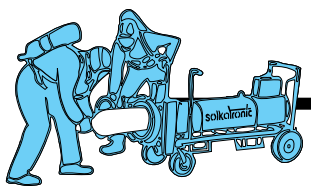
As part of our Responsible Care commitment, Air Products would like to invite the gas suppliers in China to attend a one day Safety/ER Seminar we will be conducting in Shanghai this Spring. This course will be a condensed version of our 3 day ER course which we have given worldwide to over 3000 people, including 500 Firefighters since 1990.

To insure that there is enough room for all interested parties, we will limit the participation from each company to one person. They can add an extra person if they have a facility in Shanghai. All course materials will be translated into Chinese.

This seminar will be beneficial to all of us in developing local contacts for mutual aid and to help develop a working group for ER in China.

Please let Greg Chen know how many and who will be attending from your company

AIR PRODUCTS



Shanghai ER/Safety Training
May 20, 2004

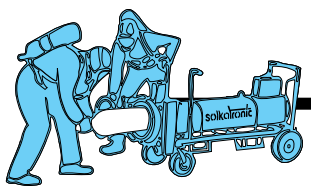
First Mutual Aid Meeting, Shanghai, Oct 18, 2004

Air Products Product Information Sources

- Air Products Product Safety Web Site

  http://www.airproducts.com/Responsibility/EHS/ProductSafety/ProductSafetyInformation/Safetygrams.htm
- Air Products Technical Information Center at:

  800-752-1597
- Air Products MSDS's
- Air Products Safetygrams
- Air Products Gases and Equipment Fact Book



Air Products Safety Literature

AIR PRODUCTS

MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT IDENTIFICATION

PRODUCT NAME:	**Nitrogen, refrigerated liquid**
CHEMICAL NAME:	Nitrogen **FORMULA:** N_2
SYNONYMS:	Liquid Nitrogen, LIN, Cryogenic Liquid Nitrogen, Nitrogen
MANUFACTURER:	**Air Products and Chemicals** 7201 Hamilton Boulevard Allentown, PA 18195-1501
PRODUCT INFORMATION:	1-800-752-1597
MSDS NUMBER: 1041	REV
	REV

SECTION 2. COMPOSITION/INFORMATION ON

Material Safety Data Sheets
MSDS

AIR PRODUCTS

Safetygram-7
Liquid Nitrogen

General

Liquid nitrogen is inert, colorless, odorless, noncorrosive, nonflammable, and extremely cold. Nitrogen makes up the major portion of the atmosphere (78.03% by volume, 75.5% by weight). Nitrogen is inert and will not support combustion; however, it is not life supporting.

Nitrogen is inert except when heated to very high temperatures where it combines with some of the more active metals, such as lithium and magnesium, to form nitrides. It will also combine with oxygen to form oxides of

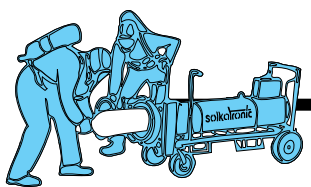
to keep heat away from the liquid that is contained in the inner vessel. Vaporizers convert the liquid nitrogen to its gaseous state. A pressure control manifold controls the pressure at which the gas is fed to the process. Processes that use nitrogen as a liquid do not require the vaporizers and pressure control manifold.

Physical and chemical properties are listed in Table 1.

Manufacture

Nitrogen is produced at air separation plants

Safetygram - 7
Liquid Nitrogen



AIR PRODUCTS

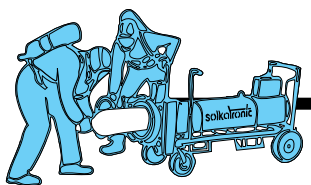
Medical Treatment Protocol Translations

US Health Dept Protocols for

- Ammonia
- Arsine
- Chlorine
- Hydrogen Chloride
- Hydrogen Fluoride
- Phosphine

Translated into

- Simplified Chinese
- Traditional Chinese
- Korean



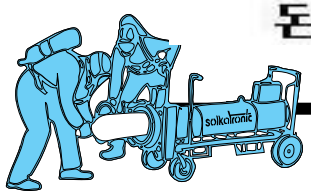
비화수소 (Arsine)(AsH3)

다른 이름으로는 수소화비소 3수소화비소, 비소3수소화물, 아비산수소, 그리고 수소비화물 등이 있다.

비화수소에 노출된 사람은 타인을 노출현장밖에서는 이차오염 시킬 위험이 없다.

- 비화수소는 인화성이 매우 독한 가스로 마늘 또는 비릿한 냄새가 나며, 냄새만으로는 공기중의 비화수소 농도가 위험수치에 있음을 감지하기 어렵다.
- 주요 노출경로는 흡입이다. 피부 또는 눈에 어떠한 독성이 없으며, 피부로 흡수되지 않는다.

설명 비화수소는 무색, 인화성의 매우 독한 기체이다. 냄새는 마늘 또는 비릿한 향이며, 0.5ppm이상의 농도에서 감지할 수 있다. 비화수소는 자극성이 없으며 증상이 바로 나타나지 않기 때문에 사람들은 노출이 된 사실을 모르는 경우가 있다.



Communications

Keeping the Worldwide ER Organization up to date

AIR PRODUCTS

ER Quarterly

Editor: Eugene Ngai | **Page 1** | 3rd Quarter 2005

Far East ER Training

Donny Fisher

During the weeks of March 28 and April 4 two emergency response training sessions were held in Asia. The first was located in Kulim, Malaysia and included members from the Kulim and Singapore teams. Also in attendance were customers and personnel from Megasis locations. The second session was held BAPB in Beijing, China. This training session included ER team members from South Korea, Taiwan, EAP, BAPB and CWIG. Both sessions involved class room and hands-on training - working with the tools, the containment equipment and the transfer and disposal equipment. Special thanks to Teow CH, Ernest Khoo and Tommy Ju, all of which worked hard to make these training sessions a success.

AIR PRODUCTS