



Workshop

Malaysians



SAND No. 2008-3832C
Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin
Company,
for the United States Department of Energy's National Nuclear Security Administration
under contract DE-AC04-94AL85000.





The Chemical Security Engagement Program: Improving Best Practices in Chemical Safety and Security

Nancy Jackson, PhD

Manager

International Chemical Threat Reduction Department
Sandia National Laboratories



Why? The Global Chemical Threat

- Prevent disasters, protect the public & workers:
 - December, 1984: Bhopal, India
- Deter those that seek to:
 - Obtain and use chemical weapons;
 - Recruit scientific experts;
 - Use industrial chemicals as low-cost alternatives to conventional attacks.



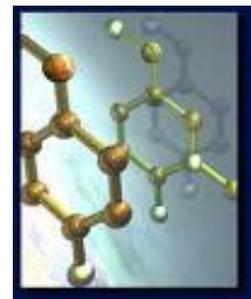


Chemical Security Engagement Program (CSP)



Program Objectives:

- Raise awareness about chemical threat, dual-use nature of chemicals.
- Foster national and regional dialogue.
- Identify chemical safety & security gaps.
- Promote and strengthen scientific collaboration among chemical professionals.
- Provide assistance to improve chemical security and safety best practices.
- **Reduce the chemical threat while promoting beneficial chemical R&D.**





What can be done?

Addressing dual-use can provide dual-benefit:

- Improve occupational health and safety for workers and students.
- Foster dialogue and scientific collaboration among academia and industry worldwide toward peaceful aims.
- Promote safe, secure, sustainable S&T development.





How we do it: Global Chemical Safety & Security Partners

- Work with host countries to assess priorities and gaps in chemical security and safety
- Bring together experts to identify chemical security assistance needs
- Partner with :
 - Host governments
 - International, regional and national professional chemical societies (FACS, IUPAC, etc.)
 - Chemical professionals
 - International efforts to improve chemical safety and security





How CSP will work:



Raise Awareness – Dual use nature of chemicals:

Reducing the chemical threat by collaborating with partner governments and chemical professionals to raise awareness about chemical security and safety, consistent with national and international guidelines, norms and requirements.

Strengthen global scientific cooperation: Providing funding to institutions for projects that advance CSP objectives in chemical safety and security.



Chemical Security Projects in Industry: Working with chemists, chemical engineers and industry representatives in the areas of chemical security and safety, including assistance in risk assessment, safety and security consultations, and design and implementation.

Create training opportunities for scientists, laboratory managers, chemical industry and policy makers on risk/vulnerability assessment and chemical safety to improve chemical security for entities housing, importing or exporting toxic industrial chemicals.





Chemical Security Engagement Program (CSP)



Risks and Gaps Identified:

Universities:

- Lack of safe practices
- Dual use of chemicals
- Improper chemical management
- Improper storage of chemicals
- Lack of enforcement of safety rules/laws

Consequences:

- Injury or death
- Expenses incurred from incidents, spills, disposal
- Loss of trust with community





Chemical Security Engagement Program (CSP)



Risks and Gaps Identified:

Industry:

- Theft of unsecured chemicals
- Improper chemical management
- Improper disposal of chemicals
- Lack of enforcement of safety rules/laws



Consequences:

- Loss of \$\$\$, lower profits, competitor gains
- Injury or death to workers and nearby residents
- Expenses incurred from incidents, spills, disposal
- Loss of trust with community



Chemical Security Engagement Program (CSP)



Course Goal:

- Increase awareness of the importance of chemical safety and security
- Increase knowledge of methods for improving chemical safety and security
- Determine needs for future training/actions

Safety vs. Security:

- Chemical Safety: Protecting people from chemicals
- Chemical Security: Protecting chemicals from people (i.e., terrorists or thieves)

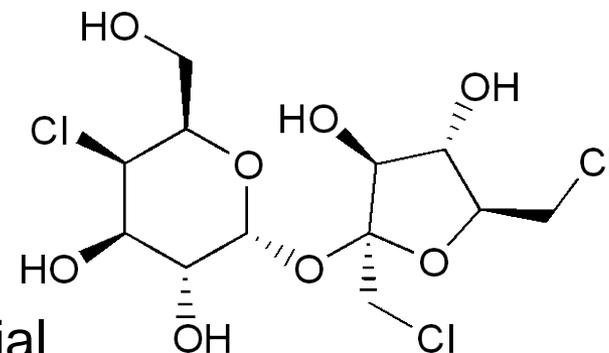




Where CSP will work

Countries with:

- Growing chemistry capabilities
- Growing chemical industry
- Regional security concerns
- Active producers/exporters of industrial chemicals



Regional Approach:

- South and Southeast Asia
- Middle East
- Expanding to other areas





Chemical Security Engagement Program (CSP)



Learn more:

- <http://www.csp-state.net>
- Elizabeth Cameron, PhD
Director, CSP
U.S. Department of State
CameronEE@state.gov
- Nancy Jackson, PhD
Sandia National Laboratories
nbjacks@sandia.gov
- Carson Kuo
CSP Program Officer
U.S. Department of State
KuoC@state.gov
- Pauline Ho, PhD
Sandia National Laboratories
pho@sandia.gov





Chemical Dual-use Awareness

Pauline Ho, PhD

International Chemical Threat Reduction Department
Sandia National Laboratories



Chemical dual-use awareness

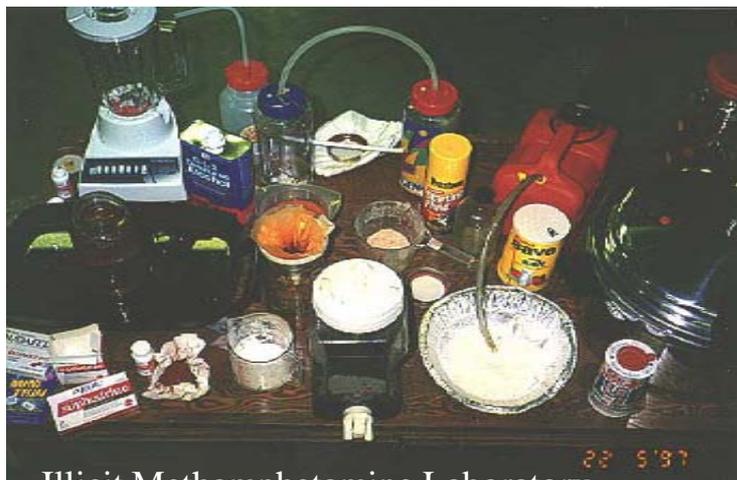
Dual use chemicals: Chemicals used in industry or everyday life that can also be used in bad ways.





Dual-use chemical example: Pseudoephedrine

- Pseudoephedrine is a common ingredient in cold medicines
- Precursor to crystal methamphetamine
- Recipes for conversion available on web



Illicit Methamphetamine Laboratory



- Clandestine meth labs in US during 2002
 - Caused 194 fires, 117 explosions, and 22 deaths
 - Cost \$23.8 million for cleanup
 - Dumped chemicals led to
 - deaths of livestock
 - contaminated streams
 - large areas of dead trees and vegetation

US DEA, http://www.deadiversion.usdoj.gov/pubs/brochures/pseudo/pseudo_trifold.htm, viewed Dec 2007



Dual-use chemical example: Cyanide



Therence Koh/AFP/Getty Images



- Widely used in mining and metal plating industries, but is also a well known poison.
- Product tampering*
 - Tylenol capsules
 - laced with KCN
 - 7 deaths, fall 1982, Chicago, Illinois, USA
 - Led to tamper-proof product packaging
- Popular with criminals and terrorists because it is relatively easy to obtain
- HCN is CW agent AC

* "Tylenol Crisis of 1982." *Wikipedia, The Free Encyclopedia*. 22 Nov 2007, 06:04 UTC. Wikimedia Foundation, Inc. 28 Nov 2007 <http://en.wikipedia.org/w/index.php?title=Tylenol_Crisis_of_1982&oldid=173056508>.



Dual-use chemical example: Pesticides

- **Widely used in homes and agriculture, but also used to poison people.**

FIGURE. Package of Chinese rodenticide implicated in the poisoning of a female infant aged 15 months — New York City, 2002



Photo/New York City Poison Control Center

- **Dushuqiang (Strong Rat Poison)**
 - Outlawed in China in the mid-1980s, but was still available
 - Nanjing, China, Sept. 2002
 - 38 people killed by poison in snack-shop food, >300 sick
 - Jealously by rival shop owner
 - Hunan, China, Sept. 2003
 - 241 people poisoned by cakes served by school cafeteria
 - Motive and perpetrator unknown
 - Tongchuan City, Shaanxi, China, April 2004
 - 74 people poisoned by scallion pancakes
 - Motive and perpetrator unknown
 - **5 other incidents reported between 1991 and 2004**

Ann. Emerg. Med., Vol. 45, pg. 609, June 2005





Many lab/industrial chemicals have dual uses

- **Dimethyl methyl phosphonate (DMMP)**

- Flame retardant for:

- building materials, furnishings, transportation equipment, electrical industry, upholstery

- Nerve agent precursor

- **Thiodiglycol**

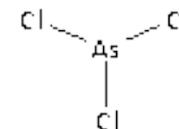
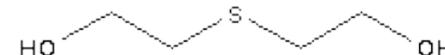
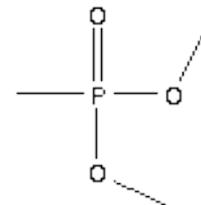
- Dye carrier, ink solvent, lubricant, cosmetics, anti-arthritis drugs, plastics, stabilizers, antioxidants, photographic, copying, antistatic agent, epoxides, coatings, metal plating

- Mustard gas precursor

- **Arsenic Trichloride**

- Catalyst in CFC manufacture, semiconductor precursor, intermediate for pharmaceuticals, insecticides

- Lewisite precursor

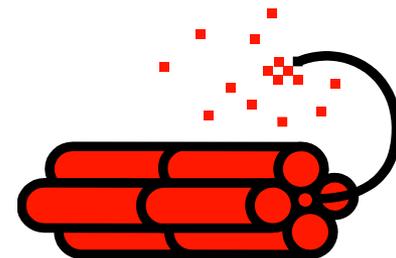


From: Chemical Weapons Convention: Implementation Assistance Programme Manual (on CD)



Dual-use Chemicals: Explosives

- **Theft of conventional explosives**
 - Chemical suppliers
 - Users such as mines or construction sites
- **Diversion of industrial or laboratory chemicals**
 - Chemical suppliers
 - Chemical factories
 - Academic teaching or research laboratories
 - Disposal sites





Theft / manufacture of explosives: Fertilizer Bomb



Photo: US DOD

- Ammonium nitrate fertilizer and fuel oil (diesel, kerosene)
- Used to bomb Alfred P. Murrah building in Oklahoma City, OK, USA
 - with nitromethane and commercial explosives
 - 168 dead, including children
 - April 1995
- Favored by IRA, FARC, ETA, etc.



Diversion of industrial / laboratory chemicals: Sodium azide



- **Widely available from older automobile airbags**
 - 1980s to 1990s
- **Poisonous**
- **Reacts explosively with metals**
 - Biological laboratory drains have exploded from discarded waste solutions containing NaN_3 as a preservative.
- **Has been found in possession of terrorists**



Diversion of industrial / laboratory chemicals

- Malaysian police arrested 36-year-old Alias Osman on June 9, 2003 in a Kuala Lumpur suburb. They claim he was a member of the militant Islamic group Jemaah Islamiah (JI). Police say he led them to an oil-palm plantation where a cache of chemicals was buried, including an unspecified amount of sodium azide. Most of the chemicals seized, potassium chloride*, calcium chloride* and aluminum powder, were similar to those used in the Bali bomb blasts.**

* Should be chlorate, not chloride

** Different devices may have used different explosive mixtures. Analysis gave evidence for chlorate and TNT

Simon Elegant, "Poisonous Minds," Time (Asia) 161, June 30, 2003.

<http://www.time.com/time/magazine/article/0,9171,501030630-460248,00.html>, viewed Nov. 2007

D. Royds, S.W. Lewis, A.M. Taylor, Talanta 67 (2005) 262–268



Diversion of industrial / laboratory chemicals: Quote from the “Terrorists Handbook”

2.1 ACQUIRING CHEMICALS

The first section deals with getting chemicals legally. This section deals with "procuring" them. The best place to steal chemicals is a college. Many state schools have all of their chemicals out on the shelves in the labs, and more in their chemical stockrooms. Evening is the best time to enter lab buildings, as there are the least number of people in the buildings, and most of the labs will still be unlocked. One simply takes a bookbag, wears a dress shirt and jeans, and tries to resemble a college freshman. If anyone asks what such a person is doing, the thief can simply say that he is looking for the polymer chemistry lab, or some other chemistry-related department other than the one they are in.

9.0 CHECKLIST FOR RAIDS ON LABS

http://www.totse.com/en/bad_ideas/irresponsible_activities/168593.html, downloaded Nov. 2007