IBCTR
INTERNATIONAL BIOLOGICAL and CHEMICAL THREAT REDUCTION

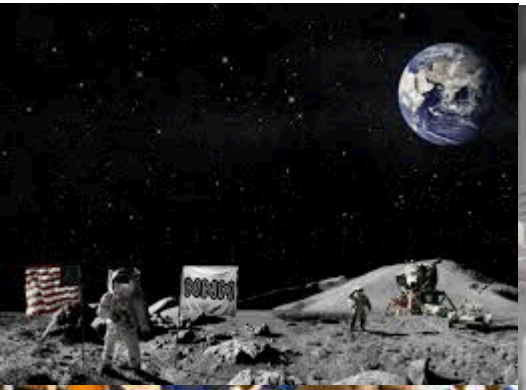
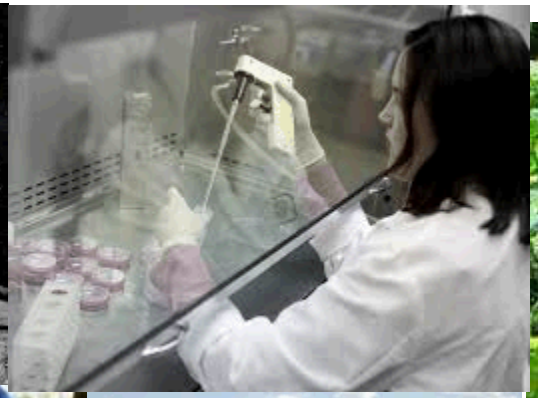
SAND2016-2146C

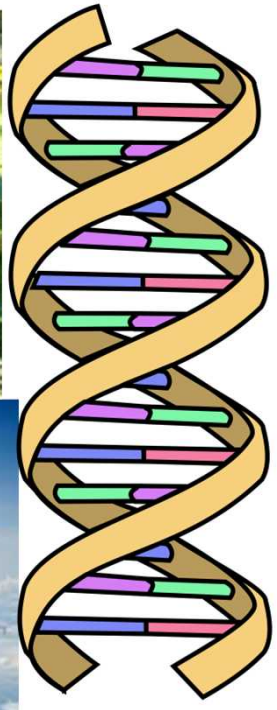
Chemicals and Terrorism

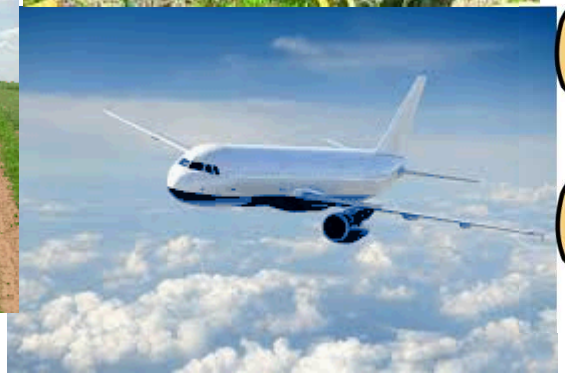
The Challenges to Chemical Security

Nancy B. Jackson, Ph.D.
Distinguished Member of Technical Staff
Sandia National Laboratories
Albuquerque, New Mexico

Chemistry has brought much good to the world

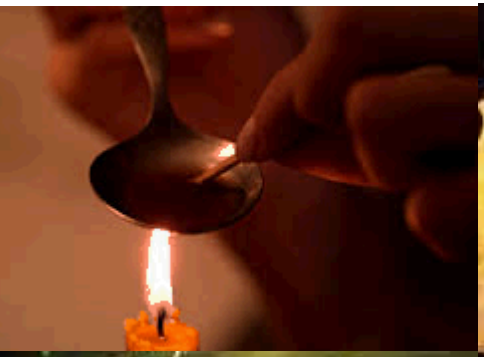





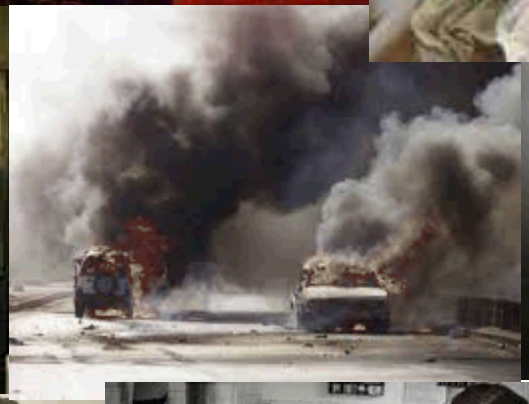
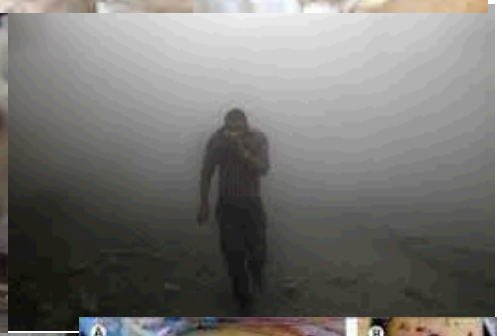






Unfortunately, Chemistry Can be Used for Bad Purposes







The Father of Chemical Weapons: Fritz Haber

Won the Nobel Prize for his development of method for producing ammonia from nitrogen and hydrogen gases:

The Haber-Bosch process

Developed chemical weapons for Germany for World War I.

Chlorine

Mustard gas

Phosgene

Zyklon A (cyanide gas) predecessor to Zyklon B

First wife committed suicide

Dual Use Chemicals

Chemical Weapons
- Chlorine
- Phosphates
- Chemicals used as Dyes
- Pharmaceutical chemical

Explosives
- Ammonium nitrate
- Potassium perchlorate
- Acetone
- Hydrogen peroxide

Drugs
- Acetic Acid
- Pseudophedrine

Pesticides as Weapons in Afghanistan

16 poison attacks in Takhar province, Afghanistan, from April 2012 to July 2012 on girls' schools. Several (if not all) of these cases involved poisoning of the school's water supply. A total of 1,355 children and 28 teachers and staff were injured in these attacks. In June Afghan authorities made arrests in the cases, implicating the Taliban as well as international terrorists.

7 poison attacks on girls' schools in Afghanistan, from April 2013 to June 2013. These attacks apparently involved gas, with many victims losing consciousness and/or requiring hospitalization. A total of 569 children were injured.

http://www.nytimes.com/2010/09/01/world/asia/01gasattack.html

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the guardian

Kurds fear ISIS use of chemical weapon in Kobani

Doctor in besieged Syrian town reports arrival of patients with blisters, burning eyes and breathing difficulties after explosion

Friday, 24 October 2014

Picture above from the Middle East Review of International Affairs Journal

CTR

The Telegraph

20 February 2015

Air strike kills ISIL 'chemical weapons expert'

Abu Malik, who learnt his deadly skills during Saddam's era, may have been preparing poison gas to keep ISIL's grip on Mosul

Chlorine: A weapon of last resort for ISIL?

The Trench, 18 February 2015

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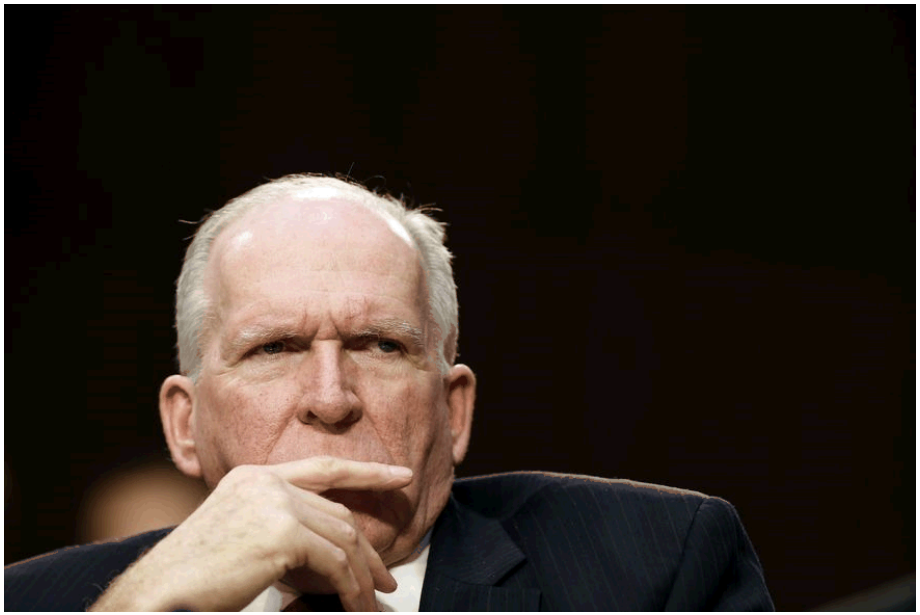
The Islamic State (ISIL) has used and can manufacture small quantities chemical weapons: chlorine and mustard gas

ISIS has access to artillery shells with CW

As Stated by John Brennan, CIA Director on CBS News 60 Minutes, On February 14, 2016.



http://www.washingtontimes.com/news/2016/feb/12/john-brennan-cia-chief-isis-has-used-chemical-weap/

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EXPRESS Home of the Daily and Sunday Express

ISIS planning deadly CHEMICAL ATTACK on shopping centres and football stadiums in the West

ISLAMIC State (ISIS) jihadis are developing deadly and undetectable chemical weapons which they can sneak into shopping centres and football stadiums in the West to cause massive casualties, it emerged today.

By NICK GUTTERIDGE

PUBLISHED: 06:37, THU, JAN 14, 2016 | UPDATED: 08:39, THU, JAN 14, 2016

ISIS ARE DEVELOPING CHEMICAL WEAPONS WITH WHICH TO ATTACK THE WEST

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ISIS and Chemical Weapons

Peshmerga test positive for mustard gas exposure after clashed with Islamic State
http://www.japantimes.co.jp/news/2015/10/08/world/peshmerga-test-positive-mustard-gas-exposure-clashed-islamic-state/

Pentagon: Reports “credible” mustard gas used in ISIS attack
http://www.cbsnews.com/news/isis-chemical-weapons-kurdish-peshmerga-fighters-iraq/

ISIS Has Fired Chemical Mortar Shells, Evidence Indicates
http://www.nytimes.com/2015/07/18/world/middleeast/islamic-state-isis-chemical-weapons-iraq-syria.html

French Authorities Hold Suspect in Beheading and Explosion at Chemical Plant
http://www.nytimes.com/2015/06/27/world/europe/french-factory-lyon-attack-isis.html

“At least 984 [Syrian] civilians were killed by exposure to chemical or toxic substances.”
http://www.nytimes.com/interactive/2015/09/14/world/middleeast/syria-war-deaths.html

US and Iraqi officials: ISIS is working to produce chemical weapons
Associated Press
Nov. 19, 2015, 11:15 AM
http://www.businessinsider.com/us-and-iraqi-officials-isis-is-working-to-produce-chemical-weapons-2015-11

EUROPE MUST 'PREPARE FOR THE POSSIBILITY' OF AN ISIS CHEMICAL ATTACK: REPORT
BY JACK MOORE ON 12/8/15 AT 6:25 AM
http://www.newsweek.com/eu-warned-prepare-isis-chemical-attack-illegal-materials-smuggled-past-blocs-401741?piano_t=1

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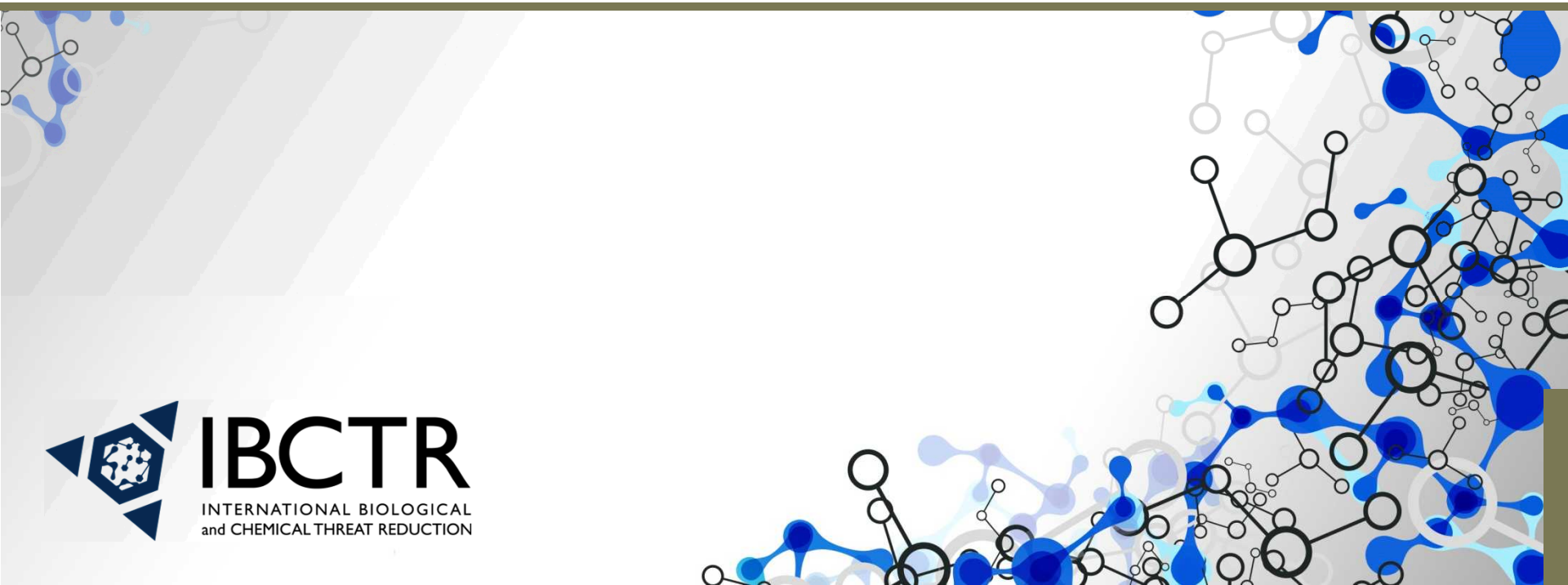
CSP
CHEMICAL SECURITY ENGAGEMENT PROGRAM

SO HOW DO WE PREVENT TERRORISTS FROM USING/MAKING/GETTING CHEMICAL WEAPONS OR TOXIC INDUSTRIAL CHEMICALS?



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The *Chemical Weapons Convention* has prevented many countries from developing chemical weapons.

- Bans chemical weapons
- Monitors the production, use, and transfer of chemicals that could be associated with chemical weapons.
- First treaty to outlaw an entire class of weapons of mass destruction and require their elimination.
- First multilateral arms control treaty to have a significant impact on the private sector.
  - Export/import, declaration, and inspection requirements.
- Open for signature on January 13 - 15, 1993.
- Entered into force on April 29, 1997.

OPCW: Organization for the Prohibition of Chemical Weapons

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192 Countries

Have signed and ratified the CWC

States that have neither signed nor acceded to CWC
Democratic People's Republic of Korea
Egypt
South Sudan

States that have Signed but Not Ratified CWC
Israel

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OPCW has investigated Chlorine Use in Syria

The Organization for the Prohibition of Chemical Weapons (OPCW) mission said this week that evidence "lends credence to the view that toxic chemicals, most likely pulmonary irritating agents such as chlorine, have been used."

Anne Gearan, Washington Post, June 18, 2014

http://www.washingtonpost.com/world/national-security/chlorine-gas-likely-used-in-attacks-in-syria-this-year-international-weapons-inspectors-say/2014/06/18/a7ec09cc-f71d-11e3-a606-946fd632f9f1_story.html

The Guardian
Wednesday 7 January 2015

Providing the security requires identifying the right threats

State and Non-state chemical threats can vary

STATE	NON-STATE
Larger quantities	Smaller amounts of chemicals
Likely to be higher tech – more sophisticated weaponization	Toxic industrial chemicals (TIC)
Incapacitating chemicals	Requires covert resourcefulness
Border issues	Border issues

Providing the security requires identifying the right threats

State and Non-state chemical threats can vary

STATE

Easier to get or synthesize chemicals

Military a major player

NON-STATE

Must break into distribution cycle

Law enforcement a major player

Sabotage chemical facilities

Requires expertise

Chemical Crime And Terrorism

How is expertise acquired?

Terrorist groups recruit science and engineering students

Tuesday, August 10, 2010 Jakarta Globe

Fighting Back: Roundup of 5 in Bandung exposes plan to target capital

Aceh Anti-Terror Sweep Rolls on

Armando Siahaan

The arrest of five terror suspects in West Java at the weekend brought to 102 the number arrested in relation to the Aceh militant network and police are seeking more fugitives, including a French national.

"Of those arrested, 86 are still in custody, while the others have been released," National Police spokesman Insp. Gen. Edward Aritonang said on Monday, adding that all would eventually be tried in Jakarta.

The suspected terrorists are linked to militant groups in the Middle East and the southern Philippines. Police allege they were training for Mumbai-style assaults on key government and Western-interest targets.

On Saturday, the Densus 88 counterterrorism squad arrested five people believed to be from the Aceh group in four raids in West Java. The raids also unearthed a makeshift laboratory where police claimed the suspects were developing high-powered explosives.

In Cibiru, Bandung, Densus 88 arrested Fakhrurozi Tanjung, a.k.a. Sayu, and Hernadi, a.k.a. Helmi. In this raid they also seized a car they alleged was being prepared for a bomb attack and uncovered the bomb lab.

Police say the car was listed as belonging to a French national, who is at large.

"We're still looking for the person who bought this car and gave it to the group," Edward said. "He's a French national, married to a Moroccan woman." Police were working with Interpol for more information on his background and known associates.

On the same day in Sukabumi, West Java, Densus 88 arrested a suspect identified as Gopur ar[illegible]

During this raid, Densus 88 confiscated chemical compounds used to make explosives, books on jihad and sketches of targeted buildings.

Edward said the targets included the police Mobile Brigade headquarters in Depok, West Java, as well as the National Police headquarters, international hotels and embassies in Jakarta.

[illegible] Saturday's raids were made in anticipation of an attack on President Susilo Bambang Yudhoyono during his visit to the area over the weekend, but said there was no evidence the suspects were planning an attack.

Yudhoyono claimed on Saturday that a terrorist cell in Ciwidey, West Java, was planning [illegible] like [illegible] a security report last night that certain elements with bad intentions were lurking in the Ciwidey area to do something against me," he said.

Edward said the president was one of the targets of the Aceh group.

Police launched their campaign against the Aceh [illegible] discovered a training camp in Aceh Besar in February, prompting a nationwide manhunt.

A flurry of arrests followed, stretching from Aceh to Java Island.

Sidney Jones, from the International Crisis Group, said police were not fighting [illegible] group, [illegible] several linked cells.

"What we saw in Aceh was an alliance of several different groups, which are now dispersed," she said. Each group could potentially form new alliances.

A policeman showing a photo of one of the five terror suspects arrested in Bandung at the weekend. Police believe Kurnia Widodo is a bomb maker. JG Photo/Afriadi Hikmal

…the squad arrested Kurnia Widodo, a.k.a Ujang, a recent university graduate who majored in chemical engineering. "We believe Kurnia was the technician at the bomb lab," …

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Chemical Crime And Terrorism

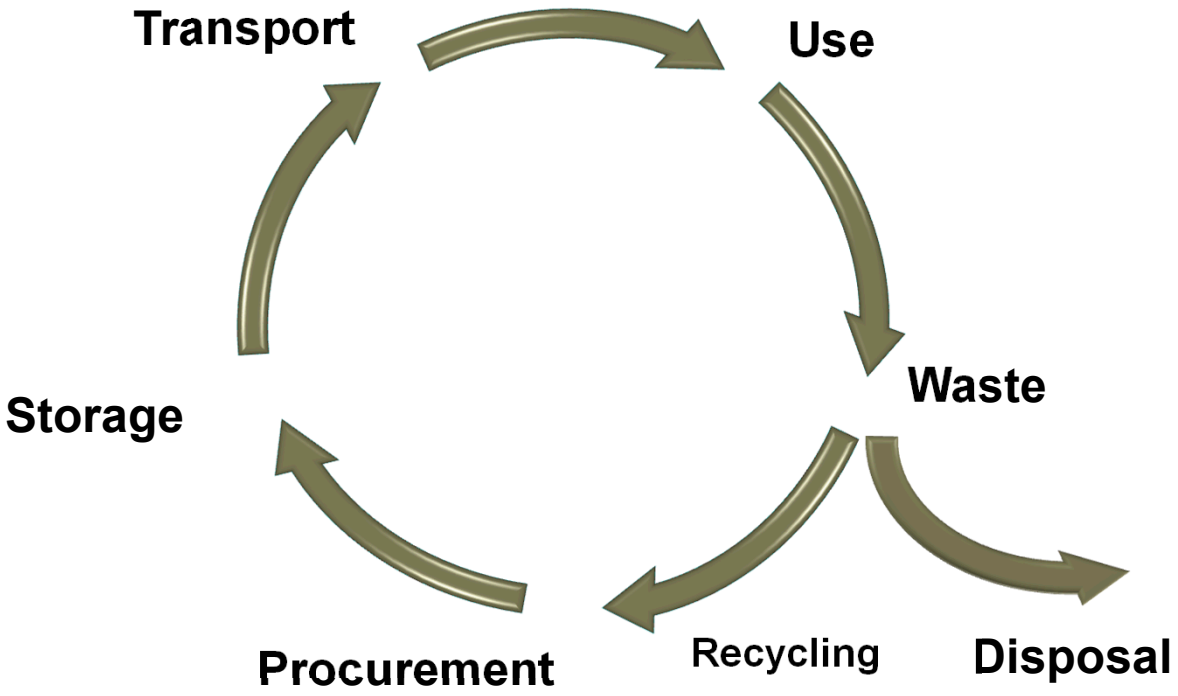
Aum Shinrikyo recruited young university scientists

- Masami Tsuchiya – Physical and Organic Chemist. Joined Aum Shinrikyo in 1989

Tokyo, Japan 1994–1995

- Sarin and other chemical weapons used to kill ~20 and injure over 4000

Chemical Management: Where are the Leaks?



Cradle-to-Grave Management

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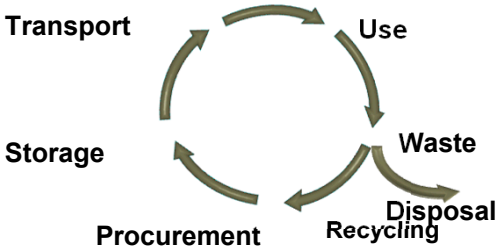
Procurement

- ✓Who are you selling to?
- ✓What are they using it for?
- ✓Did someone really order this?
- ✓Is it going into an inventory?
- ✓Export/Import issues



Storage

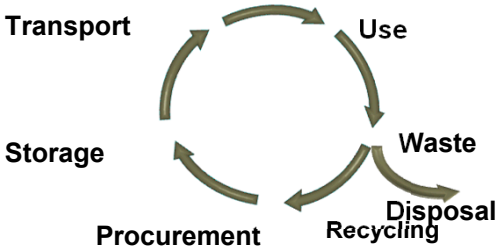
- ✓Is it safe and secure?
- ✓Who has access?
- ✓Are we keeping an inventory so we know if something goes missing?

Transport

- ✓Is the transport secure?
- ✓Is a dangerous chemical travelling through a big city?
- ✓Can we track its location?
- ✓Export/Import issues

Use

- ✓Physical security?
- ✓Disposal plans?
- ✓What are you making?
- ✓Can you prevent sabotage and theft?



Waste

- ✓Do you know what the waste company will do with your chemical?
- ✓Are you just dumping your waste?
- ✓Do you know how toxic your waste is?

Key Question?

Where you think non-state actors will most likely acquire dual use chemicals?

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Answer:

From local agents, suppliers, middlemen and contractual manufacturers. Also, theft from universities, industry, and storage facilities.

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In most of the developing and emerging countries…

- Large chemical companies/suppliers do not have direct presence in many countries
- They function through local agents
- Local agents often have a large rostrum of middlemen (briefcase companies) and area based small distributors
- Local agents work for many large companies at the same time, and deal with users and institutions through middlemen and small distributors.

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Chemical Distributors

The National Association of Chemical Distributors (NACD) defines a distributor as a company that takes title to bulk and/or non-bulk chemicals from a chemical manufacturer or supplier and re-sells the chemicals to an end-user.

In many countries there is a long chain of local agents and middlemen in between

Chemical distributors include companies that

Repackage bulk chemicals

Do not repackage chemicals (known as factory-pack distributors)

Act as brokers or traders.

Typically, almost all of them own or lease warehouses in which they temporarily store, repackage and manipulate chemicals.

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Practices of SME businesses and universities in Developing/Emerging World

- Independent
- Less Government Control
- Less regulatory Oversight
- Misuse of Academic Freedom
- Little funding for supplies after paying the salaries
- More Vulnerable

Lack of accountability and transparency

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Chemical Procurement: Feast-and-Famine

No concept (or option) for *just on time* purchase

Bulk purchase of chemicals, whenever budget is available

Take as long as six months

No Inventory tracking system

Malpractices in chemical purchases.

Chances of misplacement, theft and diversion

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No Customer Screening

Although large chemical manufacturing companies have well established protocols, ***local agents and middle men have no capacity or requirement of prior screening of potential customers***

Chemical Supplies to Individuals

in developing and emerging countries

Through middlemen, it is possible to obtain any chemical either through *dummy companies or even as individual*

The local distributors of developing world can supply any quantities of chemicals *without any verification about end-use and the purpose*

The hazardous / banned / toxic chemicals can be purchased on high cost without any proper documentation or justification.

No registration of supplier or customer is required, a part of large un-documented economies of developing world.

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Chemical Supplies: *Online Transactions*

- **Growing percentage of chemical sales is through internet**
- **Online registering requires no organization name and affiliation but only a proof of existing relationship with local distributing agent through an account**
- **No physical verification of existence and legitimacy is currently required or possible**
- **Contractual synthesis/ manufacturing in countless locations, often as SMEs/Cottage Industries**
- **Contractual synthesis is now emerging as the potential source of supply for chemicals of all types in required quantities**

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So, what can we do?

- Chemicals are ubiquitous and are not managed by governments like most nuclear materials are.
- Chemicals are mostly handled/managed by private industry.
- Chemicals are necessary for a good standard of living.
- How do we “control” chemicals without hurting the economy and future R&D?

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UN Security Council Resolution 1540

Unanimously passed on 28 April 2004

Member States:

- must refrain from supporting non-State actors in developing, acquiring, manufacturing, possessing, transporting, transferring or using nuclear, chemical or biological weapons and their delivery systems.
- must establish domestic controls to prevent the proliferation of nuclear, chemical and biological weapons, and their means of delivery, including by establishing appropriate controls over related materials.

Suicide Bomb Detector

Sandia contributed to development of this device

R3 Technologies

- The CBD-1000 uses X-band radar to detect metallic and nonmetallic explosives
- it can detect ball bearings, glass, nails, ceramics, rocks and other materials frequently used as shrapnel in suicide vests.
- CBD-1000 is the size of a cereal box, weighs about 13 pounds and is mounted on a tripod

Wearing a mock suicide vest, Albuquerque businessman Robby Roberson stands in front of his company's CBD-1000 bomb detector, being adjusted by Sandia National Laboratories scientist JR Russell. Russell worked with R3 Technologies to iron out technical issues and bring the suicide bomb detector close to commercialization. (Photo by Randy Montoya)

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Program Global Shield

World Customs Organization

A World Customs Organization program supported by INTERPOL and United Nationals Office on Drugs and Crime (UNODC)

- Improvised explosive devices (IEDs) are the most prevalent form of explosives employed by terrorists around the world. They are manufactured using widely available precursor chemicals. It is a cheap and easy way to inflict harm on infrastructures, economies, and populations.

- According to NATOs Centre of Excellence Defence Against Terrorism (COE-DAT), there were 2991 IED attacks in the world in 2012. These attacks claimed 4000 lives.

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Global Shield

World Customs Organization

Project Global Shield was doubly successful, both in interdicting a number of suspicious shipments as well as providing investigative leads on the smuggling of precursor chemicals:

- *19 seizures of explosive precursors*
- *Over 30 metric tons seized; enough material to potentially produce 100s of IEDs*
- *13 arrests reported by participating countries*

Due to the success of the project, particularly the fact that it undoubtedly saved lives by keeping bomb-making materials out of the hands of terrorists, in March 2011 the WCO endorsed a proposal for the project to become a long-term program within the WCO; enabling Customs Administrations and the Police to continue multilateral efforts to combat the illicit trafficking and diversion of precursor chemicals.

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Global Shield – Explosive Precursors

World Customs Organization

Chemical	Use
Nitromethane	Industrial solvent, cleaning solvent, pharmaceuticals, pesticides, explosives, fibers, coatings and racing fuel, dry cleaning, degreaser, solvent for superglue
Potassium Chlorate	Disinfectant, safety matches, explosives and fireworks, oxidizing agent, pesticide
Potassium Nitrate	Fertilizers, rocket propellants, fireworks, food additive, pre-rolled cigarettes, tree stump remover
Potassium Perchlorate	Fireworks, ammunition percussion caps, explosive primers, propellants, flash compositions, stars, sparklers
Sodium Chlorate	Color fixative and preservative in meats and fish, dyeing and printing textile fabrics and bleaching fibers, manufacture of rubberchemicals, corrosion inhibitor
Calcium Ammonium Nitrate	Fertilizer

Global Shield – Explosive Precursors

Chemical	Use
Ammonium Nitrate	Fertilizer in agriculture
Acetic Anhydride	Photographic film & other coated materials, production of aspirin, wood preservative, production of modified starches, synthesis of heroin
Acetone	Cleaning solvent, component of some paints and varnishes, nail polish remover, superglue remover
Urea	Nitrogen-release fertilizer, raw material for the chemical industry
Aluminium Powder & Flakes	
Hydrogen Peroxide	Bleach, disinfectant, antiseptic, oxidizer
Nitric Acid	Fertilizers, purification and extraction of gold, chemical synthesis

National Security Chemical Management Program

An important and obvious consideration to a country in designing its National Security Chemical Management concerns the resources, including

- funding
- people
- skills, etc.

which are available to the government, industry, and other civil society sectors

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National Security Chemical Management Program

Chemical Inventories

- a list of the chemicals produced/imported in country

National tracking of production/ importation

- often limited to chemicals of concern

Broader chemical information reporting

- used as needed to obtain information

Product registers

- reporting of information on product composition

Voluntary actions

- Responsible Care Security Code, ChemStewards, and National Chemical Distributor's Code of Management Practice

Training in security for all chemical professionals

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National Security Chemical Management Program

Protection of facilities with dual use chemicals

- CFATS as an example

Requirement for all chemical facilities to use inventory systems

- To notice when a chemical goes missing

Transportation safety and security regulations

- perhaps limited to chemicals of concern

Border and Customs regulation and training

- to prevent smuggling in or out of country

Law enforcement training and retail awareness

- to prevent ordinary chemicals being used for malicious purposes

Secure management of chemical wastes

Enforcement

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Chemical Management Instruments

International Regulations and Conventions:

- OPCW CWC
- Australia Group
- Stockholm Convention
- Rotterdam Convention
- Basel Convention
- Montreal Protocol

SAICM

- non-binding international agreement implemented by IOMC through WHO and UNEP for chemical safety

Global Shield – World Customs Organization

- Explosives precursors

GCC

- Common system for the Management of Hazardous Chemicals, 2002

EU Regulations:

- REACH and CLP

US Regulations:

- CFATS
- Toxic Substances Control Act (TSCA)

China REACH and GHS

India: Ministry of Environment, Forest and Climate Change

South Africa

- Hazardous Chemical Substances Regulations (HCSR) 1995

South Korea, "K-REACH" (2015)

Strategic Approach to International Chemicals Management (SAICM) focuses on safety and environment but could be expanded.

Can we add chemical security to SAICM?

SAICM's Overarching Policy Strategy (OPS) identifies five key areas :

1) **Risk reduction**

   Minimize risks to human health throughout the lifecycle of chemicals

2) **Knowledge and information**

   Ensure that knowledge and information are sufficient for managing chemicals

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SAICM
UNEP, WHO, ICCA

3) **Governance**

Promote sound management of chemicals and to ensure accountability

4) **Capacity building and technical cooperation**

"To increase the capacity for sound management of chemicals especially in developing countries, and to establish or strengthen partnerships for technical cooperation "

5) **Illegal international traffic in chemicals**

"To prevent illegal international traffic in toxic, hazardous, banned or severely restricted chemicals"

The SAICM strategy could be extended to include security issues.

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Total Chemical Management

Thank you.

Questions?

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