Environmental Issues related to chemical weapons in Syria

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How UNEP Got into it

• Chemical weapons used in Syria, 21 August 2013
• US threatens action as a “red line has been crossed”
• Syria accedes to the Chemical Weapons Convention, October 14, 2013
• UN and OPCW sets up a joint mission to collect and destroy the chemical weapons
• UN Secretary-General requests UNEP and WHO to support the mission
Syria’s Chemical Weapons

- 1290 tons of chemical weapons and precursors
- 23 Separate Facilities
  - Production Facilities
  - Mixing Facilities
  - Storage Facilities
  - Research Facilities
  - Test Facilities
- 1300 Ammunition (Unfilled)
  - Bombs
  - Missiles
  - Shells
Location Map

Sources: Monterey Institute of Int'l Studies
Chemical Weapons ?
Chemical Weapons

Figure 1: Precursors, Toxic Chemicals and Weaponised Chemicals
Classification of Chemicals to be Destroyed

- **Priority I**: Chemicals: Mustard Agent, Toxic precursors, Empty containers of Mustard Gas
- **Priority II**: All other chemicals
- **Priority III**: Effluents from treatment of Priority I, empty containers, used PPEs etc.
Handling of Priority I

• All Priority 1 except the empty mustard containers taken out of Syria
• Sulfur Mustard and DF treated onboard MV Cape Ray with field deployable Hydrolyses system
• Other Priority I chemicals treated at Veolia Environmental Services, Ellesmere Port, Chester, UK
• FDHS Effluents from Cape Ray incinerated at the Chemical Weapons treatment facility, Munster, Germany
Handling of Priority II and Priority III

- Priority II chemicals moved directly to a commercial facility for destruction
- Priority III substances moved from the process ship to the commercial facility
- Isopropanol to be destroyed in Syria
Environmental Issues

• Environmental issues with normal operations
  – Site contamination
  – Fugitive emissions

• Environmental issues associated with emergencies
  – Transport on Land
  – Storage in Latakia
  – Shipment
  – Treatment

• Public Perception issues
## Risk Assessment

### Table 3: Credible Risk Scenarios for Syria Chemical Handing

<table>
<thead>
<tr>
<th>Sl #</th>
<th>Brief Description of Scenario</th>
<th>Trigger</th>
<th>Probability</th>
<th>Consequence</th>
<th>Environmental Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Breakage of a chemical container during handling at the temporary storage site</td>
<td>Safety</td>
<td>Likely</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>2</td>
<td>Fire at one of the temporary storage sites</td>
<td>Safety/Security</td>
<td>Possible</td>
<td>Major</td>
<td>High</td>
</tr>
<tr>
<td>3</td>
<td>Leakage from a container during transport</td>
<td>Safety/Security</td>
<td>Possible</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>3</td>
<td>Vehicle roll over during transport in Syria</td>
<td>Safety/Security</td>
<td>Likely</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>4</td>
<td>Vehicle roll over leading to fire</td>
<td>Safety/Security</td>
<td>Unlikely</td>
<td>Major</td>
<td>High</td>
</tr>
<tr>
<td>5</td>
<td>Breakage of chemical container at the storage location in Latakia</td>
<td>Safety/security</td>
<td>Possible</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>6</td>
<td>Fire at the storage location at Latakia</td>
<td>Possible</td>
<td>Catastrophic</td>
<td>Critical</td>
<td></td>
</tr>
</tbody>
</table>
Guidance on Packaging
Reviewing Road Transport
Damascus - Latakia
Transportation
Latakia Port
Inspection
Loading
Inspection of Ships

- Preparedness to carry dangerous goods
- Crew training
- Onboard contingency planning
- Response kits
- CBRN teams
- Co-ordination
Storage Sites

- Capacity to produce weapons destroyed
- Some still are used as storage areas
Site Clean up

- Detailed site by site assessment of the 23 storage, production and research facilities using an Phase II EDD approach, including sampling
- Recommendations for clean-up
- Q & A
Chemical Weapons

- Mustard Gas – bis(bis(2-chloroethyl) sulfide)
- DF- methylphosphonyl difluoride