

Overview of international framework and standards related to transport, storage and handling of dangerous goods

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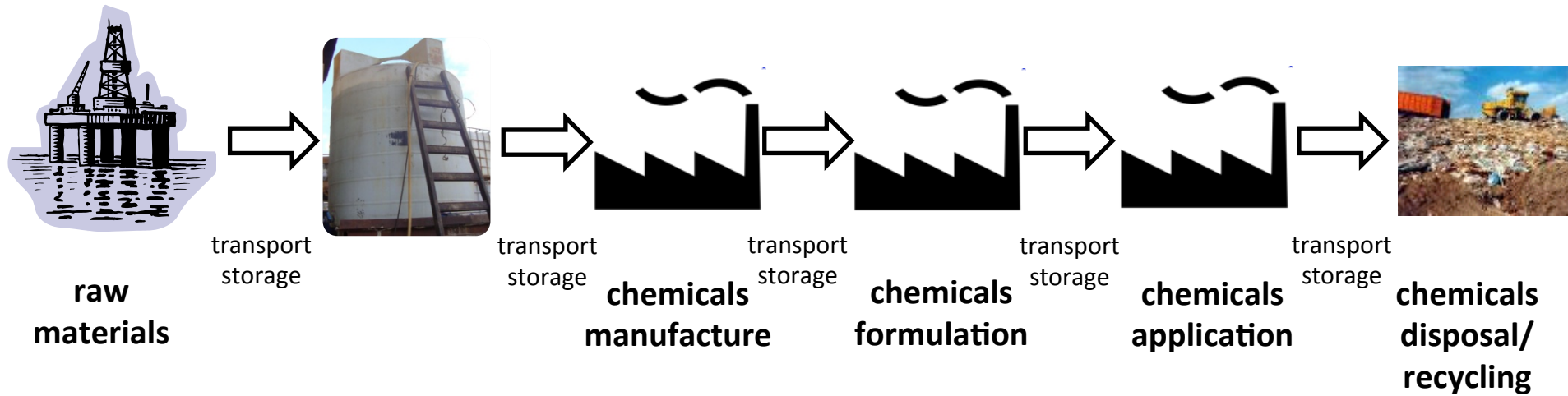


Outline

- Putting Chemical Safety Management in Context
- Regulatory Frameworks
- Programmes
- Tools



Chemical Safety Management in Context



→ Sound management of transport and storage of chemicals is crucial



Putting Chemical Safety Management in Context

- Sound management of transport and storage of chemicals is crucial
- Risks of accidents might create adverse effects for health, environment, and the economy (country and company)



Legal approaches (international, national)	→	mandatory
Guidance, Programs (international, national)	→	support
Tools (international, national)	→	support
Management at company level (individual)	→	creates results



- Legal Approaches

Regulatory Framework in “Countries of origin”:

Rotterdam Convention (PIC)

REACH

ADR

GHS (CLP)

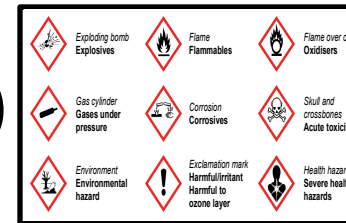
Regulations in Ghana: introduced by colleagues from Ghana



GHS Overview

Globally Harmonized System of classification and labelling of chemicals

- comprehensive tool that harmonises:
 - **Classification**: defining and classifying hazards of chemical substances and mixtures
 - **Hazard communication**:
 - Labelling (hazard pictograms)
 - Safety Data Sheets (SDS)
- target audiences:
 - Consumers
 - Workers, including transport workers
 - Emergency responders



MATERIAL SAFETY DATA SHEET																			
PRODUCT: 2,4-Dichlorophenol Emergency Phone: 800-992-5994 Dow AgroSciences LLC Indianapolis, IN 46268																			
2,4-DICHLOROPHENOL Effective Date: 7-Sep-06 Product Code: 00005 MSDS Number: 000715																			
1. PRODUCT AND COMPANY IDENTIFICATION: PRODUCT: 2,4-Dichlorophenol COMPANY IDENTIFICATION: Dow AgroSciences LLC 9200 Zionsville Road Indianapolis, IN 46268-1189	4. FIRST AID: NOTE: First aid responders should pay attention to suit protection and use the recommended protective clothing (chemical resistant gloves and apron protection). EYES: Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist. SKIN: Immediately wash thoroughly any skin exposure with non-abrasive soap and large quantities of water for 30 minutes while removing contaminated clothing and shoes. It is recommended that further amounts of 2,4-DCP may be removed from the skin by repeatedly spraying/washing the skin with polyethylene or polypropylene glycol mixtures, alternating with rinsing with large quantities of water for 30 minutes. Do not use emulsification mixtures. Do not use petroleum or industrial emulsified agents. 2,4-DCP is available polypropylene glycol mixtures, or polyethylene glycol mixtures. First aid responders should pay attention to suit protection and use the recommended protective clothing (chemical resistant gloves, splash protection). Wash contaminated clothing before reuse. Destroy contaminated leather items such as shoes, belts and watchbands. INGESTION: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately. Do not give anything by mouth.																		
2. HAZARDS IDENTIFICATION: EMERGENCY OVERVIEW Product is a white crystalline solid at room temperature and is corrosive liquid in the molten state. Strong phenol-type odor. MOLTEN OR HOT 2,4-DICHLOROPHENOL (2,4-DCP) IS IMMEDIATELY ABSORBED THROUGH THE SKIN IN AMOUNTS THAT HAVE CAUSED DEATH TO HUMANS. RAPID DEATH IN HUMANS HAS BEEN CAUSED BY SKIN EXPOSURE WITHOUT IMMEDIATE DECONTAMINATION. AMOUNTS OF MOLTEN 2,4-DCP THAT MAY COVER AS LITTLE AS 1% BODY SURFACE AREA (PALM OF HAND-SIZED) MAY CAUSE DEATH. May cause severe eye irritation with normal use, which may cause permanent impairment, even blindness. Short single exposure may cause skin burns. Contact with heated material may cause thermal burns. DOT classification as CORROSIVE, Flammable (L) (D) (C). Flashes point is 100°F (40°C). Toxic to aquatic organisms. EMERGENCY PHONE NUMBERS: 800-992-5994.																			
3. COMPOSITION/INFORMATION ON INGREDIENTS: <table border="1"> <thead> <tr> <th>Component</th> <th>CAS Number</th> <th>Wt. %</th> </tr> </thead> <tbody> <tr> <td>2,4-Dichlorophenol</td> <td>000120-69-2</td> <td>97.5</td> </tr> <tr> <td>2,6-Dichlorophenol</td> <td>000107-65-0</td> <td>1.0</td> </tr> <tr> <td>4-Chlorophenol</td> <td>000106-89-7</td> <td>0.5</td> </tr> <tr> <td>2-Chlorophenol</td> <td>000085-57-8</td> <td>0.5</td> </tr> <tr> <td>2,4,6-Trichlorophenol</td> <td>000088-06-2</td> <td>0.1</td> </tr> </tbody> </table>		Component	CAS Number	Wt. %	2,4-Dichlorophenol	000120-69-2	97.5	2,6-Dichlorophenol	000107-65-0	1.0	4-Chlorophenol	000106-89-7	0.5	2-Chlorophenol	000085-57-8	0.5	2,4,6-Trichlorophenol	000088-06-2	0.1
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GHS – Why it was developed?

- Many different systems existed worldwide, with differing requirements:
 - ✓ Vary in hazards covered and classification criteria used
 - ✓ Information required on labels and Safety Data Sheets varied (SDS)
- **Result: disparity in the information provided**
 - conflicting and inconsistent classifications and safety information (labelling and safety data sheets)



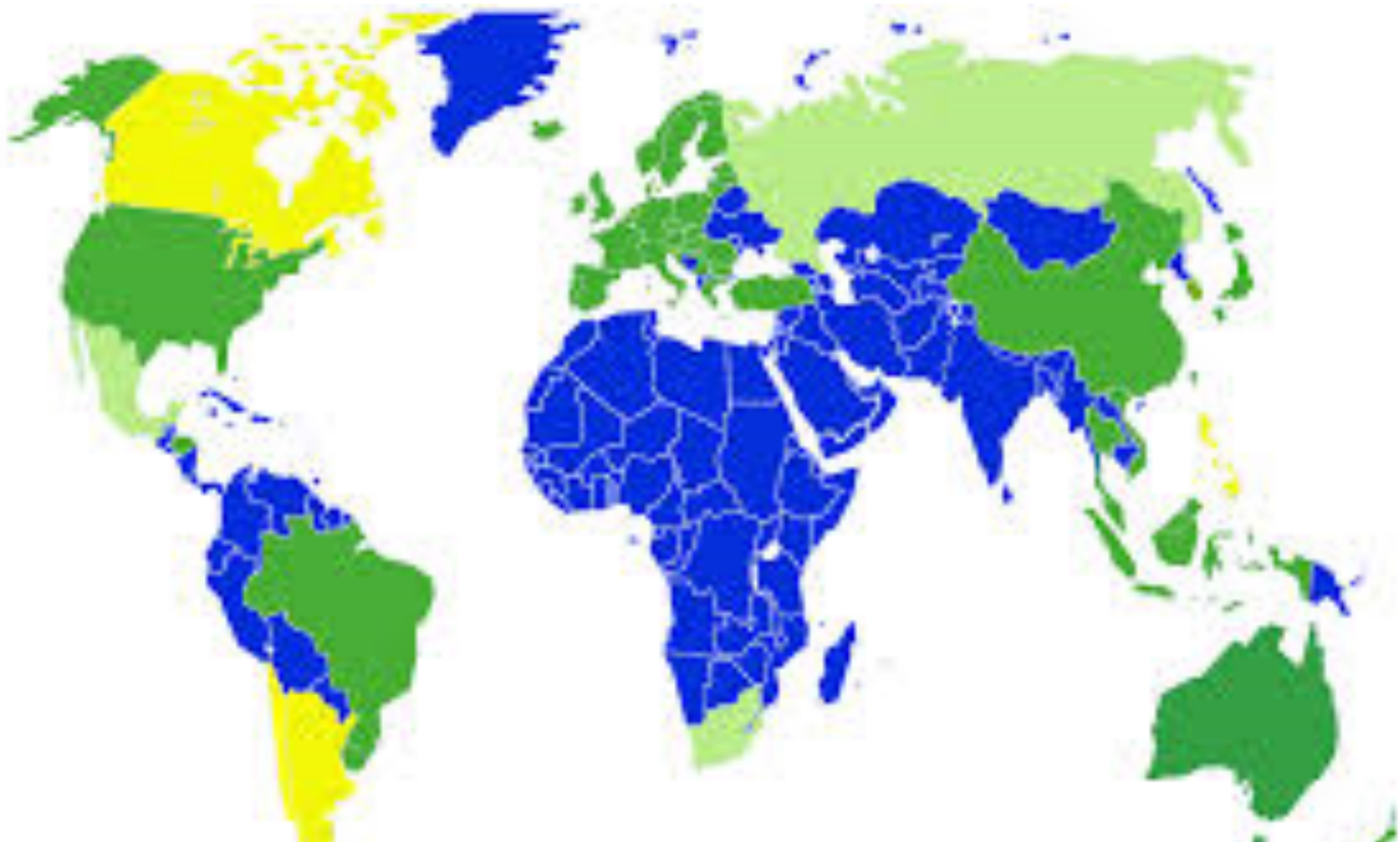
GHS Background

- The GHS has been developed by the United Nations as a non-binding treaty for UN member countries (2003)
 - international mandate: Agenda 21(1992), Chapter 19, Programme Area B, paras. 26 and 27
- Not a formal treaty, but instead **a non-legally binding international agreement**
 - provides the basis for harmonising regulations on chemicals at national, regional and worldwide level
 - the underlying infrastructure for establishment of national, comprehensive chemical safety programmes



GHS Implementation

Source: DHI Denmark



- : Countries/regions that have already implemented GHS. ■ : Countries/regions where GHS is voluntary.
- : Countries/regions that are in the process of implementing GHS. ■ : Countries/regions where GHS is not implemented or not available.

GHS Implementation highlights

Regional:

- UNECE Convention on Transboundary Effects of Industrial Accidents takes further steps towards alignment with the GHS and the improvement of industrial safety in the region

Country:

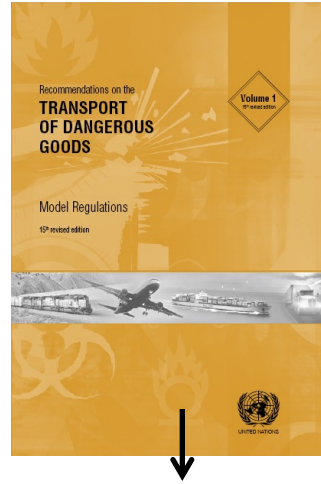
- In USA implemented through a revised Hazard Communication Standard (HCS) (March 2012) and is becoming mandatory from 1 June 2015
- In Europe implemented through CLP Regulation (Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures)
- Canada has started and has set goals for completion in 2015
- Australia, China, Japan and New Zealand have completed the main stages of Implementation



Harmonised hazard communication (labelling) worldwide!



UN Model Regulation



Global application

Regional application

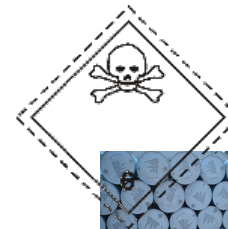


UN Model Regulation

UN Recommendation on the Transport of Dangerous Goods, Model Regulation has 7 parts including

- Scope, application, training, security
- Classification & identification of dangerous goods
- Packing conditions (packaging and tank construction standards)
- Consignment procedures
- Operational provisions (general and mode specific): segregation of goods, loading, stowage, storage, decontamination requirements, reporting of accidents/incidents...

9 classes in total, some of which are:



GHS & ADR

Example of combined GHS & ADR on single packaging

Proper shipping name and UN number

Methanol UN1230



Transport labels



XYZ Chemicals
High Street
New Town
0987 654 321



Danger

Highly inflammable liquid and vapour. Toxic if swallowed. Toxic in contact with skin. Toxic if inhaled. Causes damage to organs. Keep away from heat/sparks/open flames/hot surfaces – No smoking. Do not breathe mist/vapours/spray. Wear protective gloves/protective clothing/eye protection. IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician. IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Store in a well-ventilated place. Keep container tightly closed.

Methanol
603-001-00-X

Chemical name and product identifier

Pictograms and signal word

Hazard and precautionary statements



International Standards and Voluntary Initiatives

- International Cyanide Management Code (ICMI)
- SAICM
- Responsible Care
- Safer Production
- Emergency Response Initiatives:
 - Emergency Response Intervention Cards (cefic)
 - CHEMTREC
 - 2012 ERG



Guidance/ Programs: Strategic Approach to International Chemicals Management (SAICM)

SAICM is a global policy framework to support efforts to achieve:

“By 2020, chemicals are produced and used in ways that lead to the minimization of significant adverse effects on human health and the environment”



Guidance/ Programs: Strategic Approach to International Chemicals Management (SAICM)

- ⇒ SAICM aims to coordinate, catalyse and facilitate.
- very broad scope (entire life cycle of product);
 - emphasis on the sound management of chemicals as a sustainable development issue;
 - multi-stakeholder and multi-sectoral character;
 - Integrated approach: Quick Start Programme, Economic instruments, industry participation, technical expertise...



UNEP: Safer Production

**FLEXIBLE FRAMEWORK
→ POLICY**

Guidance for national policy development for chemical accident prevention and preparedness

**APELL
→ LOCAL LEVEL**

Local level and preparedness for environmental emergencies

**RESPONSIBLE PRODUCTION
→ COMPANY LEVEL**

Prevention of chemical accidents promoting risk communication along the value chain - aimed primarily at SMEs - sectoral approach

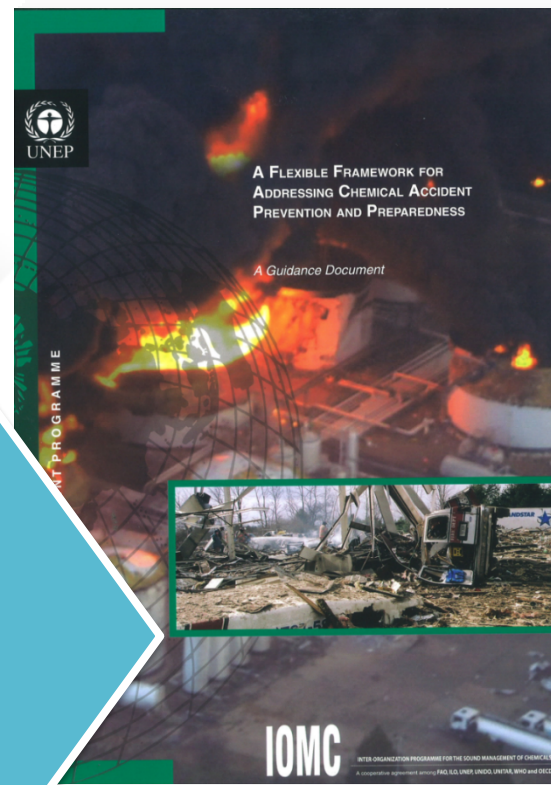


Flexible Framework Initiative in the Global Context

Builds on 30 years of international experience

- International Conventions (e.g., ILO 174, UNECE TEIA)
- International programmes (e.g. OECD's chemical accidents programme)
- Legal instruments (US RMP, European Seveso directive)
- International guidance (e.g. OECD Guiding principles)

- ▶ Prevention of accidents
- ▶ Preparedness for accidents
- ▶ Elements of CAPP programmes



STRATEGIC APPROACH TO INTERNATIONAL CHEMICALS MANAGEMENT

SAICM texts and resolutions of the International Conference on Chemicals Management



Responsible Care (ICCA)

Responsible care is a Global Chemical Management system with accountability from “cradle-to-grave”:

- Emergency Response & Preparedness
- Pollution Prevention/Environmental Protection
- Process Safety
- Employee Safety
- Security (facility, value chain, cyber)
- Product Stewardship
- Community/Stakeholder Dialogue


⇒ Access to best-practice examples and guidance



Response: Emergency Response Intervention Cards

Provide guidance on initial actions for emergency responders at the scene of a chemical transport accident

- Characteristics
- Hazards
- Personal protection
- Intervention actions
 - General
 - Spillage
 - (involving the substance)
- First aid
- Essential precautions for product recovery
- Precautions after intervention
 - Undressing
 - Equipment clean-up



ERIC
2 - 09 Flammable liquefied gas

1 CHARACTERISTICS

- Hazardous to skin, eyes and air passages.
- Forms explosive mixture with air.
- Asphyxiant: the gas will suffocate without warning.
- The gas is absorbed or readily dispersed by water fog/spray.

2 HAZARDS

- Heating of container(s) will cause pressure rise with risk of bursting and immediate release of expanding vapour cloud which may ignite, leading to explosion (VCE) and creation of a pressure wave.
- Contact with liquid will cause frostbite and severe damage to eyes.
- Gives off toxic and irritant fumes when heated or burning.
- The gas may be invisible and may enter sewers, basements or confined spaces.
- May be narcotic and cause unconsciousness.

3 PERSONAL PROTECTION

- Chemical protection suit.
- Self contained breathing apparatus.
- Protect personnel from radiated heat with water fog curtain or other heat protective measures.
- Insulating undergarments and thick textile or leather gloves.
- Consider wearing standard fire fighting clothing underneath the suit.

4 INTERVENTION ACTIONS

4.1 GENERAL

- Keep upwind.
- No smoking, eliminate ignition sources.
- PUBLIC SAFETY HAZARD - Warn people nearby to stay indoors with doors and windows closed. Stop any ventilation. Consider evacuation of people in immediate danger.
- Minimise number of personnel in risk area.
- Warn people to leave and not to re-enter basements, sewers or other confined spaces.

4.2 SPILLAGE

- Stop leaks if possible.
- Check explosive limits.
- Use low sparking hand tools and intrinsically safe equipment.
- Knock down or disperse gas cloud with water spray.
- If substance has entered a water course or sewer, inform the responsible authority.

4.3 FIRE (INVOLVING THE SUBSTANCE)

- Keep container(s) cool with water.
- Cut off gas supply if safe to do so.
- Do NOT extinguish leaking gas flame unless ABSOLUTELY necessary.
- Work from protected position to reduce risk to personnel. Use unmanned monitors or lances.
- Extinguish with water fog (spray) or dry powder.
- Do not use water jet to extinguish.
- Use water spray to knock down fire fumes if possible.
- Avoid unnecessary run-off of extinguishing media which may cause pollution.

5 FIRST AID

- If substance has got into eyes, wash out with water for at least 15 minutes and seek immediate medical attention.
- Remove contaminated clothing immediately and drench affected skin with plenty of water.
- Persons who have been in contact with the substance or have inhaled fumes should get immediate medical attention. Pass on all available product information.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing adhering to skin.
- Thaw frosted parts carefully with cold water.

6 ESSENTIAL PRECAUTIONS FOR PRODUCT RECOVERY

- Do not use standard recovery equipment. Seek specialist advice immediately.

7 PRECAUTIONS AFTER INTERVENTION

7.1 UNDRESSING

- Drench contaminated suit and breathing apparatus with water before removing facemask and suit.

7.2 EQUIPMENT CLEAN UP

- Drench with water before transporting from incident.

Response: Emergency Response Guidebook

2012
**EMERGENCY
RESPONSE
GUIDEBOOK**

A Guidebook for First Responders During the Initial Phase of a Dangerous Goods/Hazardous Materials Transportation Incident

U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration

Transport Canada
Transports Canada

Secretariat of Transport and Communications

GUIDE 153	SUBSTANCES - TOXIC AND/OR CORROSIVE (COMBUSTIBLE)	ERG2012
POTENTIAL HAZARDS		
HEALTH <ul style="list-style-type: none"> TOXIC; inhalation, ingestion or skin contact with material may cause severe injury or death. Contact with molten substance may cause severe burns to skin and eyes. Avoid any skin contact. Effects of contact or inhalation may be delayed. Fire may produce irritating, corrosive and/or poisonous gases. Runoff from fire control or dilution may be corrosive and/or irritating. 		
ERG2012 SUBSTANCES - TOXIC AND/OR CORROSIVE (COMBUSTIBLE) GUIDE 153		
EMERGENCY RESPONSE		
FIRE OR EXPLOSION <ul style="list-style-type: none"> Combustible material; may burn. When heated, vapors may form explosive mixtures. Those substances designated with a health hazard may be fatal. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. Runoff may pollute waterway. Substance may be transported by air. 		
CALL EMERGENCY RESP. <ul style="list-style-type: none"> available or no answer, refer to Table 1.2. As an immediate precautionary measure, isolate spill or leak area in all directions for liquids and at least 100 feet for solids. Keep unauthorized personnel out. Stay upwind. Keep out of low areas. Ventilate enclosed areas. 		
PROTECTIVE CLOTHING <ul style="list-style-type: none"> Wear positive pressure self-contained breathing apparatus. Wear chemical protective clothing that is specifically designed for the type of material involved. Structural firefighters' protective clothing is only for structural fires. Structural firefighters' protective clothing is only for structural fires. 		
EVACUATION <ul style="list-style-type: none"> Spill <ul style="list-style-type: none"> See Table 1 - Initial Isolation and Protective Action Distances. Fire <ul style="list-style-type: none"> If tank, rail car or tank truck is involved, do not move it if it is leaking or involved in a fire. 		
FIRE <ul style="list-style-type: none"> Dry chemical, CO₂ or water spray. Move containers from fire area if you can do it without risk. Dike fire-control water for later disposal; do not scatter the material. 		
SPILL OR LEAK <ul style="list-style-type: none"> ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. DO NOT GET WATER INSIDE CONTAINERS. 		
FIRST AID <ul style="list-style-type: none"> Move victim to fresh air. Call 911 or emergency medical service. Give artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer oxygen if breathing is difficult. Remove and isolate contaminated clothing and shoes. In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes. For minor skin contact, avoid spreading material on unaffected skin. Keep victim warm and quiet. Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. 		

Thank You

