MANAGING CHEMICAL WASTE

November 2017

Version 1.4

LEARNING OUTCOMES & RESOURCES

Learning Outcomes

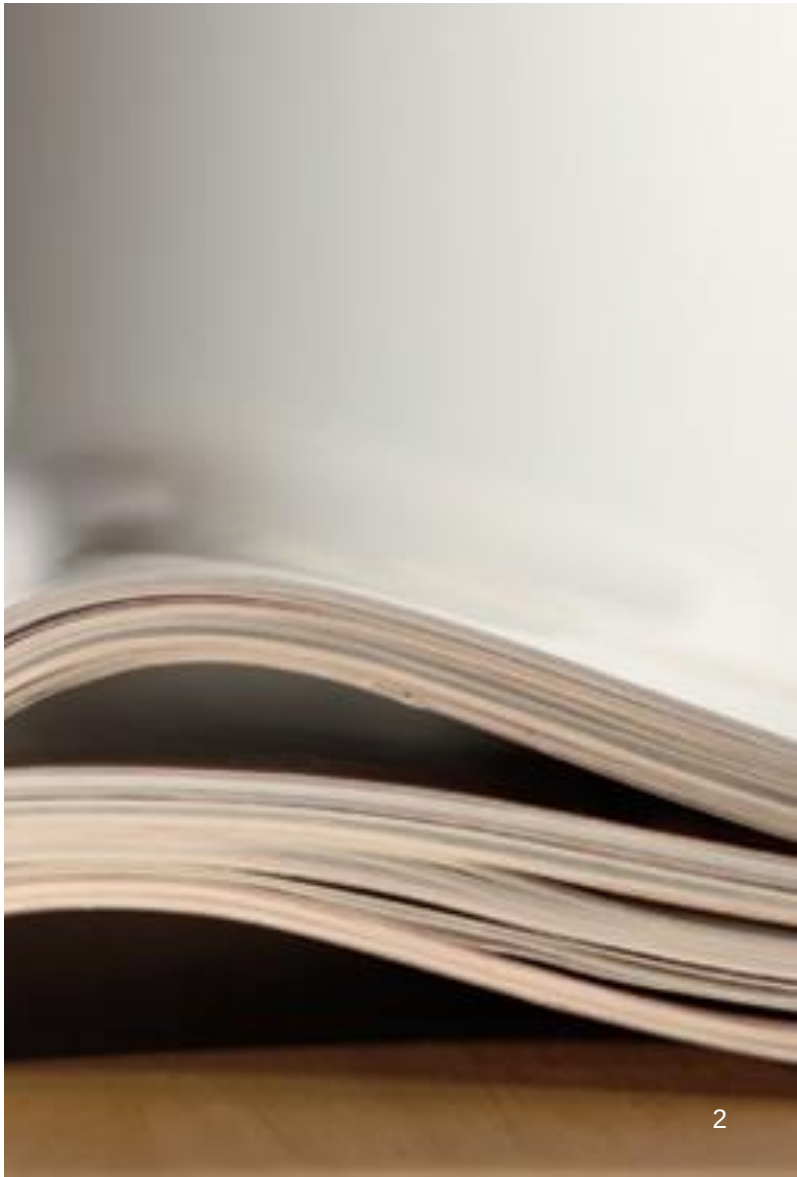
- Gaining knowledge on identifying different types of chemical waste.
- Understanding of good waste management practices.

Resources

- REMC Company Handbook.
- ZDHC Chemical Management Systems Guidance.

Workbook

Refer to complimentary excercises in your workbook.



ZDHC REQUIREMENTS

ZDHC CMS 3.5.11 - Waste and Disposal

- Procedure for Proper Waste Collection, Handling, Storing and Disposal

References: ZDHC Chemical Management Systems Guidance Manual
ZDHC Wastewater Guidelines

THE PROBLEM

What problems can occur if you do not know how to handle the chemical waste in your company?

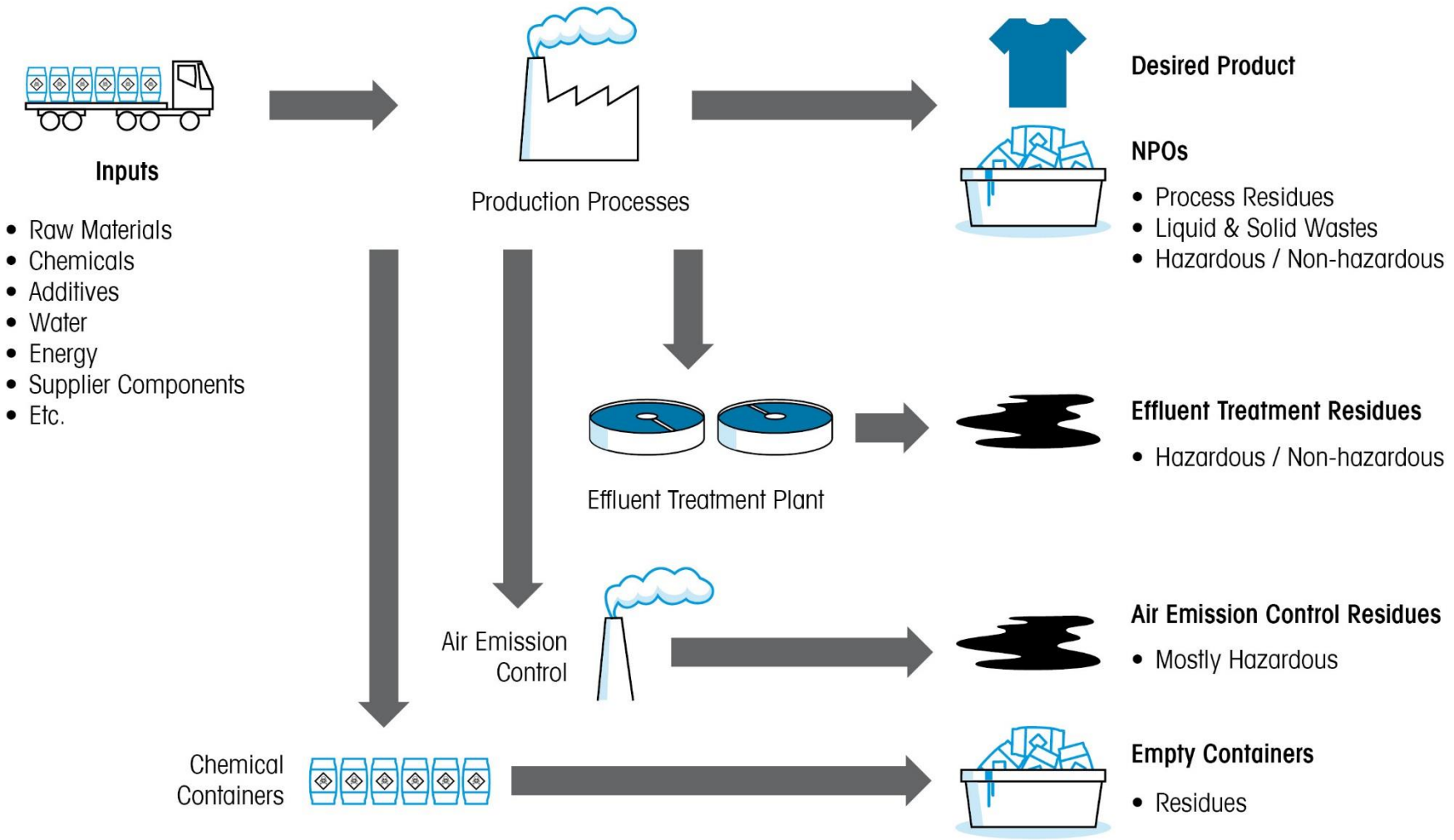
Brainstorm as a group and make notes in your workbook, exercise (13-1).

Identifying Types Of Waste

QUIZ

Which sources of Chemical Waste do you know?

SOURCES AND TYPES OF CHEMICAL WASTE

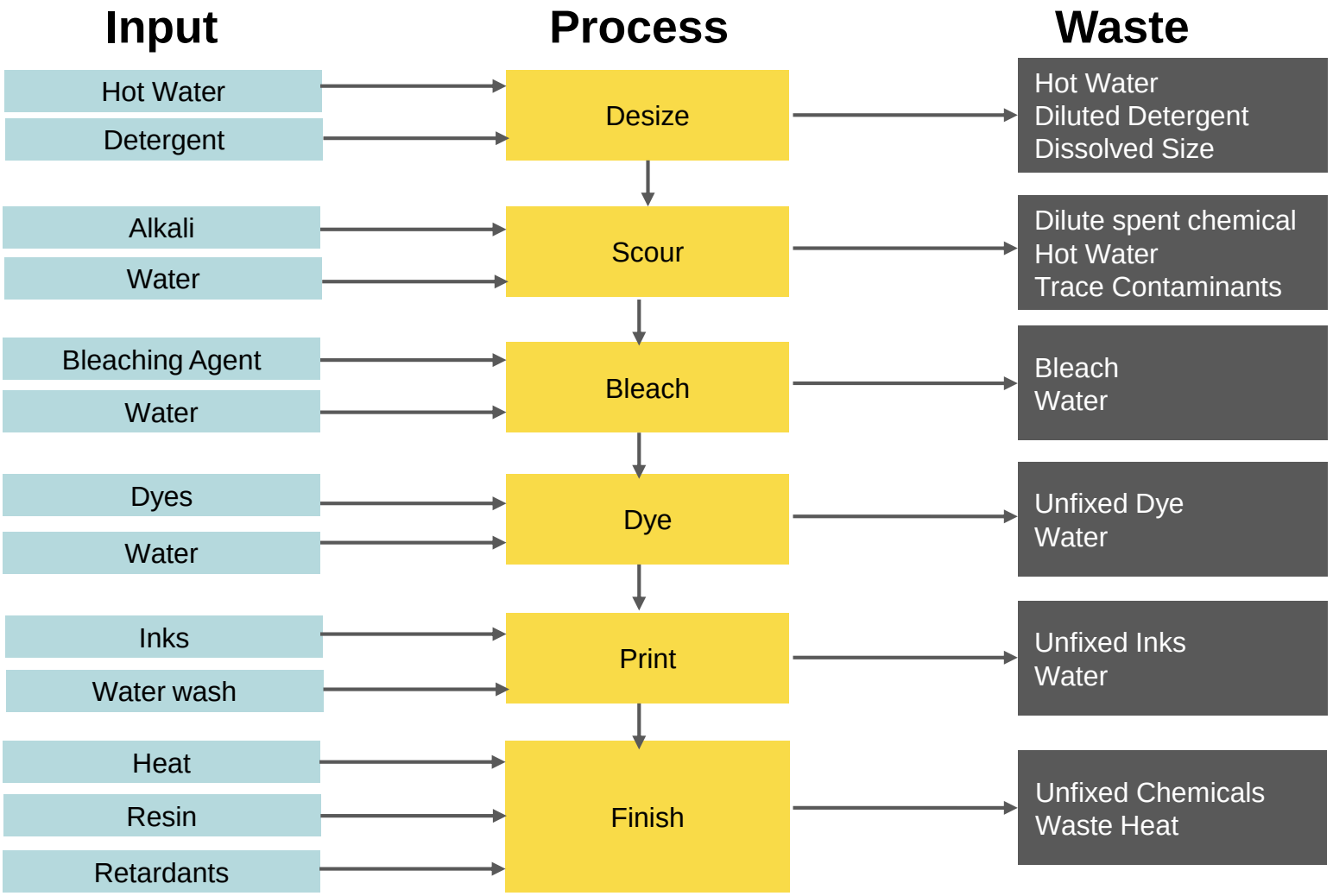


SOURCES AND TYPES OF CHEMICAL WASTE (TEXTILE)

Waste in need of:	General waste	Textile industry specific waste
No control	Waste glass, paper, paper board, wood, iron scrap (pipes, old machines), electric cables, plastic drums (clean), metal drums (clean), non-contaminated plastic wrap.	Waste yarn, waste fabric (spoilt works, trials, selvedge cuttings), wastes from shearing and raising, textile dust.
General control	Waste oil, oil-contaminated cloths, non-halogenated organic solvents, soot from oil incinerators, glue and adhesive agents, contaminated packages.	Dyes and pigments, residual padding dyeing liquors, residual printing pastes, residual padding finishing liquors, oil-containing condensates from off-gas Treatment, sludge from process waste water treatment.
High control	Waste from oil/water separators, halogenated organic solvents, PCB-containing condensers.	

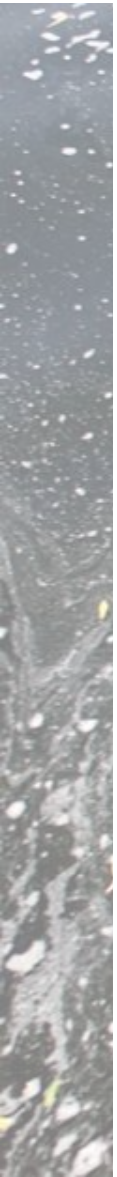
Source: BREF/BAT Textile 2003

EXAMPLE – WASTE FROM WOVENS



Good Practices In Waste Management

CONSIDERATIONS WASTE MANAGEMENT



- Systematically identify and quantify all chemical wastes (NPOs) in your company and make their costs visible.
- Identify, separate and classify hazardous wastes.
- Create a waste inventory table further off-site treatment and disposal.
- Correctly separate waste at generation point.
- Have an internal report on all waste.
- Arrange for safe on-site collection, labelling and storage of all waste.
- Carry out preliminary treatment on-site.
- Arrange for off-site treatment and disposal.
- Set-up a waste action plan.

WASTE CLASSIFICATION

Use of official waste classification:

- Classifying wastes using the ‘Y’ codes list of the Basel Convention (BC).
- European Waste List and its equivalences with ‘Y’ code lists and ‘H’ characteristics.
- US lists (F, K, P, U).

Concept:

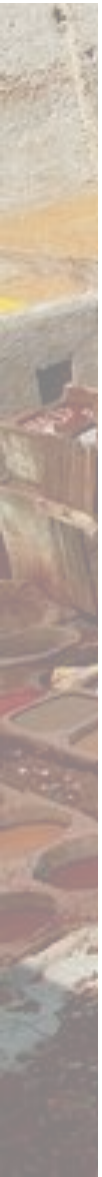
- Use of specific identification code for type of waste (e.g. EWL code).
- Refer to standardized hazard codes.

EXAMPLE: EUROPEAN WASTE LIST (EWL)

Criteria that renders waste hazardous according to **European Waste Regulation**:

Code	Designation	Note
H 1	**Explosive**	Substances and preparations which may explode under the effect of flame or which are more sensitive to shocks or friction than dinitrobenzene.
H 2	**Oxidizing**	Substances and preparations which exhibit highly exothermic reactions when in contact with other substances, particularly flammable substances.
H 3A	**Highly Flammable**	• Liquid substances (including extremely flammable liquids) and preparations having a flashpoint of below 21°C, or • Substances and preparations which may become hot and finally catch fire in contact with air at ambient temperature without any application of energy, or • Solid substances and preparations which may readily catch fire after brief contact with a source of ignition and which continue to burn or to be consumed after removal of the source of ignition, or • Gaseous substances and preparations which are flammable in air at normal pressure, or • Substances and preparations which, in contact with water or damp air, evolve highly flammable gases in dangerous quantities.
H 3B	**Flammable**	Liquid substances and preparations having a flashpoint equal to or greater than 21°C and less than or equal to 55°C.
H 4	**Irritant**	Non-corrosive substances and preparations which, through immediate, prolonged or repeated contact with the skin or mucous membrane, can cause inflammation.
H 5	**Harmful**	Substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may involve limited health risks.
H 6	**Toxic**	Substances and preparations (including very toxic substances and preparations) which, if they are inhaled or ingested or if they penetrate the skin, may involve serious, acute or chronic health risks and even death.
H 7	**Carcinogenic**	Substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence.
H 8	**Corrosive**	Substances and preparations which may destroy living tissue on contact.
H 9	**Infectious**	Substances containing viable micro-organisms or their toxins which are known or reliably believed to cause disease in man or other living organisms.
H 10	**Toxic for reproduction**	Substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may produce or increase the incidence of non-heritable adverse effects in the progeny and/or of male or female reproductive functions or capacity.
H 11	**Mutagenic**	Substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce hereditary genetic defects or increase their incidence.
H 12	-	Substances and preparations which release toxic or very toxic gases in contact with water, air or an acid.
H 13	**Sensitizing**	Substances and preparations which, if they are inhaled or if they penetrate the skin, are capable of eliciting a reaction of hyper-sensitization such that on further exposure to the substance or preparation, characteristic adverse effects are produced.
H 14	**Ecotoxic**	Substances and preparations which present or may present immediate or delayed risks for one or more sectors of the environment.
H 15	-	Substances and preparations capable by any means, after disposal, of yielding another substance, e.g. a leachate, which possesses any of the characteristics listed above.

EXAMPLE: CLASSIFICATION OF WASTE FROM LEATHER INDUSTRY



EWL Code	European waste list (EWL) Classification	H (EU)	H (Basel)	Y (Basel)
04 01	**Wastes from the leather and fur industry**			
04 01 01	Fleshings and lime split wastes			
04 01 02	Liming Waste			
04 01 03*	**Degreasing wastes containing solvents without a liquid phase**	**H3, H6, H7**	**H4.1, H6.1, H11**	**Y6, Y9, Y42**
04 01 04	Tanning liquor containing chromium			
04 01 05	Tanning liquor free of chromium			
04 01 06	Sludges, in particular from on-site effluent treatment containing chromium			
04 01 07	Sludges, in particular from on-site treatment free of chromium			
04 01 08	Waste tanned leather (blue sheetings, shavings, cuttings, buffing dust) containing chromium			
04 01 09	Wastes from dressing and finishing			
04 01 99	Wastes not otherwise specified			

EXAMPLE: CLASSIFICATION OF WASTE FROM TEXTILE INDUSTRY

EWL Code	European waste list (EWL) Classification	H (EU)	H (Basel)	Y (Basel)
04 02	**Wastes from the textile industry**			
04 02 09	Wastes from composite Mats (impregnated textile, elastomer, plastomer)			
04 02 10	Organic matter from natural products (for example grease, wax)			
04 02 14*	**Wastes from finishing containing organic solvents**	**H3, H5**	**H3, H4.1**	**Y42**
04 02 15	Wastes from finishing other than those mentioned in 04 02 14			
04 02 16*	**Dyestuffs and pigments containing dangerous substances**	**H7, H3, H5, H8**	**H3, H11, H4.1**	**Y12**
04 02 17	Dyestuffs and pigments other than those mentioned in 04 02 16			
04 02 19	**Sludges from on-site effluent treatment containing dangerous substances**	**H4, H7, H10, H6**	**(H11, H6.1)**	**Art. 1 (1) b**
04 02 20	Sludges from on-site effluent treatment other than those mentioned in 04 02 19			
04 02 21	Wastes from unprocessed textile fibres			
04 02 22	Wastes from processed textile fibres			
04 02 99	Wastes not otherwise mentioned			

WASTE INVENTORY TABLE

Company/Section		Prepared/revised on	
		Prepared/revised by	
		Next revision on	

Waste Name	Category / Type	Source Process	Storage Area	Yearly Quantity	Associated Hazards	Disposal Method (actual/recommended	Waste Disposal Vendor Address	License Number	License Validity Time

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Refer to waste classification system in REMC company manual

In most cases same or similar to corresponding chemical

SET UP A WASTE ACTION PLAN

Step1 - Establish waste inventories to classify hazardous and normal wastes as required by legislation.

Step 2 - Evaluate the possibility of upcycling and recycling the waste. *(Depending on the category of the sludge, specific sludge management options in compliance with the requirements given in this document may be chosen. These include anaerobic digestion, land application, thermal incineration, controlled landfill and recycling in making construction materials).*

Step 3 - **Establishment of hazardous waste warehouses** for the **storage of hazardous waste**, which do not pollute the environment.

Step 4 - Dispose of hazardous waste to contractors with relevant qualifications and retain all transfer records.

CONSIDERATIONS WASTE ACTION PLAN

- Persons in charge.
- Waste generation data to be collected.
- Investment (capital) and running cost associated with waste.
- Measures for reducing waste.
- Timeframe to reduce waste.
- Expected environmental benefits from monitoring/evaluating.
- Qualification of personnel involved in handling hazardous waste:
  - Presence of specific materials.
  - Potential physical and health hazards associated with these materials.
  - Proper procedures for handling and use of these materials, including the use of PPE (e.g., gloves and protective goggles).
  - Location and appropriate use of the chemical SDSs.
- Procedures to be followed in the event of an emergency.

THE 3 Rs IN THE CIRCULAR ECONOMY CONCEPT (REDUCE, REUSE, RECYCLE)

REDUCE

Example

A proper waste management plan should be implemented to promote waste minimization at source. If waste generation is unavoidable then the potential for recycling or reuse should be explored and opportunities taken.

REMANUFACTURE / REUSE

Example

Substitution of textile ETP sludge for cement. Up to a maximum of 30%, may be possible in the manufacture of non-structural building materials.

RECYCLE

Example

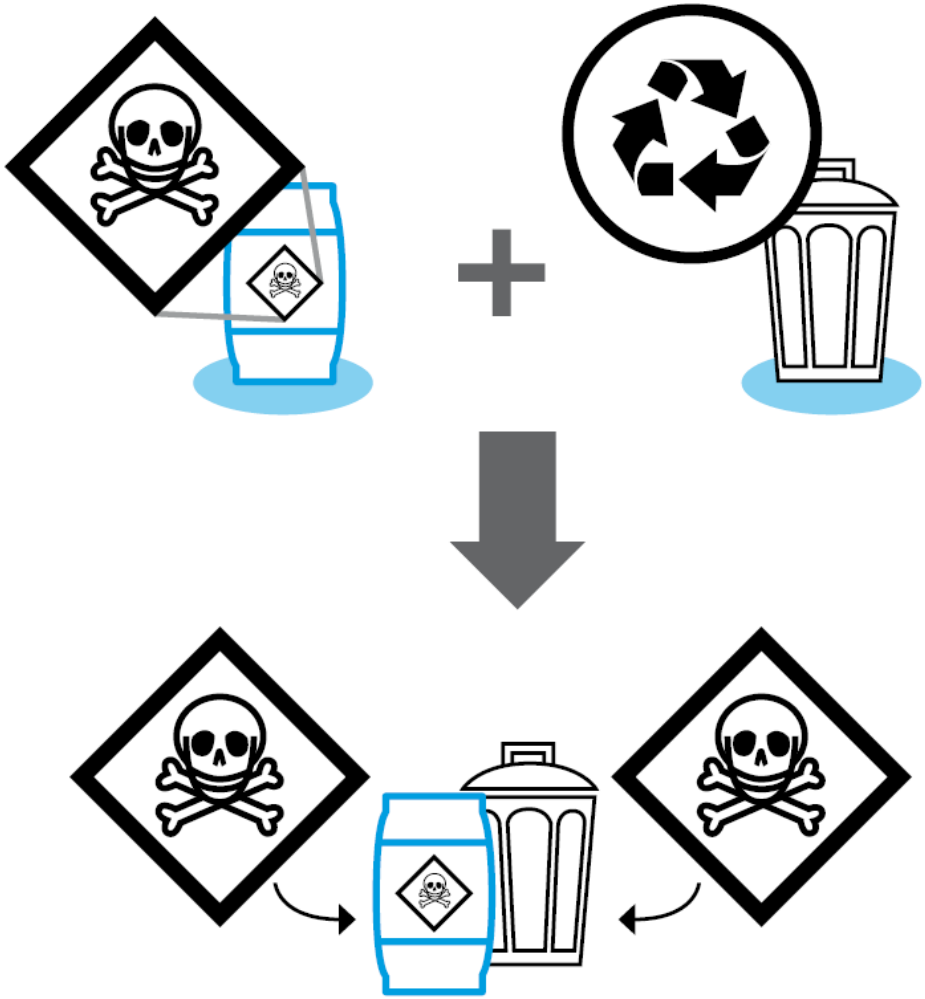
Recycled as much of your waste as possible.

QUIZ

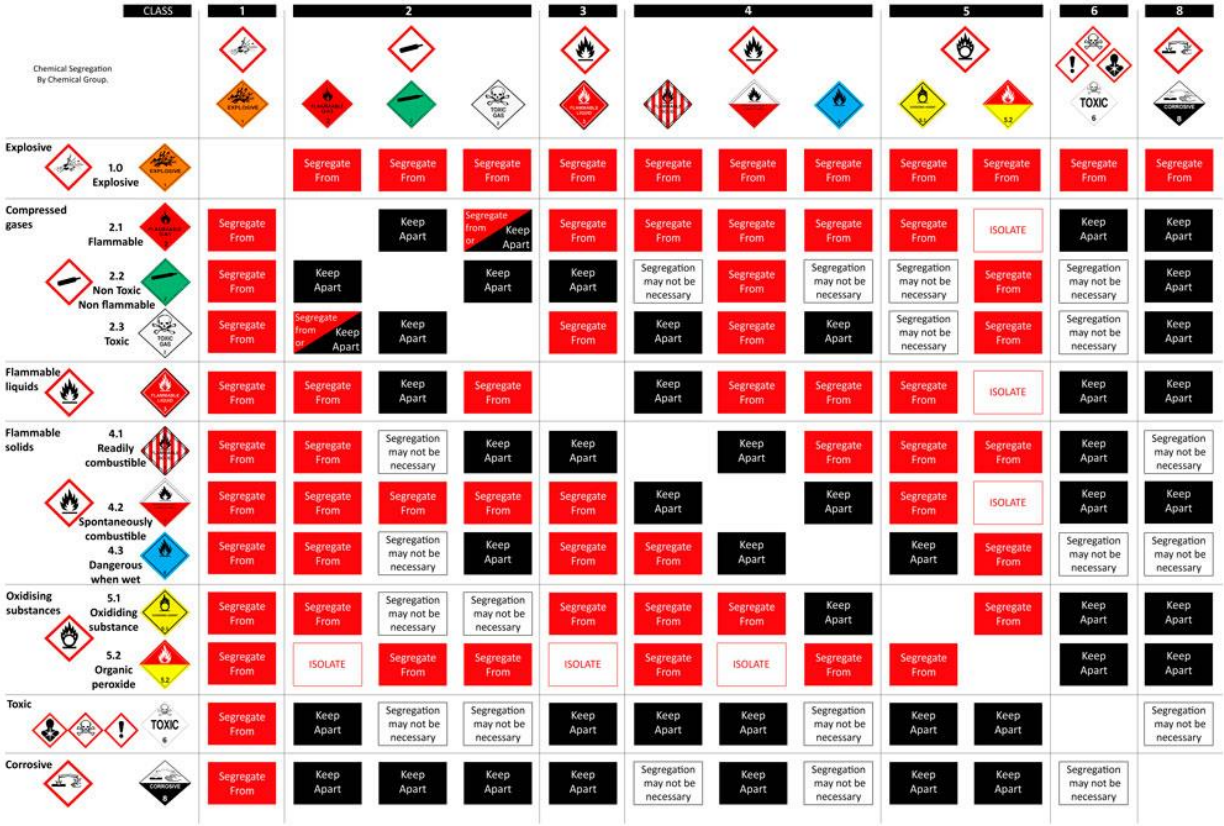
Is combined waste considered hazardous?

SEPARATE HAZARDOUS AND NON-HAZARDOUS WASTE

- Combined waste is considered hazardous.
- Ensure separation during collection, storage and disposal routes.



SEGREGATE INCOMPATIBLE HAZARDOUS WASTE



Segregate incompatible hazardous waste to prevent possible disasters (e.g. chemical reactions leading to explosions):

- Use different waste containers.
- Separation of waste containers.

LABELLING OF WASTE CONTAINERS

Correct labelling:

- Warning “hazardous waste”.
- Description of contents, in layman’s terms.
- Indication of hazard properties - e.g. “flammable”, “corrosive”, “toxic”, “explosive”. Similar to labels and pictograms used for hazardous chemicals.
- Department/section where the waste was generated.
- Name and telephone number of the employee responsible for internal hazardous waste management.
- Date container was filled.

PROVIDE ON-SITE HAZARDOUS WASTE STORAGE AREA

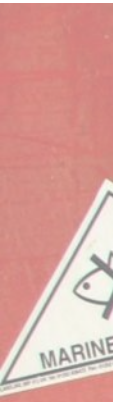
Considerations:

- Size of the storage area.
- Sufficient ventilation.
- Entry should be restricted to authorized personnel.
- Area should be protected from sun and rain.
- Take measures to contain leakage or spillage.
- Leave enough air space in containers for liquid waste (minimum 5 cm).
- Take protective measures to protect the environment in case of accidents.

BEST PRACTICES FOR ON-SITE HANDLING AND STORAGE OF CHEMICAL WASTE

- Good housekeeping practices.
- Waste storage area kept clean.
- Hazardous waste containers kept closed at all times except when discarding waste.
- Working procedures and instructions on the safe handling and emergency response readily accessible.
- Appropriate personal protective equipment provided and used in line with MSDS requirements.

ENGAGING EXTERNAL WASTE SERVICE PROVIDERS



Establish procedure and criteria for selection of waste service providers:

- Licensing/permit requirements in your country for collection.
- Transport.
- Treatment and disposal of waste.

Consider extended responsibility for managing and disposal of chemical waste:

- Ensure safe packaging and transport, e.g.:
  - Condition of vehicle.
  - Qualification of driver.
- Avoid environmental impacts, e.g.:
  - Safe storage facilities.
  - Control and treatment of leachate.
  - Air emissions.

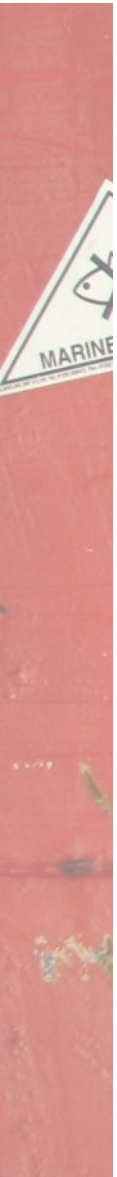
QUIZ

How should you handle empty chemical waste containers?

HANDLING OF EMPTY CHEMICAL CONTAINERS

- Clean chemical containers before storage and disposal.
- Work with a registered waste service provider for final disposal.
- Verify that the hazardous chemical containers are not reused for storage of food items.
- Explore with your chemical supplier, the possibility of a take back system of the chemical containers.

TRANSPORT OF WASTE



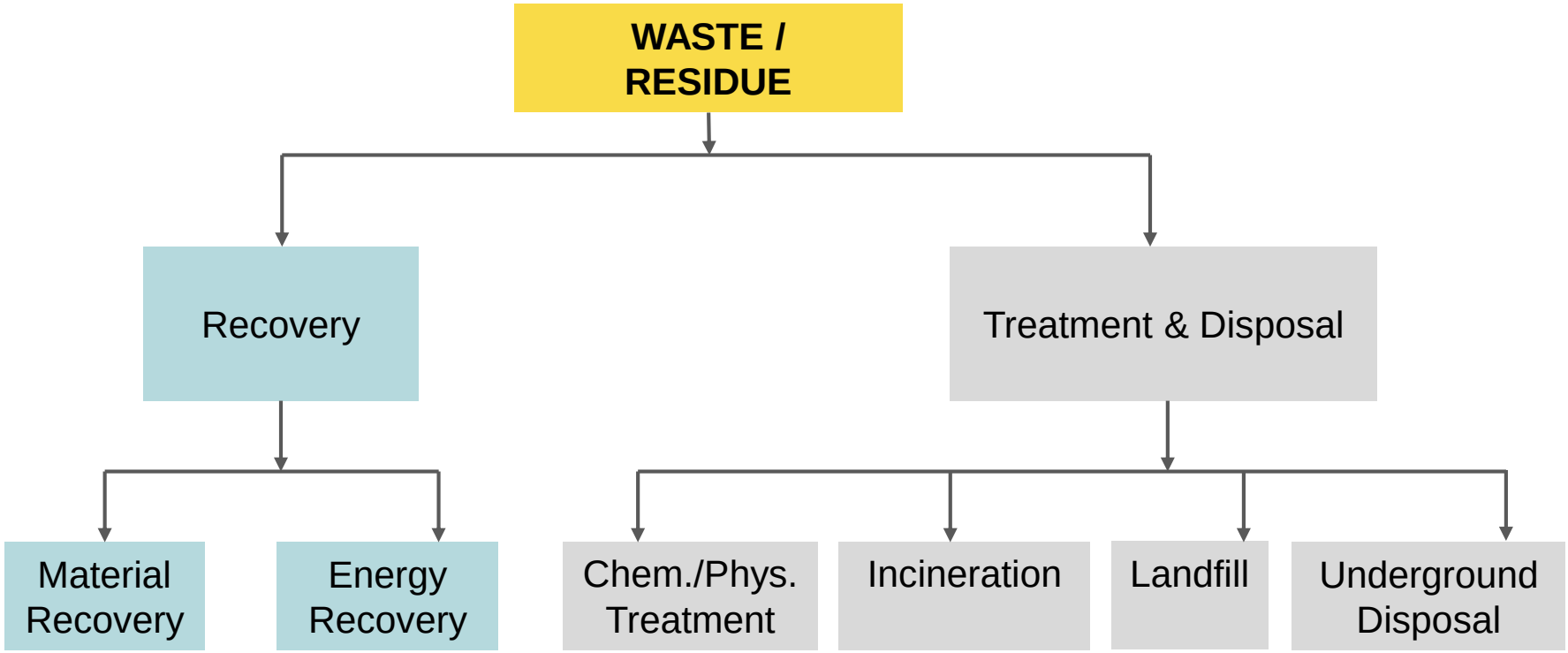
- Classify hazardous waste according to regulations for transport of dangerous goods (TDG).
- Use packages/containers in compliance with package specifications, in accordance with dangerous goods class and quantity.
- Place appropriate danger labels on waste packages.
- Ensure the carrier has a license for the TDG.
- Check equipment and the suitability of truck sent by carrier.
- Ensure proper tie-down of cargo load.
- Supply driver with the necessary documentation. In EU this would include: consignment notes, copies of the “Records of Proper Waste Management” and “Transport Emergency Cards”, relating to the waste and their dangerous goods class.

AVOID BURNING CHEMICAL WASTE IN YOUR FACTORY

- Inadvertent and long term source of persistent organic pollutants, (refer to Stockholm Convention on Persistent Organic Pollutants).
- Release of toxic by-products from the burning process.
- Harmful on surrounding environment and human health, including smoke and unpleasant odours.

SOLID WASTE TREATMENT AND DISPOSAL OPTIONS

Substitution of hazardous chemicals and application of BATs will help you to reduce the hazard levels of your sludge and waste, reducing the cost for their treatment and disposal.



Source: UNIDO

Open To Questions

SUMMARY

Every participant to feedback with one key learning from this session.

Take notes in your workbook, exercise (13-2).